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THE PREVALENCE OF HOUSEHOLD RISK FACTORS FOR CHILDREN AGE 0-17, ESTIMATED FOR 2000-2015 USING DHS AND MICS SURVEYS

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The Prevalence of Household Risk Factors for Children Age 0-17, Estimated for 2000-2015 Using DHS and MICS Surveys

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Preface

The Demographic and Health Surveys (DHS) Program is one of the principal sources of international data on fertility, family planning, maternal and child health, nutrition, mortality, environmental health, HIV/AIDS, malaria, and provision of health services.

One of the objectives of The DHS Program is to provide policymakers and program managers in low- and middle-income countries with easily accessible data on levels and trends for a wide range of health and demographic indicators. DHS Comparative Reports provide such information, usually for a large number of countries in each report. These reports are largely descriptive, without multivariate methods, but when possible they include confidence intervals and/or statistical tests.

The topics in the DHS Comparative Reports series are selected by The DHS Program in consultation with the U.S. Agency for International Development.

It is hoped that the DHS Comparative Reports will be useful to researchers, policymakers, and survey specialists, particularly those engaged in work in low- and middle-income countries.

Sunita Kishor
Director, The DHS Program

Abstract

Children whose parents and households have certain characteristics are known to be more vulnerable to negative child outcomes. Four components of vulnerability have been identified by UNICEF: (1) the child has lost one or both parents; (2) the child is not living with either parent; (3) the child lives in a household in which no adult has any formal education; and (4) the child's household is in the bottom two wealth quintiles. Children with the greatest vulnerability have components (1) and/or (2) and/or (3), and component (4). This report uses 80 surveys conducted by The Demographic and Health Surveys Program (DHS) and 55 Multiple Indicator Cluster Surveys (MICS), between 2000 and 2014 in 70 different countries, to estimate the prevalence of the components and combinations of vulnerability. These prevalences are combined with estimated numbers of children age 0-17, from the U.N. Population Division, to estimate the numbers of vulnerable children in the years of the surveys and in 2000, 2005, 2010, and 2015, except when those years are more than five years away from the survey dates. The countries with the highest combined prevalence are South Sudan, Burkina Faso, Niger, Mali, Guinea, Benin, Sierra Leone, Chad, Afghanistan, and Senegal. In these countries, 27% to 36% of children age 0-17 are in the combination of greatest vulnerability. Afghanistan has the highest combined prevalence outside of sub-Saharan Africa. These prevalences and population estimates may be used to assess the need for assistance and the coverage of programs.

Executive Summary

The planning and evaluation of programs to alleviate child deprivation in low- and middle-income countries require estimates of the level of need for assistance. Such estimates can focus on either the levels of deprivation—that is, the prevalence of negative child outcomes—or the levels of risk—the prevalence of types of disadvantages that often lead to negative child outcomes. A previous DHS comparative report (#32) examined several dimensions of deprivation for children age 0-17 in sub- Saharan Africa. The present comparative report describes the vulnerabilities or risk factors of children age 0-17 in a broader set of 70 countries.

Recent studies by UNICEF have provided firm evidence that child deprivations are disproportionately concentrated among children in four categories of risk that can be described with both DHS and MICS surveys. For example, children who have lost a parent or are not living with a parent tend to have worse outcomes than children whose parents are alive and living with the child. Thus, the first component of risk or vulnerability is present if a child has lost one or both parents. The second component is present if the child is not living with a parent. These two components are related because a child who has lost both parents cannot be living with a parent, and a child who has lost one parent is less likely to be living with a parent.

The third component of risk is related to the educational level of adults in the household. If no adult in the household has any formal schooling, the children in that household tend to have worse outcomes. This source of vulnerability is not restricted to the parents of the child, because if it were, it would not be defined for children not living with a parent.

The fourth component of risk is present if the child's household is in the bottom two wealth quintiles. The DHS and MICS calculation of a continuous score for household wealth is based on many components. The list differs from one country to another, but includes such indicators as source of water, type of sanitation, having electricity, type of construction materials, and possession of vehicles, household articles, and livestock. It is well established that children in the poorer quintiles are more likely to have worse outcomes than children in the higher quintiles. Since about 40% of children in every country will be in the bottom two wealth quintiles, this component of risk is inherently relative rather than absolute.

This report provides estimates of the percentage of children 0-17 who have each of the four components as well as four combinations of risk, and estimates of the actual numbers of children in as many countries and time points as possible with DHS and MICS surveys conducted between 2000 and 2014. For that purpose, we combine 80 DHS surveys and 55 MICS surveys from 70 countries. The estimates are provided for the year of each survey. By using a process of smoothing and extrapolation, estimates are also provided for the years 2000, 2005, 2010, and 2015, except when more than five years of extrapolation would be required. The population numbers are based on the U.N. Population Division's annual estimates of the number of children age 0-17 in each country. For reference purposes, the report includes the UNAIDS estimates of HIV prevalence in 2010 for all the countries, but no attempt is made to relate HIV prevalence to the components of vulnerability.

The report includes a description of variations in the prevalence of child vulnerabilities in the 70 countries. The distributions of the prevalences are skewed, with very high values in a relatively small number of surveys and countries. The percentage of children who have lost a parent ranges from 3% to 28%, and there are six countries with a percentage greater than 15%: Lesotho, Zimbabwe, Swaziland, Rwanda, Burundi, and Namibia. The percentage of children who do not have a parent in their household ranges from virtually none to 37%, but is greater than 23% in only six countries: Namibia, Lesotho, Swaziland, Zimbabwe, Sierra Leone, and Liberia. In both distributions, these countries are conspicuously higher than the rest, and are essentially outliers. There is partial, but not complete, overlap in the two groups of six countries because of the definitional overlap in the first two risk factors.

These two risk factors are strongly related to the child's age. At birth, virtually all children have two surviving parents and are living with both or at least with the mother. Whatever the percentage is for all children age 0-17, it will be much higher for the older children in this age range.

The distribution of the prevalence of living in a household in which all of the adults have no education is much broader. It ranges from none to 69%. The highest values occur in Niger, Burkina Faso, South Sudan, Mali, Chad, Afghanistan, Guinea, Benin, and Sierra Leone. Among the countries included in this report, Afghanistan has the lowest level of adult education outside of sub-Saharan Africa.

UNICEF suggests that the best synthesis of these four components of vulnerability consists of children who have lost one or both parents, *and/or* are not living with a parent, *and/or* are in a household with no education adults, *and* are in the bottom two wealth quintiles. The prevalence of this synthesis ranges from 3% to 36%. It is highest in the countries which are highest on the respective components, but is most strongly related to the third component, education, because that component has the broadest distribution across the 70 countries. The prevalence is highest, 27% or more of all children age 0-17, in the following ten countries: South Sudan, Burkina Faso, Niger, Mali, Guinea, Benin, Sierra Leone, Chad, Afghanistan, and Senegal.

In some countries with multiple surveys, the prevalences may appear to have increased or declined, but we do not make explicit inferences about whether any apparent trends are statistically significant. In nearly all countries, the estimated numbers of children with the various vulnerabilities have increased, primarily because of growth in the population sizes estimated by the U.N. Population Division (UNPD). It is hoped that the estimated prevalences and population numbers will be useful for establishing the magnitude of child vulnerability or disadvantage faced by children in low- and middle-income countries.

1. Introduction

The DHS surveys are best known for data collected on two sub-populations: women age 15-49 and children age 0-4. Most of the data, indicators, and analyses focus on these two groups. However, the design of DHS surveys, particularly because of the collection of data about the households in which those women and children can be identified, allow for a wider range of analyses. This report focuses on the sub-population of children age 0-17 who can also be identified within households, and factors that affect their well-being.

An earlier DHS report (Kanamori and Pullum 2013) described levels and trends in many indicators of child deprivation in sub-Saharan Africa. The study population for that report was also children age 0-17. Five types of potential deprivation were included: nutrition, health, water and sanitation, shelter, and education. The data on two types of deprivation—water and sanitation, and shelter—come from the household survey and refer to all household members. The nutrition indicators come from the height and weight measurements in the household survey that apply to children age 0-4 and girls age 15-17. Data on schooling come from the household survey and apply to children who have reached the minimum age for school attendance. The health indicators, which apply to children age 0-4 whose mothers are in the same household, are obtained from the interview with the mother. Very few indicators of child deprivation, or child-level outcomes more generally, can be obtained in comparable form throughout the age range 0-17.

This report shifts attention to potential risk factors for child deprivation. This focus is based on the premise, strongly supported by evidence, that the survival of parents, coresidence with parents, the education of the adults in the household, and the relative well-being of the household as a unit are important determinants of child-level outcomes. We will report the percentages and numbers of children age 0-17 with these risk factors and combinations of the risk factors, in many countries and for the interval 2000 to 2015, to inform programs that focus on mitigating the risk of negative child outcomes.

There is a long history of research into how parental and household characteristics may influence child outcomes. The particular stream of such research into which this report may be placed is identified with the label “orphans and vulnerable children” or “OVC”. This label has been used since the 1990s with reference to children, mostly in sub-Saharan Africa, who lost one or both parents because of AIDS. The initial application of the label “OVC” to children orphaned by AIDS has expanded because of the difficulty in determining the cause of death of a parent and because the implications of a parental death are similar regardless of the cause of death. The welfare of children who have been orphaned or have other household-level disadvantages is of great international concern. Programs to assist these children have faced substantial difficulty in assessing the numbers of children with these disadvantages. The primary objective of this report is to provide such estimates for a large number of countries.

This is not the place to review the literature on how orphanhood, household structure, and other household characteristics may be related to child outcomes. We also do not discuss the tools that identify children at risk or the mechanisms to assist those children, their families, or communities (for example, see Nyberg et al. 2012). Rather, we will identify the two most important antecedents for this report. The first is an analysis by Akwara and colleagues at UNICEF (Akwara et al. 2010) which established that (1) living in a household with chronically ill adults is not a consistent marker of child vulnerability, and (2) orphanhood is not a necessary or sufficient determinant of vulnerability or risk. Briefly stated, the impact of orphanhood depends on the type of household in which a child lives. The second antecedent is a report by UNICEF (2014) that recommended a new definition of child vulnerability in the context of HIV/AIDS, as well as more broadly, based on further analysis of household survey data from 11 countries. The new definition of child vulnerability focuses on four variables that form the foundation for the present analysis: orphanhood status, coresidence with biological parents, the education level of adults in the household, and household wealth.

The UNICEF (2014) report described four types of vulnerability that will be described as *components* of risk, and four groups that will be referred to as *combinations* of risk:

Component 1: Children who have lost one or both parents

Component 2: Children who are not living with either parent

Component 3: Children living in a household in which all adults have no education

Component 4: Children living in a household ranked in the bottom two wealth quintiles

Combination 1[1]: Children with risk components 1 and 4

Combination 2: Children with risk components 2 and 4

Combination 3: Children with risk components 3 and 4

Combination 4: Children with risk components 1 or 2 or 3 and with risk component 4

All four components are binary. The first component of risk is based on parental survival and identifies children whose biological mother and/or father has died. This includes single orphans (one parent has died) as well as double orphans (both parents have died). The second component identifies children who are not living with either the biological mother or the biological father. The first two components are associated. Double orphans, for example, will have both components 1 and 2. Single orphans, with only one surviving parent, have component 1 and do not necessarily have component 2, although they have a greater chance of component 2.

It is well-established that parental education, particularly maternal education, is related to child welfare. The third component identifies whether the child lives in a household in which no adult, whatever the relationship to the child, has any formal education at all. The component is not limited to the parents, because if it were, it could only be assessed for children whose parents are alive and living in the same household. It also is not limited to the household head.

The fourth component identifies children in the bottom two wealth quintiles. The DHS wealth quintiles are constructed on the basis of household assets, usually including source of water, type of sanitation, household construction, and possessions. A continuous wealth score is constructed as the first component of a principal components analysis (PCA), which is then partitioned into five quintiles so that the weighted number of individuals in the household sample, regardless of age, will be the same in each quintile. The wealth quintiles are inherently relative rather than absolute. One reason for including the bottom two quintiles, and not just the bottom quintile, is that the bottom quintile usually consists of largely of rural households.

Although 40% of the weighted population in the household survey will always be in the bottom two quintiles, the percentage of children (of any age, but here specifically age 0-17) in the bottom two quintiles will typically exceed 40%, simply because poorer households tend to have more children than households that are better off.

All four combinations of risk include the wealth component. The first three combinations are simply the first three components, in succession, together with the wealth component. The percentage of children with combinations 1, 2, and 3 will always be less than the corresponding percentages with components 1, 2, and 3, respectively. The fourth combination is always larger than any of the first three combinations, because it

[1] In the UNICEF report, combinations 1 and 2 are in the reverse order of what is given here. We re-order them into the same sequence as components 1 and 2.

includes children who have any of the first three components of risk—and the fourth component. The fourth combination is most comprehensive of all combinations. The percentages of children in the first three components, and all four combinations, have a theoretical lower limit of 0%.

Table 8 in the 2014 UNICEF (2014) report used 8 DHS surveys and 3 MICS surveys to estimate the percentages of children in the four components and the four combinations at the time of each survey. The DHS surveys were Cambodia 2005, Haiti 2005-06, Rwanda 2005, Swaziland 2006-07, Uganda 2006, Tanzania 2007-08, Zambia 2007, and Zimbabwe 2005-06. The three MICS surveys were Central African Republic 2006, Malawi 2006, and Sierra Leone 2005. Table 8 applied these percentages to the estimated population of children age 0-17 in 2010 in each country, available from the UNPD, to estimate the actual number of children with each of the components and risk combinations on July 1, 2010. The 2012 Revision[2] was used in the 2014 UNICEF report because it was the most recent revision available at the time. This report uses the estimates from the 2015 Revision. The dates of the 11 surveys varied but the percentages from the surveys were all applied to a fixed reference date for the population numbers (July 1, 2010) that was within five years of the surveys.

This report will provide essentially the same types of estimated percentages and populations, but for a greatly expanded list of countries and surveys. We will provide the estimated percentages at the dates of the surveys and the estimated populations on July 1 of the calendar year in which the mean date of interview occurred. In addition, this report will combine multiple surveys from each country to provide estimated percentages and populations for each country for July 1 of 2000, 2005, 2010, and 2015, except when the interval between those dates and the dates of the available surveys is greater than five years and is therefore judged to be too great to produce reliable estimates.

As in Table 8 of the 2014 UNICEF report, we will include UNAIDS estimates of HIV prevalence in 2010, for all countries. However, there will be no analysis of the relationship between HIV prevalence and the level of vulnerability.

The estimates of the numbers of children age 0-17 with specific types of vulnerabilities are intended to help the programming and monitoring of programs for vulnerable children. The population estimates can serve as denominators for estimates of program coverage, and with care they can be projected into the future for program planning. The information will contribute to global level advocacy dialogues, as well as to country-level program and policy needs.

This report is innovative because it includes large numbers of MICS and DHS surveys. It is the first DHS report to use a significant amount of MICS data. It is also innovative among DHS reports in the incorporation of population estimates from the UNPD. Finally, the procedure to produce estimates for the calendar years 2000, 2005, 2010, and 2015, synthesizing DHS and MICS surveys from various dates, is new in DHS reports.

[2] The U.N. Population Division periodically issues population estimates and projections in a series of reports called "World Population Prospects." "The 2015 Revision" simply identifies the round of estimates and projections issued in July 2015.

2. Data and Methods

2.1 Data

This report will present information on 70 different countries, with an average of nearly two surveys for each country. The report integrates four major sources of data, all of which are publicly available through different websites.

First, the UNPD is the source of estimated population numbers. An Excel spreadsheet[3] was downloaded from the UNPD website (http://esa.un.org/wpp/). It provides the estimated population of every country in the world, in five-year intervals from 1950 to 2015, in broad age groups for both sexes combined. One of the broad age groups is ages 0-17. The estimates refer to July 1 of the calendar year. The estimates come from the 2015 Revision of World Population Prospects. Only the estimates for reference years 2000, 2005, 2010, and 2015 were extracted. These numbers are given in a table in Appendix B. Estimates for July 1 of the years between 2000 and 2015 other than 2005 and 2010 (e.g. 2001, 2002, 2003, and 2004) were obtained by interpolation (linear on a log scale) between pairs of pairs of reference years (e.g. 2000 and 2005).

Second, UNAIDS is the source of HIV prevalence estimates for adults age 15-49. The numbers were drawn from a spreadsheet available at the UNAIDS website (http://www.aidsinfo.unaids.org). The DHS surveys that include HIV testing are a major contributor to the UNAIDS database, although we emphasize that the prevalence estimates come from UNAIDS and not directly from DHS surveys. Only estimates for 2010 are provided.[4] We include the point estimate of adult prevalence (men and women combined, ages 15-49), a low estimate and a high estimate (for an uncertainty interval that is not necessarily interpretable as a 95% confidence interval), and the estimated number of children (ages 0-14) "living with HIV". For UNAIDS purposes, the 15th birthday, rather than the 18th birthday, is the boundary between childhood and adulthood. An analysis of the association between HIV prevalence and child vulnerability is beyond the scope of this report.

The third source of data is 85 DHS surveys.[5] Since the late 1990s, almost all DHS surveys have included a question about the mother's survival; if she is alive, there is a question about whether she is in the same household as the child. There are parallel questions about the father. These questions are part of the household survey and are asked about all children, up to age 14 or 15 in the earliest surveys and up to age 17 in the more recent surveys. The information is provided by the "household respondent", i.e. an adult, typically the household head or spouse of the household head, and not by the child. If the parent is said to reside in the household, the line number on the household roster is provided. If a parent has died, the surveys do not include information about the date or cause of death.

The main report on every DHS survey includes detailed information drawn from the responses to these four binary questions. There are nine possible combinations of responses about parental survival and coresidence. The main report typically provides the distribution across these categories within a chapter entitled "Orphans and Vulnerable Children." The distribution normally includes categories of age and sex of the child, type of place of residence, region within the country, and wealth quintile. The reports also include two columns that are exactly equivalent to components 1 and 2: the percentage of children with one or both parents who have died and the percentage of children not living with either parent.

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[3] WPP2015_POP_F08_1_TOTAL_POPULATION_BY_BROAD_AGE_GROUP_BOTH_SEXES.XLS

[4] 2010 is the reference year that is closest to the median year of the data.

[5] The label "DHS survey" includes AIDS Indicator Surveys and Malaria Indicator Surveys if they contained the necessary information.

In order to match the numbers in the DHS reports on coresidence with parents, a subtle check on residency is necessary. The household respondent may say that a child's parent lives in the household and provide a line number, but it is possible that the adult on that line does not satisfy a *de jure* requirement for residency. In this situation, the residency requirement takes precedence,[6] and it will be concluded that the parent *does not* live with the child. Appendix A provides the specific Stata code for these calculations, and also the process for handling "missing" codes.

Highest level of education is included in all surveys with a standard DHS variable that typically has categories "None (or preschool)", "Primary", "Secondary", and "Higher". An indicator for any schooling is set to 0 for the household, and is then replaced with 1 if anyone in the household (a) is age 18 or above, and (b) has a level of education other than "None (or preschool)", and (c) satisfies the *de jure* residency requirement. If the household remains with a 0 on this indicator, then all children age 0-17 in the household will have the third component of vulnerability.

The wealth quintile is coded onto the record of every person in the household and is the same for every member of a household. Quintiles 1 and 2 comprise the lowest two quintiles.

The early surveys in which the orphanhood and coresidency questions only extended to age 14 or 15 will not be included in this report.[7] It would be possible to extrapolate to age 17 by leveraging information in those surveys that do include children up to age 17. However, this kind of extrapolation would be necessary for components 1 and 2 and combinations 1, 2, and 4, with separate adjustments for each, and any adjustment would introduce some uncertainty. Readers familiar with DHS data are likely to be surprised that some countries have omitted the orphanhood or coresidency questions entirely, or only recently included those questions up to age 17. Such countries are omitted or may be included for only one survey. Any omissions of a survey or a country from this report are due solely to unavailability of the required data.

The fourth and final data source includes 50 MICS household surveys with the same information described above. Permission to use the MICS surveys was readily obtained from UNICEF (http://mics.unicef.org/). Identification of the relevant variables was complicated by less standardization in variable names across surveys, although there was a high level of comparability with DHS coding and no surveys had to be discarded for reasons other than the age limitation. Coordination between the DHS and MICS survey platforms was helpful and certainly contributed to the very high level of agreement between the DHS and MICS results from the same country. Because DHS and MICS do not entirely overlap in the countries where they work, the use of both types of surveys has substantially broadened the scope of this report beyond what would have been possible with either platform alone. Since the MICS surveys always have a *de jure* criterion for household residency, it was not necessary to check that criterion in the construction of codes for coresidency with parents or for the education of adults in the household.

The countries represented in the report are listed in Table 1. The columns of the table describe how many DHS and/or MICS surveys are included for each country. Tanzania had five surveys, the largest number, and several countries had four—Ghana, Nigeria, Sierra Leone, Uganda, and Zimbabwe. In Table 1, as elsewhere in this report, the countries are listed in alphabetical order and are not grouped by region. A majority of the countries are in sub-Saharan Africa.

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[6] DHS surveys normally use a *de facto* definition of residence, which is operationalized with hv103=1, i.e. the person "slept here last night." However, in the present context it is required that the child and the parent have *de jure* residence, which is operationalized with hv102=1, i.e. the person "usually sleeps here," to be consistent with the MICS and UNICEF estimates.

[7] A few surveys appear to include orphanhood and coresidency only up to age 14 or 15, but have country-specific variables that extend to age 17. All of the surveys that appear to have the lower cutoff were checked for a possible country-specific variable with a higher cutoff, and if it could be found, they were retained.

The fieldwork for many surveys extends across two calendar years. For each survey, the mean date of interview was calculated; we only identify the calendar year in which the mean date was located, rather than the two calendar years in which the fieldwork may have been conducted. In the calculation of the mean date, the year and month (not the day) of interview were used.[8] Dates in the surveys of Ethiopia and Nepal were converted to the Gregorian calendar.

The distribution of the surveys across calendar years 2000 through 2014 is described in Table 2. Two DHS surveys from 2000 are included, but no surveys from 2001 or 2002. Most of the MICS surveys (42 out of 55) are concentrated in 2005-06 and 2010-11, corresponding with MICS rounds 3 and 4, respectively. Several earlier MICS surveys, in round 2, included the required information but only extended to age 14 or 15 for the questions on parental survival and coresidence. Several DHS surveys prior to 2004 are also omitted because of that limitation. The median survey year is 2009.

Table 3 lists all the surveys with the year and whether the survey was conducted by DHS or MICS. The table provides the number of children in the sampled households who were recorded to be age 0-17 at the date of interview. Both the unweighted and weighted numbers are provided. The weighted numbers are adjusted for the sample design. This involved taking account of the usual pattern of over-sampling smaller strata and under-sampling larger strata, and adjusting further for cluster-level non-response. The unweighted and weighted numbers are always very close, but we provide both numbers because all estimates given in this report are weighted. The total number of children age 0-17 in all the surveys is over four million.

The final column of Table 3 shows the estimated number of children age 0-17 in the country on July 1 of the year of the survey, in thousands. These estimates are taken from the UNPD spreadsheet. The estimates are rounded to the nearest thousand. The mean dates of the surveys and the dates of the population estimates are slightly asynchronous, but not by more than half a year. All population estimates in this report are set at July 1 of the calendar year.

There is enormous variation in the populations of the various countries, far more variation than in the sample sizes, although countries with smaller populations tend to have smaller samples. The population number of children age 0-17 ranges from 81,000 in Sao Tome and Principe in 2008 to 446,799,000 in India in 2006. The number in the samples ranges from 5,830 in the Ukraine 2005 MICS survey to 198,294 in the India 2006 DHS survey.

Table 4 lists the countries with indicators from UNAIDS of the prevalence of HIV in 2010. This year was selected because it is close to the median year of the surveys (2009) and is one of the four reference years (2000, 2005, 2010, and 2015). The first column provides the estimated prevalence of HIV in the population of adults age 15-49, men and women combined and expressed as a percentage. Adult HIV prevalence is estimated to have been greater than 10% (an arbitrary cutoff) in 2010 in Lesotho, Malawi, Mozambique, Namibia, Swaziland, Zambia, and Zimbabwe. The second and third columns show low and high estimates, respectively, as described earlier. The last column is the estimated number of children who "living with AIDS," that is, are HIV positive. This number is not given in thousands but is usually rounded to the nearest thousand. The number in the last column is greater than 100,000 (an arbitrary cutoff) in Ethiopia, Mozambique, Nigeria, Uganda, Zambia, and Zimbabwe. The entries "NA", for "Not Available" apply to countries with "…" in the UNAIDS spreadsheet as well as countries that are included in this report but are not included in the UNAIDS spreadsheet: Comoros, Iraq, Jordan, Sao Tome and Principe, and Ukraine.

[8] To avoid a half-month of error in the calculation of the mean date of interview, it was taken into account that the numbers normally assigned to years and months are ordinal, and must be translated to a continuous scale of time.

Table 1. The number of DHS and MICS surveys available for each country included in this report

Country	DHS	MICS	Total	Country	DHS	MICS	Total
Afghanistan	0	1	1	Lesotho	2	0	2
Azerbaijan	1	0	1	Liberia	2	0	2
Bangladesh	0	1	1	Madagascar	1	0	1
Belize	0	2	2	Malawi	2	1	3
Benin	2	0	2	Maldives	1	0	1
Bolivia	2	0	2	Mali	1	0	1
Burkina Faso	1	1	2	Mauritania	0	2	2
Burundi	1	1	2	Moldova	1	1	2
Cambodia	2	0	2	Mozambique	0	1	1
Cameroon	2	1	3	Namibia	2	0	2
Central African Rep	0	2	2	Nepal	2	0	2
Chad	1	1	2	Niger	1	0	1
Colombia	3	0	3	Nigeria	2	2	4
Comoros	1	0	1	Pakistan	1	0	1
Congo	3	0	3	Rwanda	2	0	2
Costa Rica	0	1	1	Sao Tome and Principe	1	0	1
Côte d'Ivoire	2	1	3	Senegal	2	0	2
Democratic Republic of the Congo	2	1	3	Sierra Leone	2	2	4
Egypt	3	0	3	Somalia	0	1	1
Ethiopia	2	0	2	South Sudan	0	1	1
Gabon	1	0	1	Sudan	0	1	1
Gambia	0	1	1	Swaziland	1	1	2
Georgia	0	1	1	Tanzania	5	0	5
Ghana	2	2	4	Thailand	0	1	1
Guinea	1	0	1	Timor-Leste	1	0	1
Guinea-Bissau	0	1	1	Togo	1	2	3
Guyana	2	0	2	Tunisia	0	1	1
Haiti	2	0	2	Uganda	4	0	4
Honduras	2	0	2	Ukraine	0	2	2
India	1	0	1	Uzbekistan	0	1	1
Iraq	0	1	1	Viet Nam	1	2	3
Jamaica	0	1	1	Yemen	0	1	1
Jordan	3	0	3	Zambia	2	0	2
Kazakhstan	0	2	2	Zimbabwe	2	2	4
Kyrgyz Republic	1	1	2	**Total**	**85**	**50**	**135**

Table 2. The number of DHS and MICS surveys available for calendar years 2000 to 2014

Survey year	DHS	MICS	Total
2000	2	0	2
2003	2	0	2
2004	6	0	6
2005	11	5	16
2006	8	18	26
2007	6	2	8
2008	6	1	7
2009	7	1	8
2010	8	10	18
2011	7	9	16
2012	13	3	16
2013	7	0	7
2014	2	1	3
Total	**85**	**50**	**135**

Table 3. For each survey included in this report, the unweighted and weighted numbers of children age 0-17 and the estimated population age 0-17 in the year of the survey (July 1, in thousands). Population estimates from the U.N. Population Division, 2015 Revision

Country	Year	Survey type	Unweighted sample size	Weighted sample size	Population age 0-17
Afghanistan	2011	MICS	54,214	54,270	15,465
Azerbaijan	2006	DHS	9,717	9,420	2,760
Bangladesh	2006	MICS	127,250	127,359	58,567
Belize	2006	MICS	3,404	3,370	130
Belize	2011	MICS	7,321	7,196	137
Benin	2006	DHS	48,734	48,084	4,291
Benin	2012	DHS	48,453	47,071	4,973
Bolivia	2003	DHS	37,856	37,961	3,851
Bolivia	2008	DHS	34,185	34,338	4,005
Burkina Faso	2006	MICS	20,517	20,422	7,364
Burkina Faso	2010	DHS	44,221	44,517	8,289
Burundi	2005	MICS	22,799	23,000	4,197
Burundi	2010	DHS	22,270	22,099	4,803
Cambodia	2005	DHS	33,463	31,832	5,901
Cambodia	2010	DHS	30,789	29,910	5,827
Cameroon	2004	DHS	25,004	25,274	9,086
Cameroon	2006	MICS	21,303	21,495	9,492
Cameroon	2011	DHS	35,828	36,081	10,552
Central African Republic	2006	MICS	27,391	27,274	1,992
Central African Republic	2010	MICS	28,884	28,774	2,097
Chad	2004	DHS	16,158	16,315	5,395
Chad	2010	MICS	51,243	51,123	6,600
Colombia	2000	DHS	17,615	17,169	15,267
Colombia	2005	DHS	58,732	55,438	15,078
Colombia	2010	DHS	72,545	66,428	14,670
Comoros	2012	DHS	11,384	11,425	347
Congo	2005	DHS	14,526	14,849	1,694
Congo	2009	DHS	14,374	14,156	1,905
Congo	2011	DHS	25,265	24,329	2,018
Costa Rica	2011	MICS	7,377	6,578	1,352
Côte d'Ivoire	2005	DHS	11,423	11,491	9,159
Côte d'Ivoire	2006	MICS	28,658	28,103	9,345
Côte d'Ivoire	2012	DHS	24,805	23,979	10,542

(Continued)

Table 3. – *Continued*

Country	Year	Survey type	Unweighted sample size	Weighted sample size	Population age 0-17
Democratic Republic of the Congo	2007	DHS	25,219	25,860	31,796
Democratic Republic of the Congo	2010	MICS	33,257	33,287	34,978
Democratic Republic of the Congo	2013	DHS	53,324	54,349	38,272
Egypt	2005	DHS	45,155	43,371	30,021
Egypt	2008	DHS	36,033	34,359	30,600
Egypt	2014	DHS	46,699	46,299	34,233
Ethiopia	2005	DHS	34,180	37,002	40,446
Ethiopia	2011	DHS	38,876	40,513	45,738
Gabon	2012	DHS	19,084	18,108	709
Gambia	2006	MICS	23,379	23,289	784
Georgia	2005	MICS	10,323	10,244	1,058
Ghana	2003	DHS	13,163	12,481	9,633
Ghana	2006	MICS	12,742	12,457	10,236
Ghana	2008	DHS	21,775	20,537	10,661
Ghana	2011	MICS	27,466	25,889	11,339
Guinea	2012	DHS	23,653	23,620	5,768
Guinea-Bissau	2006	MICS	20,677	20,618	734
Guyana	2005	DHS	4,373	4,324	312
Guyana	2009	DHS	9,529	8,351	307
Haiti	2006	DHS	22,280	21,685	4,178
Haiti	2012	DHS	26,152	25,122	4,266
Honduras	2006	DHS	45,211	42,856	3,209
Honduras	2012	DHS	43,131	40,762	3,174
India	2006	DHS	198,294	209,752	446,799
Iraq	2011	MICS	117,912	113,261	15,373
Jamaica	2011	MICS	6,665	6,530	892
Jordan	2007	DHS	36,050	33,511	2,519
Jordan	2009	DHS	31,822	29,783	2,699
Jordan	2012	DHS	34,716	32,240	2,935
Kazakhstan	2006	MICS	17,072	16,405	4,777
Kazakhstan	2010	MICS	16,107	16,253	4,798
Kyrgyz Republic	2005	MICS	10,015	9,800	1,951
Kyrgyz Republic	2012	DHS	13,873	13,085	2,062
Lao PDR	2006	MICS	16,263	15,960	2,763
Lao PDR	2011	MICS	43,411	42,277	2,796
Lesotho	2004	DHS	16,514	15,961	904
Lesotho	2009	DHS	16,675	15,804	905
Liberia	2007	DHS	17,928	17,724	1,754
Liberia	2013	DHS	24,862	23,729	2,103
Madagascar	2009	DHS	44,897	44,643	10,337
Malawi	2004	DHS	32,134	31,981	6,676
Malawi	2006	MICS	71,425	71,087	7,044
Malawi	2010	DHS	64,806	63,345	7,849
Maldives	2009	DHS	15,913	15,493	120
Mali	2012	DHS	31,936	32,244	8,663
Mauritania	2007	MICS	30,474	30,441	1,592
Mauritania	2011	MICS	30,613	30,454	1,740
Moldova	2005	DHS	7,810	7,926	1,016
Moldova	2012	MICS	6,363	6,527	827
Mozambique	2008	MICS	34,728	35,136	12,017
Namibia	2007	DHS	18,858	18,933	965
Namibia	2013	DHS	17,903	18,392	1,034
Nepal	2006	DHS	19,935	19,806	11,802
Nepal	2011	DHS	20,808	20,839	11,704
Niger	2012	DHS	37,972	38,486	9,972

(Continued)

Table 3. – *Continued*

Country	Year	Survey type	Unweighted sample size	Weighted sample size	Population age 0-17
Nigeria	2007	MICS	63,187	62,228	73,824
Nigeria	2008	DHS	78,662	74,788	75,870
Nigeria	2011	MICS	76,606	75,474	82,352
Nigeria	2013	DHS	89,859	90,438	86,974
Pakistan	2012	DHS	42,278	40,022	74,766
Rwanda	2005	DHS	24,938	24,867	4,512
Rwanda	2010	DHS	28,295	28,433	4,994
Sao Tome and Principe	2008	DHS	6,660	6,762	82
Senegal	2011	DHS	39,535	36,941	6,730
Senegal	2013	DHS	21,034	18,882	7,150
Sierra Leone	2005	MICS	21,022	21,029	2,565
Sierra Leone	2008	DHS	21,408	22,280	2,756
Sierra Leone	2010	MICS	31,674	31,741	2,890
Sierra Leone	2013	DHS	38,843	38,417	3,053
Somalia	2006	MICS	18,620	18,619	4,695
South Sudan	2010	MICS	31,931	31,956	5,036
Sudan	2010	MICS	42,212	42,458	17,563
Swaziland	2006	DHS	10,910	11,488	553
Swaziland	2010	MICS	9,696	9,858	556
Tanzania	2004	DHS	16,903	16,854	19,648
Tanzania	2004	DHS	25,022	24,621	19,648
Tanzania	2007	DHS	23,085	22,457	21,479
Tanzania	2010	DHS	25,652	25,179	23,554
Tanzania	2012	DHS	27,657	26,998	25,100
Thailand	2006	MICS	38,954	38,271	17,316
Timor-Leste	2009	DHS	34,611	34,411	516
Togo	2006	MICS	16,063	15,582	2,866
Togo	2010	MICS	15,944	15,416	3,155
Togo	2014	DHS	23,633	21,929	3,470
Tunisia	2012	MICS	11,209	11,025	3,065
Uganda	2000	DHS	20,732	21,757	13,330
Uganda	2006	DHS	25,771	25,706	16,290
Uganda	2011	DHS	30,625	30,708	19,075
Uganda	2011	DHS	25,279	25,583	19,075
Ukraine	2005	MICS	5,830	4,264	8,790
Ukraine	2012	MICS	8,635	5,893	7,894
Uzbekistan	2006	MICS	19,906	20,063	10,154
Viet Nam	2005	DHS	9,033	9,408	28,295
Viet Nam	2006	MICS	12,736	12,089	27,850
Viet Nam	2010	MICS	14,183	13,852	26,140
Yemen	2006	MICS	13,637	13,624	11,113
Zambia	2007	DHS	19,156	19,130	6,831
Zambia	2013	DHS	45,029	44,861	8,074
Zimbabwe	2005	DHS	21,218	20,908	6,455
Zimbabwe	2009	MICS	26,677	26,208	6,738
Zimbabwe	2010	DHS	20,029	19,713	6,811
Zimbabwe	2014	MICS	32,704	32,894	7,360

Table 4. For each country included in this report, the estimated prevalence of HIV among adults age 15-49 (a percentage) and the number of children age 0-14 who were "living with HIV" in 2010. Estimates from UNAIDS, 2015

Country	Adult HIV Prevalence	Low Estimate	High Estimate	No. children age 0-14 living with HIV
Afghanistan	<0.1	<0.1	<0.1	<500
Azerbaijan	0.1	<0.1	0.2	<100
Bangladesh	<0.1	<0.1	<0.1	<1000
Belize	1.3	1.2	1.4	<200
Benin	1.2	1.1	1.4	7,900
Bolivia	0.3	0.2	0.4	<1000
Burkina Faso	1.1	0.9	1.2	17,000
Burundi	1.6	1.4	1.8	18,000
Cambodia	0.8	0.5	1.5	7,000
Cameroon	5.1	4.8	5.3	60,000
Central African Republic	5.2	4.7	5.7	19,000
Chad	3.0	2.5	3.6	29,000
Colombia	0.4	0.3	0.5	3,500
Comoros	NA	NA	NA	NA
Congo	3.2	2.9	3.5	12,000
Costa Rica	0.2	0.2	0.3	<200
Côte d'Ivoire	4.0	3.6	4.3	47,000
Democratic Republic of Congo	1.2	1.1	1.3	62,000
Egypt	<0.1	<0.1	<0.1	<200
Ethiopia	1.4	1.2	1.6	150,000
Gabon	4.7	4.2	5.4	4,500
Gambia	2.0	1.6	2.5	2,100
Georgia	0.2	0.1	0.2	NA
Ghana	1.7	1.3	2.1	25,000
Guinea	1.6	1.4	1.8	NA
Guinea-Bissau	3.9	3.5	4.3	4,700
Guyana	1.5	1.1	2.2	<500
Haiti	2.1	2.0	2.1	12,000
Honduras	0.5	0.5	0.6	2,700
India	NA	NA	NA	NA
Iraq	NA	NA	NA	NA
Jamaica	1.8	1.6	2.3	<1000
Jordan	NA	NA	NA	NA
Kazakhstan	0.1	0.1	0.2	NA
Kyrgyz Republic	0.2	0.2	0.3	<500
Lao	0.3	0.2	0.3	<1000
Lesotho	23.3	22.1	24.6	22,000
Liberia	1.5	1.3	1.7	4,400
Madagascar	0.4	0.3	0.4	5,000
Malawi	11.7	10.9	12.4	150,000
Maldives	NA	NA	NA	NA
Mali	1.4	1.2	1.6	17,000
Mauritania	0.8	0.7	1.0	1,700
Moldova	0.5	0.5	0.6	<200
Mozambique	11.2	9.9	12.9	170,000
Namibia	14.3	13.5	15.3	17,000
Nepal	0.3	0.2	0.3	1,700
Niger	0.7	0.6	0.8	NA
Nigeria	3.5	3.2	3.8	360,000
Pakistan	<0.1	<0.1	<0.1	1,000
Rwanda	3.1	2.9	3.4	31,000
Sao Tome and Principe	NA	NA	NA	NA
Senegal	0.7	0.6	0.8	3,600
Sierra Leone	1.6	1.4	1.8	4,500

(Continued)

Table 4. – *Continued*

Country	Adult HIV Prevalence	Low Estimate	High Estimate	No. children age 0-14 living with HIV
Somalia	0.6	0.5	0.8	5,100
South Sudan	2.8	2.0	3.9	16,000
Sudan	0.2	0.2	0.3	3,500
Swaziland	27.4	26.6	28.2	19,000
Tanzania	6.1	5.5	6.7	NA
Thailand	1.3	1.1	1.4	8,300
Timor-Leste	NA	NA	NA	NA
Togo	2.8	2.3	3.4	14,000
Tunisia	<0.1	<0.1	<0.1	NA
Uganda	6.9	6.6	7.3	170,000
Ukraine	NA	NA	NA	NA
Uzbekistan	0.2	0.2	0.3	NA
Viet Nam	0.4	0.4	0.5	3,500
Yemen	<0.1	<0.1	<0.1	<500
Zambia	13.0	12.4	13.7	110,000
Zimbabwe	18.0	17.2	18.7	170,000

NA: Not Available

2.2 Methods

The construction of the eight binary indicators for each child age 0-17—the four components and four combinations of vulnerability—was described above. Chapter 3 will present the distributions of these types of child vulnerability, across surveys, with the percentages from each survey and the estimated numbers of children with each component and combination of vulnerability, on July 1 of the year of the survey. The numbers of children are obtained by simply multiplying the estimated population in the last column of Table 3 by the estimated proportion with the respective types of vulnerability. The observed prevalences (synonymous with "percentages") and implied population numbers in the years of the surveys will be provided in Chapter 3 in Tables 5 and 6.

The usefulness of these purely descriptive estimates in Chapter 3 is limited by irregularities in the dates of the surveys as well as by differences[9] in estimates coming from successive surveys in the same country. Comparisons across countries, or trends within countries, are difficult to perceive from Tables 5 and 6 in this report. In the UNICEF (2014) report, variation in the timing of the surveys was counteracted by selecting a specific reference year, 2010. As described earlier, the estimated prevalences from the surveys were applied to the UNPD estimates of the numbers of children aged 0-17 on July 1 of the reference year. The approach in this report is similar, but includes four reference years, rather than one, and allows for reconciliation of multiple surveys from the same country by constructing fitted values on lines.

Synthesizing the surveys and providing estimates for reference years requires a combination of smoothing and extrapolation that depends on the number of surveys available for each country. The objective of this procedure is to obtain estimated prevalences and population numbers at the midpoint of reference years 2000, 2005, 2010 and 2015. Such numbers can facilitate comparisons across countries which had surveys scattered across different years. This also simplifies extrapolation by users of this report, if desired, into the future—although any extrapolation requires caution.

[9] Such differences may arise from sampling error or non-sampling error or genuine changes in prevalence.

The results of this procedure will be presented in the form of a separate figure and table for each country. Because of the large number of countries, these results are included in Appendix C. We now describe the methodology for producing these figures and tables.

With only one survey, the prevalence from that survey will be extended forward and backward, unchanged, to the nearest reference years. For example, if the mean date of interview for that single survey, on a continuous time scale, is 2006.32, then the prevalences of the components and combinations of vulnerability will be extended forward to 2010.5 and backward to 2005.5. The estimated prevalences will be the same at both dates, but the population age 0-17 will be different in 2010 from what it was in 2005 and the numbers of vulnerable children will be different. Thus, the prevalences from the survey, specifically with the date 2006.32, will be applied to the population at date 2006.5 in Chapter 3, Table 6, and to the population at 2005.5 and 2010.5 in Appendix C. The associated graphs of the prevalences in Appendix C will have a horizontal straight line.

It is certainly possible that the underlying prevalence was not constant within the five-year interval between two reference years such as 2005 and 2010. However, with just one data point, there is no basis for applying a slope to the line connecting the two reference years. The procedure followed here is equivalent to that used in the UNICEF (2014) report, in which prevalences from surveys conducted in 2005-2008 were applied to the reference year 2010. Users are certainly free to ignore the extensions to the reference years if they are uncomfortable with the horizontal extrapolation.

If the country had two surveys with the necessary information, the two data points (for each component and combination of vulnerability) will be connected with a line that passes through those two points and is then extrapolated to the reference year before and nearest to the first survey and to the reference year after and nearest to the second survey. The line going through the two data points is a logistic curve and not a straight line. The logistic function is preferred for a binary outcome and has the highly desirable property that it is constrained to be between 0 and 1 (or 0% and 100%). The curvature is not evident between the data points, but appears in the extrapolation. If the country had more than two surveys with the necessary information, the only modification is that the line will not go through the data points exactly but will be the "best fitting" logistic. All graphs include the upper and lower 95% confidence bands.

We now describe the methods in more detail. The mean dates of interview and the prevalences are calculated with individual-level files for each of the 135 surveys, using sampling weights. The estimated prevalences can be calculated simply as weighted means of the binary (0/1) outcomes. However, in order to develop a better sense of their statistical stability, the prevalences were actually calculated with logit regressions adjusted for clustering as well as for sample weights. In a logit regression with no covariates, the constant term (or intercept) can be exponentiated to obtain the odds, and the odds can then be converted to a proportion.[10] This "fitted" proportion will agree exactly with the proportion that could be calculated directly as the weighted mean of a binary (0/1) outcome. The advantage to using a logit model in this context is that Stata will produce two estimated variances that can be compared. One is the estimated variance (the square of the standard error) for the constant term, adjusted for the weights and clusters. The other is the estimated variance *without* these adjustments, i.e., for a simple random sample (srs) of the same size. These two estimated variances will be referred to as V1 and V0, respectively. V0, which is not adjusted for the survey design, will always be substantially smaller than V1. The weights, and in particular the cluster design of DHS and MICS surveys, will reduce the efficiency of all estimates and will produce more uncertainty, larger standard errors, and larger variances. This loss of efficiency can be restated in terms of a reduction of the "effective" sample size. The design effect (DEFT) for a survey is given by the ratio V1/V0, and the effective sample size is obtained by dividing the nominal sample size by the DEFT. The

[10] The proportion is the odds divided by 1+odds.

standard DHS main reports provide the adjusted standard errors and DEFTs for many indicators in their Appendix B. The DEFT in the present analysis is different for each outcome.

Clustering reduces the efficiency of a sample because cases in the same cluster or enumeration area tend to be more similar to one another than cases in different clusters. That is, adding another case in the same cluster does not increase the information in the data as much as adding another case outside that cluster. This redundancy or repetitiveness of information reduces the "effective" sample size relative to a simple random sample, and increases the DEFT.

Our strategy to calculate the DEFT is somewhat different from that used in the preparation of the main DHS reports. The software used in DHS data processing is not user-friendly, but it is more comprehensive because it includes an adjustment for the stratification in the sample. The calculation described here ignores the potential effect of stratification, and is likely to over-estimate the DEFT. All DHS samples are stratified, usually by combinations of urban-rural residence and region. Stratification generally increases the efficiency of a sample, and counteracts the effect of clustering. With the "svyset" and "svy" commands, Stata adjusts for stratification, as well as weighting and clustering. However, we omitted that adjustment because of the large number of surveys, uncertainty about the specification of the stratification code in DHS and (especially) MICS surveys, and the simple fact that the procedure often failed because the variables used here are so highly clustered. Within a survey, typically with several hundred clusters, it can easily happen that *all* children in some clusters have the specified characteristic or *no* children have the characteristic[11]. In such clusters there is no within-cluster variation. The cluster option works satisfactorily by itself, but not when it is combined with the stratification option. As a result, our estimates of the DEFT tend to be somewhat too high and the confidence bands are somewhat too wide. Such a bias is preferable to providing confidence intervals that are too narrow and imply an exaggerated accuracy of the estimates.

The results described above for each survey, with the sample size, the summary date of interview, the eight prevalences, and the DEFT associated with each of these prevalences, were summarized on a single record for each survey. In a second step, the surveys for each country were grouped together, and the estimates for the reference years were generated. In these eight logit regressions, the frequency for each data point is the effective sample size, i.e., the nominal sample size divided by the DEFT. When there are more than two surveys for a country, the line of best fit takes into account the differences between surveys in the effective sample size, and fits more closely the point estimates from surveys with a larger effective sample size.

The results for each country are presented in Appendix C, with each country on a separate page. Each page includes a table with all the estimated prevalences and populations in 2000, 2005, 2010, and 2015, except for reference years that were more than five years away from any data points. The page for a specific country also includes a figure that visually presents the fitted lines for vulnerability components 1, 2, and 3, and vulnerability combination 4.

The fitted lines are accompanied by 95% confidence bands, as described above. The confidence bands convey a visual sense of the uncertainty in the estimates, and are not provided numerically in the tables. If there is a single survey, the confidence interval for that point estimate is simply extended to the nearest reference years before and after that survey. If there are two or more surveys, the extrapolated estimates tend to have wider confidence bands, depending both on the extent of the extrapolation (in time) and the effective sample sizes.

The uncertainty associated with the prevalence estimates cannot easily be translated into uncertainty associated with the population estimates. All the numbers from the UNPD are estimates with their own

[11] The computational difficulties can be equally serious if the number of children in a cluster with a specified outcome is close to none or close to all.

unspecified degrees of uncertainty. It would be virtually impossible to specify the uncertainty of the population estimates that would incorporate both the uncertainty in the prevalence estimates and the uncertainty in the UNPD numbers.

There is a high degree of consistency between estimates from successive surveys in the same country. Differences between successive estimates could be the result of sampling error, other measurement error, or genuine change in the underlying population. This report will not attempt to make inferences about whether differences or apparent trends are statistically significant. Any appearance of trends, particularly when extrapolated, should be examined with care; interpretations should take into account the visual uncertainty intervals.

For two specific countries, Burundi and Kyrgyz Republic, preliminary evidence of a trend between two surveys was judged to be spurious. The Burundi 2005 MICS survey provides an estimate of the prevalence of vulnerability component 1 that is substantially higher than the 2010 DHS survey, while estimates for components 2 and 3, as well as combination 4, are substantially lower. These discrepancies could not be traced to any apparent coding errors. Rather than suppress or ignore that survey, it was decided to include the estimates from the earlier survey in every way except in the regression lines and the table on the country page for Burundi. Similarly, for Kyrgyz Republic, the 2005 MICS survey produced estimates of vulnerability component 2 and combination 4 that were substantially lower than the estimates from the 2012 DHS survey. This difference could not be explained by careful comparison of the data files. The earlier survey was then detached from the regression lines and estimates in the table on the country page for Kyrgyz Republic.

In both countries, the earlier survey was detached. The later survey was retained and treated as a single point within a five-year interval. The detached surveys were MICS and the retained surveys were DHS, but the criterion was the relative timing, and not the source of the surveys. Again, we repeat that no DHS or MICS surveys that met the sole criterion of including the parental survival and coresidence information up to age 17 were dropped. Users are certainly free to modify the decision described above for Burundi and Kyrgyz Republic, and construct lines that include both surveys.

3. Descriptive Results

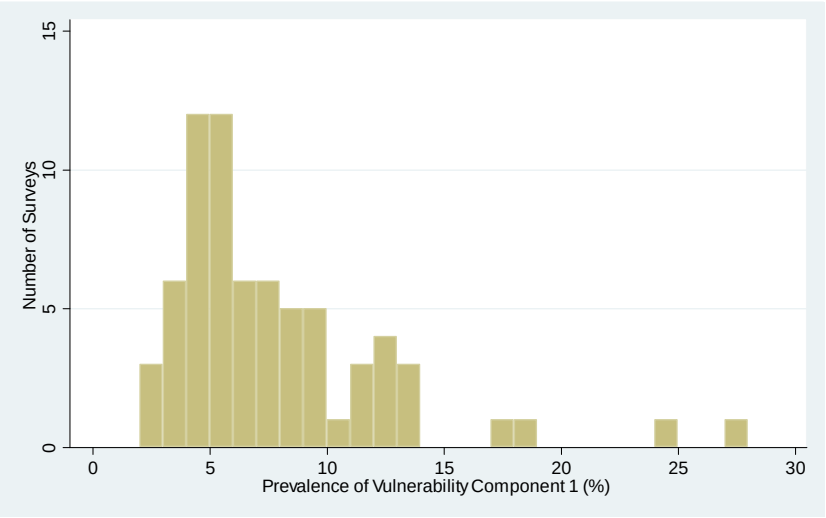
3.1 Overview of the Prevalence of Vulnerability across All Surveys

An overview of the four components and four combinations of vulnerability will now be presented, based on the values of the indicators in the most recent survey in each of the 70 countries. As described earlier, the number of surveys varies across countries. It would be possible to examine the distributions across all surveys, but the interpretation is easier if we select one survey per country—the most recent survey—and use countries rather than surveys as units. There is less variation across countries in the date of the most recent survey than in the dates of all the surveys. Of the 70 most recent surveys, none was in the interval 2000-2004; 18 were in the interval 2005-2009; the remaining 52 were in the interval 2010-2014. 42 surveys were in the three-year interval 2010-2012. The breakdown between DHS and MICS is almost exactly the same is for all surveys: 42 were DHS and 28 were MICS.

All eight distributions will be shown visually with histograms. In all histograms in this section, the horizontal axis is the prevalence, i.e., the percentage of children age 0-17 with the characteristic. The vertical axis is the number of surveys with the specified prevalence. The horizontal and vertical scales, and the width of the bars, differ from one histogram to another because the distributions are so different.

Figure 1 shows the distribution of the first component, the loss of one or both parents. The most common values are 4% and 5%.[12] A total of 42 countries, 60% of the total, are in a narrow range from 4% to 8%. All except 4 countries are in a range from 2% to 13%. In descending order, the 4 countries in which more than 13% of children have experienced the loss of a parent are Lesotho (27.7%), Swaziland (24.3%), Zimbabwe (18.5%), and South Sudan (17.4%). Lesotho, Swaziland, and Zimbabwe are the three countries with highest adult HIV prevalence in Table 4 (23.3%, 27.4%, and 18.0%, respectively). Beyond other considerations, a high prevalence of orphanhood will result in high prevalences of component 2 and combinations 1, 2, and 4.

Figure 1. Distribution of vulnerability component 1 (children who have lost one or both parents) across all 70 countries



[12] "5%", for example, should be interpreted here as 5.00% to 5.99%.

Figure 2. Distribution of vulnerability component 2 (children who are not living with either parent) across all 70 countries

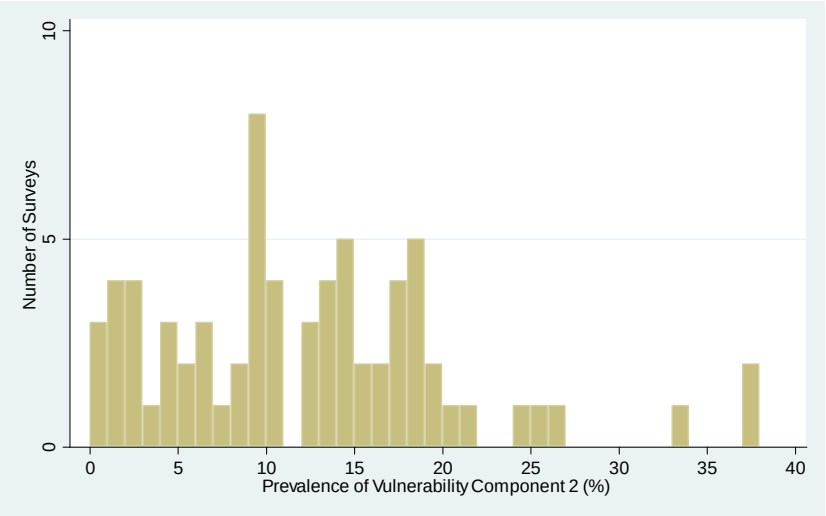


Figure 2 shows much higher dispersion in the prevalence of the second component, which is not living with either parent. In some surveys, virtually no children age 0-17 are living without at least one parent. It is also not unusual for the prevalence to be as high as 20%, although the prevalence drops abruptly after that. Only 6 countries have a prevalence of 24% or more. These are Namibia (37.9%), Lesotho (37.1%), Swaziland (33.3%), Zimbabwe (26.6%), Liberia (25.2%), and Sierra Leone (24.7%). Table 4 shows that the adult prevalence of HIV is high in Namibia (14.3%), but is low in Liberia and Sierra Leone (1.5% and 1.6%, respectively).

If we could follow a birth cohort of children from their birth until they reach age 17, it would be observed that the percentage of children who are orphans and/or not living with a parent is close to 0 at birth and increases steadily with age. The same principle applies to components 1 and 2 and combinations 1 and 2. That is, whatever prevalence is observed for the full age range 0-17, the value for the younger ages will lower and the value for the older ages, say 12-17, will be much higher.

Components 1 and 2 are strongly associated, by definition, but component 3, living in a household in which all the adults have no formal education, does not have a built-in association with those components. The distribution of the percentage of children with this characteristic is shown in Figure 3. The most common values are 0% and 1%, although the distribution is skewed to the right with a tail reaching almost 70% of children. Using an arbitrary threshold of 40%, the countries with the highest prevalence are Niger (69.6%), Burkina Faso (66.8%), South Sudan (64.4%), Mali (60.5%), Chad (52.8%), Afghanistan (49.5%), Guinea (48.3%), Benin (45.1%), and Sierra Leone (42.5%). Other countries with a prevalence above 30% are Ethiopia (38.7%), Côte d'Ivoire (35.8%), Senegal (35.4%), Gambia (32.0%), and Burundi (31.3%). Afghanistan is the only country outside of sub-Saharan Africa to appear among the highest values on the first three vulnerability components.

Figure 3. Distribution of vulnerability component 3 (children who are living in a household in which all of the adults have no education) across all 70 countries

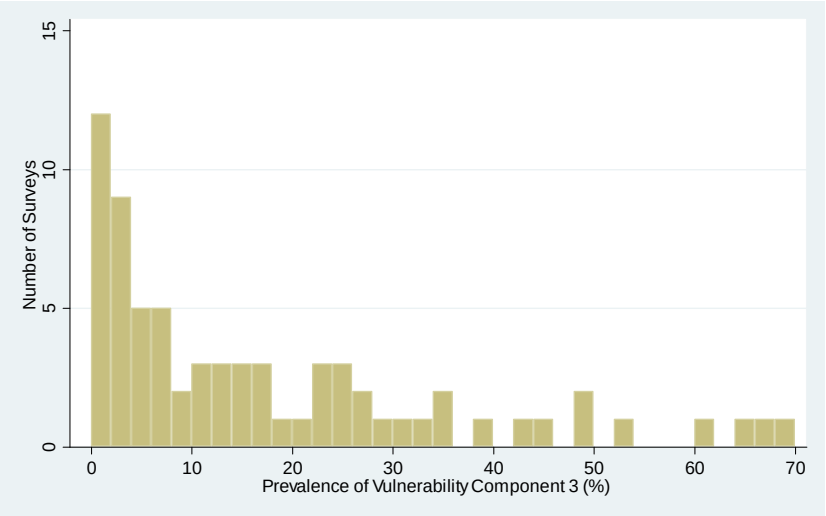
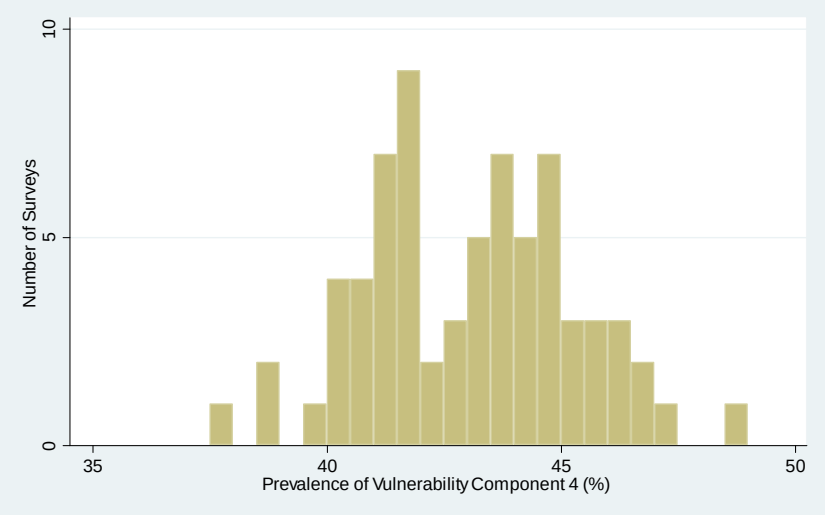


Figure 4. Distribution of vulnerability component 4 (children who are living in a household ranked in the bottom two wealth quintiles) across all 70 countries



The fourth component refers to children in the bottom two quintiles of the wealth index. As mentioned earlier, although it could be expected that 40% of children would be in the bottom two wealth quintiles, there is considerable variation in a range from 38.0% in Moldova to 48.5% in Costa Rica, shown in Figure 4. Most surveys exceed the 40% level because poorer parents tend to have higher fertility, and poorer households usually contain more children.

It would be possible to adjust the fourth component in two ways. For example, the 40% threshold could be calculated on the basis of the continuous wealth scale, for all children age 0-17. This would identify exactly the lowest 40% of children. An alternative would be to use an absolute scale of wealth.

The first three combinations of vulnerability describe children who have one of the first three components *and* are in the bottom two wealth quintiles. If all the children who lost a parent were also in the bottom two wealth quintiles, the prevalence of combination 1 would be the same as the prevalence of component 1. Otherwise, the prevalence of combination 1 will be *less than* the prevalence of component 1. Similarly for

combinations and components 2 and 3. We expect the distributions of combinations 1, 2, and 3 to be similar to the distributions of components 1, 2, and 3, respectively, but more compressed.

The distribution of combination 1, shown in Figure 5, shows this type of similarity and compression when compared with Figure 1. For example, the highest 4 countries in Figure 1 had at least 13% of children who had lost one or both parents. The same countries are the highest 4 in Figure 5, in which they have at least 7% who had lost one or both parents *and* were in the bottom two wealth quintiles. The countries are Lesotho (12.2%), Swaziland (12.0%), Zimbabwe (8.9%), and South Sudan (7.5%). The only other countries with a prevalence of combination 1 above 5% are Namibia (6.8%), Burundi (6.4%), Rwanda (6.4%), Malawi (5.7%), and Uganda (5.6%). The remaining 61 countries have a prevalence below 5%.

Figure 5. Distribution of vulnerability combination 1 (both components 1 and 4) across all 70 countries

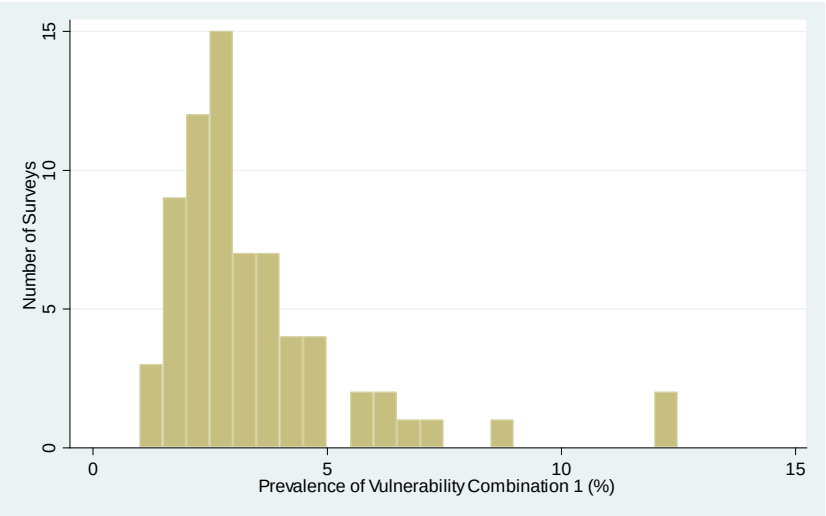
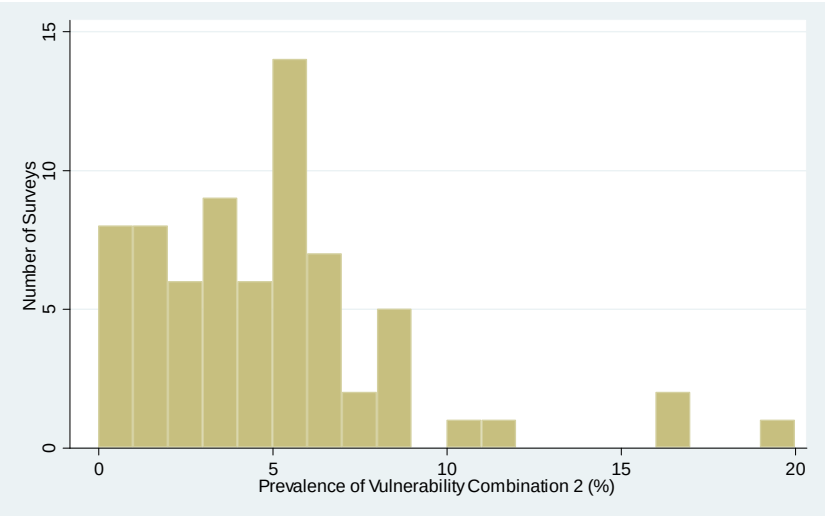


Figure 6. Distribution of vulnerability combination 2 (both components 2 and 4) across all 70 countries



The distribution of combination 2 is shown in Figure 6. Component 2 (in Figure 2) had 6 countries with a prevalence of at least 24%, i.e., 24% of children living without either parent. The highest values in Figure 6 have a prevalence of at least 10%, i.e., 10% of children living without either parent *and* being in the

bottom two wealth quintiles. There are five such countries: Namibia (19.3%), Lesotho (17.0%), Swaziland (16.8%), Zimbabwe (11.9%), and Thailand (10.9%). The highest 4 countries on component 4 are exactly the same, and in the same sequence, as the highest 4 countries on combination 2.

Combination 3, like component 3, has a skewed distribution with a long tail to the right. In Figure 3, the percentage of children living in a household in which no adult had any formal education reached a maximum of approximately 70%, but in Figure 7 the maximum is half of that value, 35%. The same countries that were high on component 3 are also high on combination 3, but on a compressed scale and with some minor re-arrangements. The 12 countries with a prevalence of at least 20% are South Sudan (35.2%), Burkina Faso (34.8%), Niger (34.5%), Mali (31.8%), Guinea (28.7%), Benin (28.7%), Afghanistan (27.2%), Chad (27.0%), Sierra Leone (24.4%), Nigeria (23.5%), Senegal (23.4%), and Ethiopia (22.0%). The only country outside of sub-Saharan Africa with a prevalence of 20% or more is Afghanistan.

Figure 7. Distribution of vulnerability combination 3 (both components 3 and 4) across all 70 countries

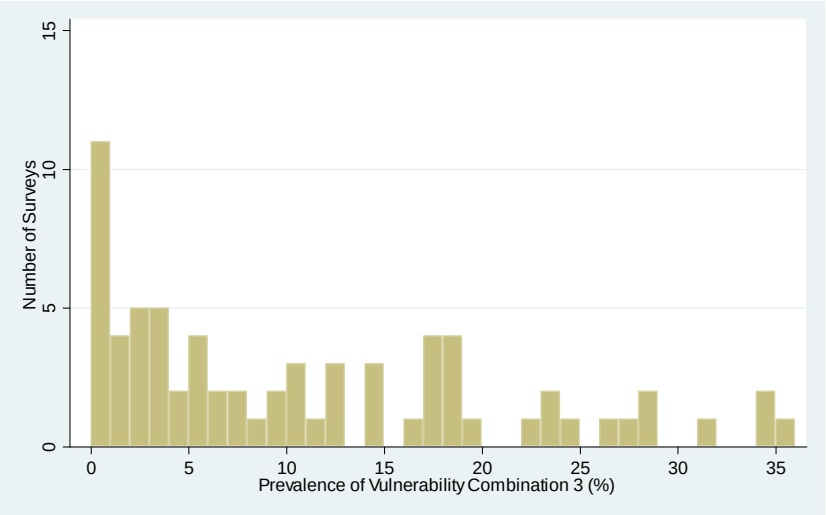
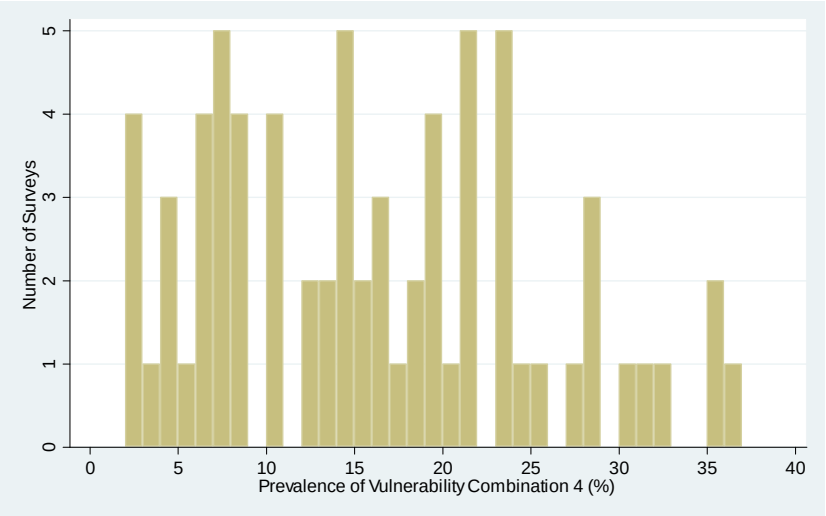


Figure 8. Distribution of vulnerability combination 4 (components 1 or 2 or 3, and component 4) across all 70 countries



Combination 4 is a summary of all four risk factors or vulnerabilities. It identifies children who have *any* of the first three components *and* the fourth component. That is, the combination identifies children who have lost one or both parents, *and/or* are not living with either parent, *and/or* are living in a household in which all adults have no education, *and* are living in a household ranked in the bottom two wealth quintiles. The distribution of the prevalence of this summary combination, across all 70 countries, is shown in Figure 8. The distribution is very wide, with prevalences that range from a minimum of 3% of all children age 0-17 to a maximum of 36%. The countries with the highest prevalences are mainly the countries with the highest levels of component 3. In Figure 8 there are 10 countries with a prevalence of combination 4 of 27% or more: South Sudan (36.9%), Burkina Faso (35.6%), Niger (35.2%), Mali (32.5%), Guinea (31.2%), Benin (30.8%), Sierra Leone (28.7%), Chad (28.4%), Afghanistan (28.0%), and Senegal (27.4%).

We will briefly describe the statistical associations among the risk factors, continuing with the most recent survey from each of the 70 countries. Correlations will be calculated, giving equal weight to each country—that is, not taking into account the sizes of the surveys or countries. To simplify the terminology, the four components will be labelled C1, C2, C3, and C4, respectively, and the four combinations or groupings will be labelled G1, G2, G3, and G4, respectively. The letter "r" will indicate a correlation. For example, the correlation between component 1 and component 2 will be denoted as r(C1,C2).

There are six possible bivariate correlations among the four components of vulnerability. Two of the calculated correlations would be considered numerically large. The largest is r(C1,C2)=0.74. This relationship is expected to be strong by definition, because children who have lost both parents cannot be living with either parent, and children who have lost one parent will have an increased risk of not living with either parent, when compared with children whose parents are still living. The association is fundamentally at the level of individual children, although it would also be expected that a country with many orphans will also have many children living without a parent in the household. Nevertheless, within each country and across countries, there is variation in the degree to which children with living parents will actually be living with those parents. If we calculate the square of r(C1,C2) and multiply by 100, we find that about 55% of the variation in C2 is statistically explained by variation in C1, or vice versa.[13] The remaining 45% of the variation in coresidence is due to other factors, which vary from country to country.

The next largest correlation among the four components is r(C3,C4)=-0.31. We would not expect negative correlations among the indicators of vulnerability. It is counter-intuitive that education and wealth would be negatively correlated. In this case, the negative correlation is clearly spurious. It is not calculated with child-level data within countries, but at an ecological or aggregated level. Component 4, as described earlier, would be expected to be equally likely in all countries, with a prevalence of 40%. If it were exactly 40% in every country, i.e., a constant, then all correlations with component 4 would be zero. Dispersion in this component from one country to another is not due to variations in poverty but to variations in the number of children per household. The negative correlation can largely be traced to 12 countries with very high levels of component 3, but somewhat below average levels of component 4. These are the 12 countries in which the prevalence of component 3 is 35% or more. In a sequence that begins with the highest level of component 3, these are Niger, Burkina Faso, South Sudan, Mali, Chad, Afghanistan, Guinea, Benin, Sierra Leone, Ethiopia, Côte d'Ivoire, and Senegal. Most of these countries are geographically contiguous; only one, Afghanistan, is outside of sub-Saharan Africa. In all of these countries, more than 40% of children are in the bottom two wealth quintiles, but the excess above 40%, which is due mainly to higher fertility in poorer households, is not as great as in most of the other countries. If these 12 countries are excluded, r(C3,C4) drops to -0.08. The sign remains negative but the magnitude is close to zero.

The remaining four correlations among the vulnerability components range from -0.05 to +0.07, with corresponding percentages of explained variation less than 1%. The associations between the first three

[13] Here and elsewhere, calculations are based on more decimal places than are shown.

components and the corresponding combinations, r(C1,G1), r(C2,G2), and r(C3,G3), are very high (0.98, 0.96, and 0.98, respectively) because the variation in the three combinations is driven primarily by the variation in the corresponding components. These high correlations are certainly expected because of the definitions of the first three components and the first three combinations.

The prevalence of combination 4, the synthesis of the four components, is found with regression to have a simple empirical relationship to the prevalence of components 1, 2, 3, and 4: it is almost exactly equal to a weighted average of the prevalences of the four components. The weights for the four components are 0.17, 0.31, 0.45, and 0.07, respectively. These weights add to 1.00 and the R^2 value for the model is 0.99.[14] This regression, with 70 data points—one for the most recent survey from each country—shows that the biggest driver of combination 4 is component 3, the prevalence of children living in households with no educated adults, with a weight of 0.45. Component 2 is next most important, with weight 0.31; component 1 is next most important, with weight 0.17; and component 4 is least important, with weight 0.07.

This regression simply describes an empirical pattern of association among indicators of risk, with no direct implications for child outcomes or for the underlying concept of "vulnerability". Nevertheless, at an aggregate level, it is striking that the prevalence of combination 4, which was constructed for each country with individual-level information, can be reproduced almost perfectly and additively from the prevalences of components 1, 2, 3, and 4. Moreover, the sum of the weights for components 1 and 2 (0.48) is almost exactly the same as the weight for component 3 (0.45). In terms of specifying the synthesized indicator, this suggests an almost equal importance of (a) the survival *and* coresidence status of parents and (b) the formal education of adults in the household. More informative analysis of the associations among vulnerabilities would be conducted with individual children, within specific countries, as the units of analysis.

3.2 The Prevalence of Vulnerabilities in Each Survey

Table 5 lists the observed percentages of children age 0-17 in each survey with each of the four components or four combinations of vulnerability. For most countries, these numbers are remarkably consistent across successive surveys. In Appendix C, the percentages for components 1, 2, and 3, and combination 4, are represented by dots or points. The dots are blue for DHS surveys and red for MICS surveys. The prevalences in the Mali 2012 DHS survey are not actually national, because that survey omitted parts of the country for security reasons. The report on that survey provides a description of its coverage.

Few countries show large changes in the prevalence of the vulnerability indicators. The decline in orphanhood in Rwanda is likely the result of orphans from the genocide of 1994 having grown over time to be above age 18, and with the recovery and stability of the country fewer orphans emerged. In countries with high HIV prevalence, a decline in orphanhood may be due to the increased use of antiretroviral (ARV) drugs, or a decline in the incidence of new HIV cases. Some countries show a decline in component 3 because long-term increases in educational levels, in particular the expansion of primary education, have led to better-educated adults.

Any apparent changes should be confirmed with country-specific investigation. Over a period of five years, say, the prevalence of components 1, 2, or 3 would not be expected to change dramatically. Most (approximately 70% to 75%) of the children under 18 in 2005, for example, were also under 18 in 2010.

[14] These weights are the coefficients in a linear regression of the prevalence of combination 4 on the prevalences of components 1, 2, 3, and 4, with no intercept. There is no mathematical reason why the coefficients should add to 1.00. Without rounding, they add to .9982. When this model is applied to subsets of the 70 countries, the sum of the coefficients can be greater or smaller than 1. The sum of 1.00 for the full dataset is helpful for the interpretation but is not necessary.

One consequence of this demographic continuity is inertia in the prevalence of risk factors. Children who were orphans in 2005 will also be orphans in 2010. If their household contained no educated adults in 2005, the same will almost certainly be true in 2010. At a national level, changes in the prevalence of the risk factors is gradual.

Table 5. The observed percentages of children age 0-17 with each component and combination of vulnerability, in each survey

Country	Survey type	Year	Component				Combination			
			1	2	3	4	1	2	3	4
Afghanistan	MICS	2011	4.7	1.7	49.5	41.0	2.1	0.8	27.2	28.0
Azerbaijan	DHS	2006	3.6	2.1	0.1	43.5	1.4	1.0	0.1	2.2
Bangladesh	MICS	2006	5.9	5.5	24.9	44.0	2.6	1.9	17.7	19.9
Belize	MICS	2006	5.2	6.6	2.6	44.3	1.9	2.4	2.2	5.8
Belize	MICS	2011	3.9	6.9	2.5	45.4	1.7	2.9	2.3	6.1
Benin	DHS	2006	7.1	13.1	45.6	41.6	3.0	4.1	28.0	29.9
Benin	DHS	2012	6.1	14.6	45.1	42.6	2.6	5.4	28.7	30.8
Bolivia	DHS	2003	5.3	7.3	2.8	44.5	2.8	3.0	2.1	6.3
Bolivia	DHS	2008	4.5	9.2	3.7	44.4	2.3	3.7	2.6	6.8
Burkina Faso	MICS	2006	7.4	10.5	62.5	41.4	2.9	2.6	33.9	35.1
Burkina Faso	DHS	2010	5.6	9.4	66.8	41.8	2.1	3.1	34.8	35.6
Burundi	MICS	2005	19.4	8.6	15.7	40.1	8.8	3.4	7.7	14.9
Burundi	DHS	2010	13.3	9.5	31.3	40.2	6.4	3.7	18.5	21.8
Cambodia	DHS	2005	8.8	7.8	7.9	43.8	4.3	2.7	5.9	10.6
Cambodia	DHS	2010	6.9	9.0	6.9	44.9	3.8	3.4	5.3	10.2
Cameroon	DHS	2004	10.3	18.3	17.3	43.1	3.9	5.8	13.3	18.4
Cameroon	MICS	2006	10.6	16.5	17.2	43.2	4.4	5.8	13.7	19.0
Cameroon	DHS	2011	9.7	18.7	15.1	43.7	3.8	6.7	12.4	18.5
Central African Republic	MICS	2006	12.1	16.3	16.4	39.3	4.4	5.7	10.9	15.8
Central African Republic	MICS	2010	12.8	14.7	14.2	40.2	4.7	5.0	9.1	14.0
Chad	DHS	2004	8.1	11.9	55.2	41.4	3.1	4.5	31.2	32.8
Chad	MICS	2010	8.0	9.2	52.8	40.6	3.4	3.1	27.0	28.4
Colombia	DHS	2000	6.3	10.1	2.0	45.3	3.0	4.9	1.7	8.5
Colombia	DHS	2005	6.5	10.3	1.8	45.7	3.1	5.4	1.6	8.6
Colombia	DHS	2010	5.4	9.2	1.3	46.6	2.7	5.3	1.1	7.9
Comoros	DHS	2012	5.1	17.0	23.2	45.6	2.1	6.6	16.7	21.7
Congo	DHS	2005	9.3	16.7	2.4	43.0	3.8	6.2	1.8	9.2
Congo	DHS	2009	6.9	14.6	2.2	42.2	2.7	5.6	1.9	8.1
Congo	DHS	2011	6.7	15.3	2.8	43.1	3.1	5.8	2.2	8.8
Costa Rica	MICS	2011	3.0	4.2	0.7	48.5	1.5	2.4	0.6	4.0
Côte d'Ivoire	DHS	2005	8.1	19.4	34.1	41.8	3.2	6.2	18.7	22.8
Côte d'Ivoire	MICS	2006	8.5	20.7	31.7	42.9	3.3	6.8	19.8	24.5
Côte d'Ivoire	DHS	2012	8.7	21.7	35.8	41.5	3.2	8.3	18.1	23.1
Democratic Republic of the Congo	DHS	2007	9.3	13.6	7.1	39.5	4.0	4.5	4.4	10.1
Democratic Republic of the Congo	MICS	2010	10.4	12.1	6.5	40.5	4.4	4.2	4.1	9.6
Democratic Republic of the Congo	DHS	2013	8.9	13.9	6.4	41.0	4.1	5.2	4.5	10.5
Egypt	DHS	2005	5.0	1.2	10.3	43.7	2.5	0.7	7.9	10.0
Egypt	DHS	2008	4.7	1.1	9.9	43.5	2.6	0.6	8.0	10.4
Egypt	DHS	2014	3.6	0.9	7.9	41.6	1.7	0.4	5.5	7.1
Ethiopia	DHS	2005	11.3	10.4	48.6	41.3	4.8	3.6	27.6	29.4
Ethiopia	DHS	2011	9.3	10.9	38.7	42.0	4.0	3.5	22.0	24.4
Gabon	DHS	2012	6.8	19.8	2.3	41.6	2.6	8.9	1.2	10.8
Gambia	MICS	2006	8.7	15.9	32.0	43.0	3.6	5.7	18.5	23.5
Georgia	MICS	2005	4.9	2.9	0.1	39.0	2.1	1.0	0.1	2.8
Ghana	DHS	2003	7.7	17.7	24.8	43.8	3.4	6.0	17.2	22.0
Ghana	MICS	2006	8.0	14.3	21.2	43.7	3.2	4.3	16.6	20.6
Ghana	DHS	2008	7.6	17.9	19.8	44.1	3.3	6.5	15.3	20.3
Ghana	MICS	2011	7.7	17.1	17.9	44.5	4.1	6.6	14.2	20.1
Guinea	DHS	2012	9.3	18.3	48.3	41.5	3.5	5.9	28.7	31.2

(Continued)

Table 5. – *Continued*

Country	Survey type	Year	Component 1	Component 2	Component 3	Component 4	Combination 1	Combination 2	Combination 3	Combination 4
Guinea-Bissau	MICS	2006	11.5	18.9	26.9	40.9	4.4	7.4	17.3	23.4
Guyana	DHS	2005	7.4	11.5	1.1	47.1	3.7	4.4	1.0	7.5
Guyana	DHS	2009	6.8	12.8	0.5	46.0	3.0	5.3	0.5	7.3
Haiti	DHS	2006	11.4	20.2	20.6	43.5	4.5	6.8	15.4	21.0
Haiti	DHS	2012	12.2	20.6	13.9	44.9	4.9	8.5	10.7	18.4
Honduras	DHS	2006	6.1	13.2	3.7	44.5	2.6	4.7	2.9	8.4
Honduras	DHS	2012	6.4	13.2	2.3	44.8	3.0	5.2	1.9	8.3
India	DHS	2006	4.9	4.3	25.2	46.1	2.7	1.8	19.6	21.6
Iraq	MICS	2011	5.2	1.8	4.1	44.8	2.2	0.7	3.6	5.8
Jamaica	MICS	2011	5.2	12.7	0.1	45.7	2.5	4.8	0.1	6.6
Jordan	DHS	2007	2.7	0.5	0.5	42.6	1.4	0.3	0.5	2.0
Jordan	DHS	2009	3.4	1.0	0.5	43.9	1.5	0.5	0.5	2.2
Jordan	DHS	2012	2.9	0.8	0.5	43.4	1.8	0.5	0.4	2.3
Kazakhstan	MICS	2006	6.8	3.7	0.2	47.1	3.3	1.8	0.1	4.7
Kazakhstan	MICS	2010	5.1	3.3	0.2	46.7	2.6	1.7	0.1	4.1
Kyrgyz Republic	MICS	2005	5.5	5.4	0.1	43.6	2.1	2.3	0.1	4.2
Kyrgyz Republic	DHS	2012	4.0	12.8	0.2	43.1	1.3	6.8	0.1	7.6
Lao PDR	MICS	2006	6.6	3.9	12.1	45.5	3.1	1.2	10.0	12.5
Lao PDR	MICS	2011	5.3	6.3	10.2	47.3	2.9	1.9	8.9	12.0
Lesotho	DHS	2004	28.1	33.3	5.5	41.5	12.5	14.2	3.5	21.1
Lesotho	DHS	2009	27.7	37.1	5.4	43.7	12.2	17.0	3.4	22.0
Liberia	DHS	2007	7.2	22.0	21.3	39.9	3.1	6.5	13.7	18.2
Liberia	DHS	2013	7.2	25.2	17.8	40.4	2.8	8.0	11.9	17.9
Madagascar	DHS	2009	7.3	14.6	12.7	43.3	3.6	5.7	10.2	15.5
Malawi	DHS	2004	14.9	20.1	14.8	40.7	6.7	8.6	10.2	17.4
Malawi	MICS	2006	12.5	18.1	13.9	41.0	5.1	7.0	8.6	14.8
Malawi	DHS	2010	12.6	18.8	10.3	41.5	5.7	7.4	7.5	14.7
Maldives	DHS	2009	3.0	6.2	7.9	44.5	1.7	1.8	5.7	8.5
Mali	DHS	2012	4.5	9.2	60.5	40.7	1.8	3.3	31.8	32.5
Mauritania	MICS	2007	7.7	10.1	16.1	44.0	3.6	4.6	11.7	16.6
Mauritania	MICS	2011	7.2	9.4	13.8	44.9	3.0	4.7	10.1	15.2
Moldova	DHS	2005	4.4	8.8	0.6	41.1	2.3	3.5	0.1	5.3
Moldova	MICS	2012	4.6	10.6	1.4	38.0	2.6	5.0	0.6	7.3
Mozambique	MICS	2008	12.3	14.6	14.4	41.5	4.8	4.8	9.1	14.4
Namibia	DHS	2007	17.4	36.0	7.1	46.7	9.9	19.3	5.2	25.4
Namibia	DHS	2013	13.6	37.9	5.5	46.1	6.8	19.3	4.5	23.5
Nepal	DHS	2006	5.1	7.4	30.5	44.1	2.6	2.2	19.2	21.1
Nepal	DHS	2011	4.9	7.5	27.4	45.4	2.6	2.4	19.0	21.2
Niger	DHS	2012	5.2	10.2	69.6	41.1	2.3	4.4	34.5	35.2
Nigeria	MICS	2007	6.3	7.4	34.6	42.1	2.0	2.0	24.3	25.9
Nigeria	DHS	2008	6.2	11.3	27.4	43.4	2.3	4.2	21.2	24.1
Nigeria	MICS	2011	6.7	8.8	21.3	42.9	2.4	3.1	18.0	20.9
Nigeria	DHS	2013	5.7	10.2	29.1	43.7	1.9	3.6	23.5	25.8
Pakistan	DHS	2012	4.6	2.2	23.3	44.5	2.3	1.0	18.0	19.7
Rwanda	DHS	2005	20.5	14.0	15.5	40.6	9.1	4.4	8.2	15.5
Rwanda	DHS	2010	13.4	13.2	10.6	41.9	6.4	5.3	7.5	14.2
Sao Tome and Principe	DHS	2008	4.4	17.5	5.2	39.9	1.6	5.7	3.3	8.3
Senegal	DHS	2011	7.2	15.2	39.5	44.7	3.2	6.2	26.7	30.3
Senegal	DHS	2013	7.0	14.9	35.4	44.4	3.1	6.0	23.4	27.4
Sierra Leone	MICS	2005	11.3	20.3	51.4	40.2	4.4	6.6	28.6	30.9
Sierra Leone	DHS	2008	11.4	25.6	48.8	40.3	4.4	8.8	27.5	31.0
Sierra Leone	MICS	2010	13.0	22.4	41.4	40.4	4.8	7.2	25.3	28.9
Sierra Leone	DHS	2013	10.4	24.4	42.5	41.3	3.7	8.4	24.4	28.7
Somalia	MICS	2006	9.7	8.5	25.2	40.4	3.5	2.8	14.3	16.9
South Sudan	MICS	2010	17.4	13.2	64.4	41.5	7.5	4.7	35.2	36.9
Sudan	MICS	2010	5.7	4.1	22.6	44.4	2.8	2.2	17.8	20.0

(Continued)

Table 5. – *Continued*

Country	Survey type	Year	Component 1	Component 2	Component 3	Component 4	Combination 1	Combination 2	Combination 3	Combination 4
Swaziland	DHS	2006	23.3	34.2	6.6	44.8	11.4	16.3	4.7	22.6
Swaziland	MICS	2010	24.3	33.3	6.5	45.7	12.0	16.8	5.5	23.6
Tanzania	DHS	2004	10.8	16.2	10.2	41.2	3.6	5.7	7.0	12.5
Tanzania	DHS	2004	9.9	15.6	11.4	41.8	4.0	5.1	8.2	13.6
Tanzania	DHS	2007	10.8	16.7	11.2	41.6	4.8	6.0	7.8	13.9
Tanzania	DHS	2010	9.9	16.8	10.1	42.5	4.3	6.0	8.0	14.2
Tanzania	DHS	2012	9.4	16.7	8.7	42.5	4.0	6.1	6.8	13.4
Thailand	MICS	2006	4.8	19.3	2.2	43.9	2.3	10.9	1.4	12.9
Timor-Leste	DHS	2009	7.2	9.2	18.9	40.9	3.5	3.1	13.0	16.0
Togo	MICS	2006	9.9	16.7	23.9	43.5	3.8	5.3	16.6	21.1
Togo	MICS	2010	9.6	14.7	22.4	44.4	3.9	4.6	15.8	19.7
Togo	DHS	2014	8.8	16.2	21.4	45.2	3.5	5.2	14.5	19.2
Tunisia	MICS	2012	2.8	0.9	3.6	41.8	1.4	0.3	3.1	4.4
Uganda	DHS	2000	14.2	18.9	11.0	39.7	4.9	6.2	7.1	13.1
Uganda	DHS	2006	14.9	19.9	9.6	40.9	6.4	6.7	6.5	13.5
Uganda	DHS	2011	11.8	20.4	9.3	41.1	5.2	7.2	6.0	13.0
Uganda	DHS	2011	11.5	19.0	8.9	42.0	5.6	7.0	6.2	13.6
Ukraine	MICS	2005	5.3	1.0	0.1	44.7	2.7	0.1	0.1	2.9
Ukraine	MICS	2012	4.8	2.7	0.1	38.9	2.2	1.3	0.1	3.1
Uzbekistan	MICS	2006	4.1	1.9	0.1	44.0	1.8	0.7	0.1	2.1
Viet Nam	DHS	2005	4.2	3.9	3.8	45.2	2.5	1.6	3.6	6.8
Viet Nam	MICS	2006	3.8	2.8	2.5	38.5	1.7	0.8	2.3	4.5
Viet Nam	MICS	2010	3.9	5.3	2.5	43.4	2.3	2.6	2.3	6.4
Yemen	MICS	2006	5.2	1.7	17.2	41.8	2.4	0.9	12.9	14.8
Zambia	DHS	2007	14.9	19.2	6.0	42.7	4.9	6.9	4.5	11.6
Zambia	DHS	2013	11.3	17.3	4.1	42.7	4.7	5.9	3.4	10.5
Zimbabwe	DHS	2005	23.9	29.0	4.8	44.9	10.9	12.9	3.4	18.0
Zimbabwe	MICS	2009	25.2	26.1	3.1	44.4	11.4	11.0	2.1	16.5
Zimbabwe	DHS	2010	21.3	29.2	3.3	44.9	9.9	12.9	2.4	17.0
Zimbabwe	MICS	2014	18.5	26.6	3.2	44.8	8.9	11.9	2.3	16.1

3.3 The Number of Vulnerable Children in the Year of Each Survey

Table 6 lists the estimated numbers of children age 0-17 with each type of vulnerability on July 1 of the year of each survey—the year that includes the mean date of interview. The numbers, in thousands of children, are calculated simply by multiplying the UNPD estimated population of children age 0-17 by the proportion of children who have the specified type of vulnerability, as given (in percentages) in Table 5. Most countries have increasing populations of children age 0-17 within the interval from 2000 to 2015. (This generalization does not apply to all countries; for example, the population age 0-17 in Bangladesh is believed to have decreased in recent years, and the UNPD estimates a temporary decline from 2005 to 2010 in Timor-Leste because of political conflict and resulting displacement.) Thus, even if the prevalence of a type of vulnerability does not change, the number of children with that type of vulnerability will tend to increase. The population increase can be substantial. For example, an annual increase of 3% in the base population would produce an increase of about 16% in five years, 34% in ten years, or 56% in 15 years. In the calculation of numbers of children with each type of vulnerability, the population base was not adjusted for incomplete coverage of any surveys, such as occurred in the Mali 2012 DHS survey.

The prevalences in Table 5 and the population estimates in Table 6 are supplemented with smoothed and extrapolated estimates in Appendix C for reference years 2000, 2005, 2010, and 2015, but estimates more than five years beyond the range of the observations are suppressed.

Table 6. The estimated numbers of children age 0-17 with each component and combination of vulnerability, in the year of the survey (July 1, in thousands)

Country	Survey type	Year	Component 1	Component 2	Component 3	Component 4	Combination 1	Combination 2	Combination 3	Combination 4
Afghanistan	MICS	2011	725	258	7,653	6,345	327	121	4,212	4,334
Azerbaijan	DHS	2006	98	58	3	1,201	40	28	3	62
Bangladesh	MICS	2006	3,433	3,249	14,595	25,751	1,550	1,120	10,350	11,673
Belize	MICS	2006	7	9	3	58	2	3	3	8
Belize	MICS	2011	5	9	3	62	2	4	3	8
Benin	DHS	2006	306	561	1,958	1,786	130	176	1,201	1,281
Benin	DHS	2012	302	726	2,244	2,121	131	271	1,425	1,532
Bolivia	DHS	2003	205	279	110	1,714	107	114	79	244
Bolivia	DHS	2008	180	367	147	1,778	90	150	106	270
Burkina Faso	MICS	2006	544	771	4,601	3,049	213	191	2,496	2,587
Burkina Faso	DHS	2010	463	782	5,538	3,464	177	258	2,882	2,947
Burundi	MICS	2005	815	361	658	1,682	370	142	322	624
Burundi	DHS	2010	640	457	1,502	1,933	309	176	890	1,046
Cambodia	DHS	2005	518	462	468	2,587	252	160	351	626
Cambodia	DHS	2010	405	522	404	2,617	221	200	309	591
Cameroon	DHS	2004	938	1,662	1,569	3,914	351	529	1,207	1,676
Cameroon	MICS	2006	1,005	1,567	1,635	4,104	418	552	1,303	1,808
Cameroon	DHS	2011	1,019	1,973	1,593	4,608	406	704	1,305	1,947
Central African Republic	MICS	2006	240	325	326	783	87	113	218	315
Central African Republic	MICS	2010	268	308	298	842	98	105	191	294
Chad	DHS	2004	440	644	2,976	2,235	166	243	1,686	1,769
Chad	MICS	2010	531	604	3,483	2,681	227	203	1,781	1,875
Colombia	DHS	2000	968	1,539	305	6,918	459	755	263	1,292
Colombia	DHS	2005	986	1,559	273	6,886	473	814	237	1,289
Colombia	DHS	2010	799	1,349	191	6,830	403	779	166	1,153
Comoros	DHS	2012	18	59	81	158	7	23	58	75
Congo	DHS	2005	157	282	40	729	65	105	30	155
Congo	DHS	2009	132	279	41	804	51	106	36	155
Congo	DHS	2011	136	309	57	871	62	117	44	177
Costa Rica	MICS	2011	41	57	10	656	21	32	8	55
Côte d'Ivoire	DHS	2005	746	1,775	3,125	3,825	295	565	1,710	2,091
Côte d'Ivoire	MICS	2006	798	1,937	2,964	4,006	306	638	1,851	2,288
Côte d'Ivoire	DHS	2012	918	2,284	3,771	4,373	339	872	1,911	2,437
Democratic Republic of the Congo	DHS	2007	2,970	4,339	2,243	12,564	1,286	1,434	1,393	3,196
Democratic Republic of the Congo	MICS	2010	3,629	4,219	2,276	14,157	1,547	1,481	1,437	3,372
Democratic Republic of the Congo	DHS	2013	3,410	5,320	2,454	15,698	1,563	1,988	1,721	4,025
Egypt	DHS	2005	1,512	351	3,097	13,120	755	196	2,363	3,013
Egypt	DHS	2008	1,450	342	3,041	13,304	789	198	2,458	3,191
Egypt	DHS	2014	1,243	323	2,702	14,243	566	132	1,897	2,426
Ethiopia	DHS	2005	4,580	4,225	19,673	16,716	1,939	1,442	11,161	11,891
Ethiopia	DHS	2011	4,251	4,979	17,691	19,211	1,828	1,615	10,082	11,172
Gabon	DHS	2012	48	141	16	295	19	63	8	77
Gambia	MICS	2006	68	125	251	337	28	45	145	184
Georgia	MICS	2005	52	30	1	413	22	11	1	30
Ghana	DHS	2003	743	1,705	2,387	4,217	326	582	1,657	2,121
Ghana	MICS	2006	817	1,461	2,172	4,478	332	445	1,699	2,107
Ghana	DHS	2008	807	1,904	2,113	4,703	348	693	1,627	2,162
Ghana	MICS	2011	871	1,936	2,031	5,050	470	749	1,605	2,277
Guinea	DHS	2012	536	1,054	2,784	2,395	202	338	1,654	1,800
Guinea-Bissau	MICS	2006	84	139	198	300	12	14	3	24
Guyana	DHS	2005	23	36	3	147	9	16	1	22
Guyana	DHS	2009	21	39	1	141	187	284	642	875
Haiti	DHS	2006	474	844	860	1,816	209	363	457	784
Haiti	DHS	2012	519	878	591	1,915	12	14	3	24
Honduras	DHS	2006	194	424	120	1,429	82	150	92	269
Honduras	DHS	2012	205	420	73	1,423	94	164	59	264
India	DHS	2006	21,874	19,349	112,640	205,851	11,969	8,138	87,395	96,355
Iraq	MICS	2011	796	269	635	6,886	343	100	559	896
Jamaica	MICS	2011	47	113	1	408	23	43	1	59

(Continued)

Table 6. – *Continued*

Country	Survey type	Year	Component 1	Component 2	Component 3	Component 4	Combination 1	Combination 2	Combination 3	Combination 4
Jordan	DHS	2007	68	14	13	1,072	36	7	13	51
Jordan	DHS	2009	93	26	15	1,184	41	13	13	60
Jordan	DHS	2012	86	22	14	1,274	52	13	12	68
Kazakhstan	MICS	2006	323	178	10	2,250	160	87	6	226
Kazakhstan	MICS	2010	243	161	9	2,239	124	83	5	196
Kyrgyz Republic	MICS	2005	108	106	2	850	41	45	2	82
Kyrgyz Republic	DHS	2012	82	263	4	888	26	141	2	157
Lao PDR	MICS	2006	182	109	333	1,256	86	33	277	346
Lao PDR	MICS	2011	149	177	286	1,321	82	54	248	336
Lesotho	DHS	2004	254	301	50	376	113	129	32	191
Lesotho	DHS	2009	251	336	49	396	110	154	31	199
Liberia	DHS	2007	126	385	373	699	54	115	241	319
Liberia	DHS	2013	152	530	375	851	59	169	250	376
Madagascar	DHS	2009	756	1,513	1,313	4,477	372	591	1,058	1,606
Malawi	DHS	2004	992	1,339	989	2,715	446	576	679	1,160
Malawi	MICS	2006	880	1,273	982	2,886	360	494	603	1,042
Malawi	DHS	2010	990	1,474	806	3,258	448	583	586	1,155
Maldives	DHS	2009	4	7	9	53	2	2	7	10
Mali	DHS	2012	388	799	5,242	3,527	152	287	2,752	2,819
Mauritania	MICS	2007	123	161	256	700	58	73	186	264
Mauritania	MICS	2011	126	163	239	780	52	82	175	264
Moldova	DHS	2005	45	90	6	418	23	36	1	54
Moldova	MICS	2012	38	87	12	314	21	41	5	61
Mozambique	MICS	2008	1,478	1,752	1,735	4,986	576	574	1,090	1,733
Namibia	DHS	2007	168	347	68	450	96	186	50	245
Namibia	DHS	2013	141	391	57	477	70	199	46	243
Nepal	DHS	2006	605	876	3,604	5,199	305	262	2,269	2,486
Nepal	DHS	2011	577	875	3,209	5,315	309	278	2,222	2,485
Niger	DHS	2012	518	1,012	6,939	4,097	232	440	3,440	3507
Nigeria	MICS	2007	4,638	5,440	25,570	31,093	1,488	1,493	17,957	19,139
Nigeria	DHS	2008	4,674	8,584	20,769	32,916	1,768	3,219	16073	18,291
Nigeria	MICS	2011	5,513	7,287	17,539	35,326	2,000	2,570	14828	17,230
Nigeria	DHS	2013	4,919	8,895	25,326	38,003	1,644	3,136	20402	22,421
Pakistan	DHS	2012	3,462	1,657	17,414	33,268	1,715	745	13438	14,726
Rwanda	DHS	2005	926	632	697	1,834	410	198	371	701
Rwanda	DHS	2010	670	662	529	2,092	321	265	374	709
Sao Tome and Principe	DHS	2008	4	14	4	33	1	5	3	7
Senegal	DHS	2011	482	1,021	2,661	3,008	216	419	1,797	2,042
Senegal	DHS	2013	501	1,063	2,531	3,174	222	432	1,674	1,960
Sierra Leone	MICS	2005	290	520	1,319	1,031	112	170	734	792
Sierra Leone	DHS	2008	315	706	1,345	1,110	122	241	758	855
Sierra Leone	MICS	2010	375	647	1,196	1,168	137	209	732	834
Sierra Leone	DHS	2013	316	743	1,297	1,261	114	258	743	876
Somalia	MICS	2006	455	398	1,183	1,897	164	130	671	794
South Sudan	MICS	2010	874	666	3,241	2,088	378	234	1,774	1,859
Sudan	MICS	2010	993	728	3,964	7,798	498	390	3,119	3,510
Swaziland	DHS	2006	129	189	36	248	63	90	26	125
Swaziland	MICS	2010	135	185	36	254	67	94	30	131
Tanzania	DHS	2004	2,122	3,192	2,009	8,100	709	1,110	1,377	2,454
Tanzania	DHS	2004	1,949	3,064	2,234	8,209	784	1,010	1,609	2,665
Tanzania	DHS	2007	2,324	3,583	2,413	8,934	1,035	1,281	1,675	2,995
Tanzania	DHS	2010	2,342	3,960	2,375	10,008	1,011	1,409	1,873	3,335
Tanzania	DHS	2012	2,363	4,184	2,187	10,666	1,008	1,522	1,717	3,352
Thailand	MICS	2006	831	3,347	376	7,594	399	1,889	251	2,238
Timor-Leste	DHS	2009	37	48	97	211	18	16	67	83
Togo	MICS	2006	284	480	684	1,248	109	153	476	605
Togo	MICS	2010	304	463	706	1,401	122	145	499	621
Togo	DHS	2014	305	563	743	1,567	122	180	505	668
Tunisia	MICS	2012	87	28	111	1,282	42	9	96	134

(Continued)

Table 6. – *Continued*

Country	Survey type	Year	Component 1	Component 2	Component 3	Component 4	Combination 1	Combination 2	Combination 3	Combination 4
Uganda	DHS	2000	1,891	2,520	1,463	5,287	657	828	953	1740
Uganda	DHS	2006	2,432	3,238	1,570	6,656	1,035	1,096	1,059	2,196
Uganda	DHS	2011	2,243	3,887	1,775	7,847	991	1,370	1,145	2,482
Uganda	DHS	2011	2,197	3,619	1,693	8,008	1,066	1,330	1,186	2,590
Ukraine	MICS	2005	469	85	12	3,933	242	11	9	251
Ukraine	MICS	2012	383	214	8	3,068	176	100	8	248
Uzbekistan	MICS	2006	414	189	10	4,463	182	69	10	210
Viet Nam	DHS	2005	1,190	1,109	1,069	12,785	716	455	1,005	1,910
Viet Nam	MICS	2006	1,058	787	702	10,726	480	229	645	1,253
Viet Nam	MICS	2010	1,016	1,379	657	11,348	607	671	602	1,673
Yemen	MICS	2006	577	190	1,917	4,645	270	100	1,430	1,641
Zambia	DHS	2007	1,017	1,314	408	2,915	336	470	311	794
Zambia	DHS	2013	914	1,394	334	3,446	383	477	271	847
Zimbabwe	DHS	2005	1,542	1,872	308	2,897	701	835	217	1,165
Zimbabwe	MICS	2009	1,701	1,760	206	2,992	768	740	141	1,109
Zimbabwe	DHS	2010	1,449	1,991	226	3,055	675	881	165	1,155
Zimbabwe	MICS	2014	1,365	1,955	239	3,297	654	876	168	1,182

4. Conclusions

This report relies heavily on earlier work by Priscilla Idele and other researchers, primarily at UNICEF, that was described in the introduction. In their framework, child vulnerability is defined in terms of household-level risk factors, more specifically the survivorship of the parents, coresidence with the parents, educational level of adults in the household, and relative poverty. On the basis of the earlier empirical work, it is believed that children with these risk factors, alone or in combination, have increased probabilities of negative outcomes such as malnutrition, lack of schooling, and other childhood deprivations with potentially lifelong consequences.

The objective of this report has been to provide national estimates of the prevalence of these risk factors, and the numbers of children who have them, for use by programs intended to mitigate the risks of negative outcomes.

There has been a transition away from alternative indicators of child vulnerability that have been included in many DHS and MICS surveys and that focus on illness, potentially due to HIV infections. An earlier definition proposed by UNICEF (2005, p. 17) had the following components for use in household surveys:

"A child made vulnerable by HIV/AIDS is below the age of 18 and:

i) has lost one or both parents, or

ii) has a chronically ill parent (regardless of whether the parent lives in the same household as the child), or

iii) lives in a household where in the past 12 months at least one adult died and was sick for 3 of the 12 months before he/she died, or

iv) lives in a household where at least one adult was seriously ill for at least 3 months in the past 12 months."

When vulnerability is defined in such narrow and transitory terms, it is difficult to measure and to link to child outcomes. Illnesses and deaths in the child's household are not restricted to the effects of HIV/AIDS. Such conditions also exclude most of the children in developing countries who are demonstrably at high risk of negative outcomes for other reasons. The new indicators are better suited for global monitoring and multi-country analysis. Individual countries may of course select or define indicators that are most appropriate for their own circumstances, available data, and programs.

Our application of the UNICEF (2014) indicators of child vulnerability has maximized international coverage and relevance to programs that counteract high risk. The report includes 70 countries—all the countries that had a DHS or MICS survey with the required information. The main limitation is that surveys in which the questions on parental survival or coresidence only extended to ages 14 or 15 were discarded, with little significant impact, because almost all the countries that had an early survey with a lower age limit also had at least one subsequent survey that extended to age 17.

The most comprehensive indicator of vulnerability in the new framework is combination 4: children who have lost one or both parents, *and/or* are not living with either parent, *and/or* are living in a household in which all adults have no education, *and* are living in a household ranked in the bottom two wealth quintiles. The prevalence of this synthesis ranges from 3% to 36%. It is highest in the countries which are highest on the respective components, but is most strongly related to the third component, education, because that

component has the broadest distribution across the 70 countries. That is, the absence of any adult with formal education in the household, component 3, has the greatest influence on the main indicator. The prevalence is highest, 27% or more of all children age 0-17, in the following ten countries: South Sudan, Burkina Faso, Niger, Mali, Guinea, Benin, Sierra Leone, Chad, Afghanistan, and Senegal. Afghanistan has the highest prevalence outside of sub-Saharan Africa. South Sudan is the only other country on this list that is outside of a geographically contiguous band from Senegal to Chad.

By including all relevant DHS and MICS surveys, the number of countries that could be included is substantially larger than it would have been with just with one survey program or the other. An examination of Table 1 shows that 32 countries had only a DHS survey (one or more); 22 countries had only a MICS survey (one or more), and 16 countries had both DHS and MICS surveys. Moreover, the use of both DHS and MICS surveys has increased the number of data points within those 16 countries with both types of surveys. The harmonization of questions and categories made it possible to blend the estimates within those countries.

The relevance to programs has been achieved by estimating actual numbers of children at risk, not just the percentages or prevalences. For this purpose, we used the base populations of children age 0-17 estimated by another UN agency, the Population Division. Within DHS publications, the extrapolation from prevalences to population numbers is rare. It is done here to provide denominators for program planning or coverage estimates.

The smoothing and extrapolation of prevalence to provide estimates for a set of reference years—2000, 2005, 2010, 2015—is innovative, at least within DHS reports. The strategy included a simple adjustment for the DEFT that allows for the use of aggregated data, rather than individual-level data. This kind of data reduction is desirable when working with large files—in this case, a total of more than four million children age 0-17 are included in the 135 surveys. Refinement of this adjustment is possible in future analyses.

An important limitation of the approach described here is that it is restricted to children within the household population. The most vulnerable children in most countries are likely to be living outside of households and are not identified with DHS and MICS surveys, which are household-based. For example, many children in the upper end of the 0-17 age interval who are exploited for their labor are outside the household population—even though such exploitation can certainly also take place within households. Children who are displaced by disasters or conflict can be of any age and, even when accompanied by their parents or other adults, are at high risk of negative outcomes but are outside the sampling frame of household surveys.

Two principal directions for potential modifications may be suggested. First, the bottom two wealth quintiles as calculated by DHS and MICS may not be optimal for international comparisons. The wealth quintiles describe variation in household assets *within* a country. It is possible that an absolute measure of wealth would be a better indicator of risk. DHS has developed strategies to move in the direction of absolute measures of wealth while retaining the underlying logic of the continuous version of the wealth index (see Rutstein and Staveteig 2014 and Staveteig and Mallick 2014). Second, an ongoing research objective is the refinement of the risk factors and the clarification of their impact on outcomes that are often age-specific. The synthesis report (UNICEF 2014) examined the relationship of the risk factors to several child health and development outcomes, spanning a child's life cycle; that analysis formed the basis for redefining "vulnerable children," in a way that the current study builds on. Country-specific analyses for selected countries have been completed using the most recent survey data, and UNICEF is in the process of turning those analyses into summary reports and policy briefs.

Research that links household structure with child outcomes is challenging, particularly when restricted to the past and current information in DHS and MICS surveys. We do not know, for example, how long the child has been orphaned or living separately from parents. We have little knowledge of whether there may

be another adult in the household, even if not a parent, who is a dedicated substitute for a parent. We do not know whether the parents or other adults in the household, even if not formally educated themselves, may place a high value on education for the child. Such information is not available in these surveys and would be difficult to incorporate in future surveys. Some other information has been only partially exploited. For example, the current framework could be broadened to take into account how many other children are in the household and how they are related to the adults and the reference child. More use could be made of the relationship to the household head and characteristics of the household head.

Although the framework applied here is compatible with more nuanced research into risk factors and outcomes, there is an advantage to its simplicity. The DHS and MICS data, no matter how cleverly they are refined, will inevitably lead to classifying some children as being at high risk, when in fact they do not have measurable negative outcomes, and to classifying other children as not being at high risk, when in fact they do have negative outcomes, such as not attending school. The estimates provided here are best taken at face value, as the percentages and numbers of children in 70 countries who have specific disadvantages that are likely to lead to deprivations with long-term effects.

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Appendix A. Construction of Indicators

Some specific coding instructions are provided because the relevant variables have some missing values and there can be ambiguity about how they are interpreted. The following Stata instructions are specific to DHS files or MICS files.

In DHS files, hv111 is survival of the mother (1=yes, 0=no) and hv113 is survival of the father. hv112 is line mother of the mother, if in the household, and hv114 is line number of the father, if in the household. In a step not shown here, hv112 and hv114 are recoded to the value 98 if the parent is in the household but is not a *de jure* resident.

```
gen one_or_both_parents_dead=0
replace one_or_both_parents_dead=1 if hv111==0 | hv113==0

gen with_neither_parent=0
replace with_neither_parent=1 if (hv112==0 | hv112>=98) & (hv114==0 |
hv114>=98)
```

In MICS files, the variables corresponding with hv111-hv114 have different names in different surveys. For convenience, after the variables were identified, they were renamed hv111-hv114, but the values were not recoded. The MICS files are always limited to *de jure* residents so it was not necessary to construct codes 98 for hv112 and hv114. The renamed hv111 and hv113 MICS variables are consistently coded with 1=yes and 2=no. In order to match the numbers in MICS reports, some missing value codes need to be introduced.

```
gen one_or_both_parents_dead=0
replace one_or_both_parents_dead=1 if hv111==2 | hv113==2
replace one_or_both_parents_dead=. if (hv111==1 & hv113>2) | (hv111>2 &
hv113==1) | (hv111>2 & hv113>2)

gen mo_in_hh=0
replace mo_in_hh=1 if hv112>0 & hv112<.
replace mo_in_hh=. if hv111>2 & hv112==.
gen fa_in_hh=0
replace fa_in_hh=1 if hv114>0 & hv114<.
replace fa_in_hh=. if hv113>2 & hv114==.

gen with_neither_parent=0
replace with_neither_parent=1 if mo_in_hh==0 & fa_in_hh==0
```

The matching criteria for these calculations were the percentages of children with one or both parents dead, or living with neither parent, in DHS and MICS main reports, on STATcompiler, or in table 8 of the UNICEF report. It is difficult to match all numbers exactly, but it is believed that any discrepancies are negligible, rarely as much as one percentage point, and can be traced to rounding error.

All calculations for this report were done with Stata 13.

Appendix B. Population Estimates of Children Age 0-17 in 2000, 2005, 2010, and 2015

Table B.1. For each country included in this report, the estimated population age 0-17 in 2000, 2005, 2010, and 2015 (July 1, in thousands). Estimates from the U.N. Population Division, 2015 Revision

	Year			
Country	**2000**	**2005**	**2010**	**2015**
Afghanistan	10,865	13,232	15,167	16,716
Azerbaijan	3,024	2,802	2,600	2,538
Bangladesh	57,622	58,656	58,213	57,168
Belize	118	129	136	140
Benin	3,610	4,181	4,760	5,312
Bolivia	3,744	3,923	4,060	4,138
Burkina Faso	6,234	7,150	8,289	9,475
Burundi	3,804	4,197	4,803	5,685
Cambodia	6,133	5,901	5,827	5,850
Cameroon	8,308	9,292	10,334	11,472
Central African Rep	1,817	1,967	2,097	2,242
Chad	4,619	5,609	6,600	7,671
Colombia	15,267	15,078	14,670	14,144
Comoros	280	305	334	368
Congo	1,501	1,694	1,962	2,259
Costa Rica	1,441	1,411	1,363	1,308
Côte d'Ivoire	8,236	9,159	10,129	11,193
Democratic Republic of the Congo	25,482	29,837	34,978	40,639
Egypt	29,602	30,021	30,993	35,095
Ethiopia	35,400	40,446	45,085	48,448
Gabon	581	631	684	748
Gambia	647	758	895	1,051
Georgia	1,268	1,058	906	832
Ghana	9,067	10,030	11,104	12,330
Guinea	4,457	4,888	5,499	6,196
Guinea-Bissau	665	721	787	871
Guyana	306	312	306	279
Haiti	4,069	4,160	4,248	4,294
Honduras	3,084	3,207	3,218	3,109
India	432,541	445,384	452,501	451,990
Iraq	11,738	13,157	14,933	17,270
Jamaica	1,000	974	911	821
Jordan	2,218	2,352	2,794	3,160
Kazakhstan	5,009	4,771	4,798	5,356
Kyrgyz Republic	2,057	1,951	1,994	2,170
Lao PDR	2,677	2,755	2,791	2,813
Lesotho	900	905	905	921
Liberia	1,445	1,627	1,963	2,203
Madagascar	8,120	9,409	10,583	11,776
Malawi	6,002	6,856	7,849	8,949
Maldives	137	127	118	119
Mali	5,892	6,855	8,132	9,526
Mauritania	1,342	1,521	1,704	1,890
Moldova	1,230	1,016	862	777
Mozambique	9,413	10,977	12,764	14,589
Namibia	891	947	992	1,063
Nepal	11,283	11,802	11,803	11,316
Niger	6,052	7,440	9,158	11,332
Nigeria	61,723	69,896	80,134	91,855

(Continued)

Table B.1. – *Continued*

Country	Year			
	2000	2005	2010	2015
Pakistan	66,057	69,344	72,822	77,779
Rwanda	4,248	4,512	4,994	5,532
Sao Tome and Principe	70	78	85	94
Senegal	5,142	5,759	6,530	7,596
Sierra Leone	2,070	2,565	2,890	3,166
Somalia	3,942	4,577	5,201	5,787
South Sudan	3,418	4,122	5,036	6,028
Sudan	14,140	15,887	17,563	18,954
Swaziland	557	552	556	569
Tanzania	17,593	20,198	23,554	27,611
Thailand	18,312	17,761	15,647	14,656
Timor-Leste	482	545	509	581
Togo	2,506	2,798	3,155	3,553
Tunisia	3,500	3,209	3,033	3,115
Uganda	13,330	15,776	18,518	21,473
Ukraine	10,534	8,790	7,892	7,897
Uzbekistan	10,729	10,231	9,849	10,081
Viet Nam	30,553	28,295	26,140	25,578
Yemen	9,918	10,944	11,813	12,629
Zambia	5,660	6,459	7,429	8,535
Zimbabwe	6,326	6,455	6,811	7,504

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This appendix gives the vulnerability indicators and population estimates for each country as of July 1 of reference years 2000, 2005, 2010, and 2015, except when those dates are more than five years before or after the dates of the surveys, defined as the mean date of interview. The estimated percentages of children age 0-17 who have the component or combination of vulnerability are obtained by smoothing and extrapolating the available survey data, as described in the report. All countries that had a DHS or MICS survey in the interval from 2000 to 2014 with the parental survival and coresidence information up to age 17 are included. For convenience, the four components and combinations of vulnerability are listed again:

Component 1: Children who have lost one or both parents

Component 2: Children who are not living with either parent

Component 3: Children living in a household in which all adults have no education

Component 4: Children living in a household ranked in the bottom two wealth quintiles

Combination 1: Children with risk components 1 and 4

Combination 2: Children with risk components 2 and 4

Combination 3: Children with risk components 3 and 4

Combination 4: Children with risk components 1 or 2 or 3 and with risk component 4

When there was only one survey, the same prevalence estimates are given for the reference years immediately before and after. For example, if there was only one survey, and it was in 2006, then the prevalences from that survey are given in table 5 of the report and the population numbers are given in table 6 of the report, both for 2006, but in this appendix the prevalences and population numbers are given for 2005 and 2010. Users who have reason to believe that the underlying prevalences changed between 2005 and 2010 are free to ignore the extrapolations to 2005 and 2010.

The estimated percentages for components 1, 2, 3, and combination 4 are shown graphically. The graphs include approximate 95% confidence bands. The estimated percentages for all components and combinations are given numerically in a table. Estimated numbers of children, in thousands, are obtained by applying the percentages to the estimated numbers of children age 0-17, at the specified reference dates, from the U.N. Population Division World Population Prospects, 2015 Revision. Those population numbers are given in Appendix B.

Figure AF. Observed and fitted percentages of children age 0-17 in Afghanistan with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

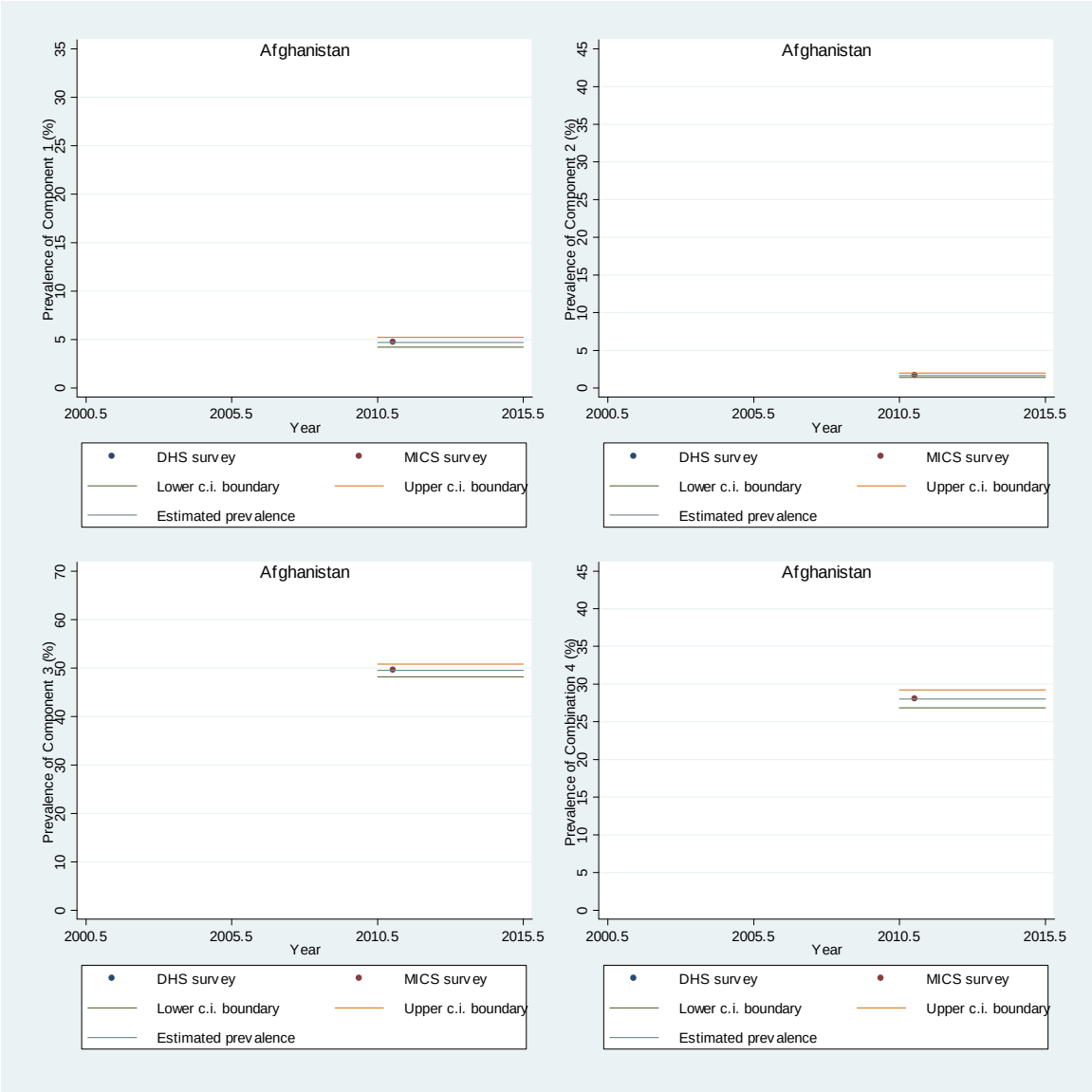


Table AF. Fitted percentages and estimated populations of children age 0-17 in Afghanistan with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	4.7	1.7	49.5	41.0	2.1	0.8	27.2	28.0
2010	Population	711	253	7,506	6,223	321	119	4,131	4,250
2015	Percentage	4.7	1.7	49.5	41.0	2.1	0.8	27.2	28.0
2015	Population	783	279	8,272	6,859	354	131	4,552	4,684

Figure AZ. Observed and fitted percentages of children age 0-17 in Azerbaijan with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

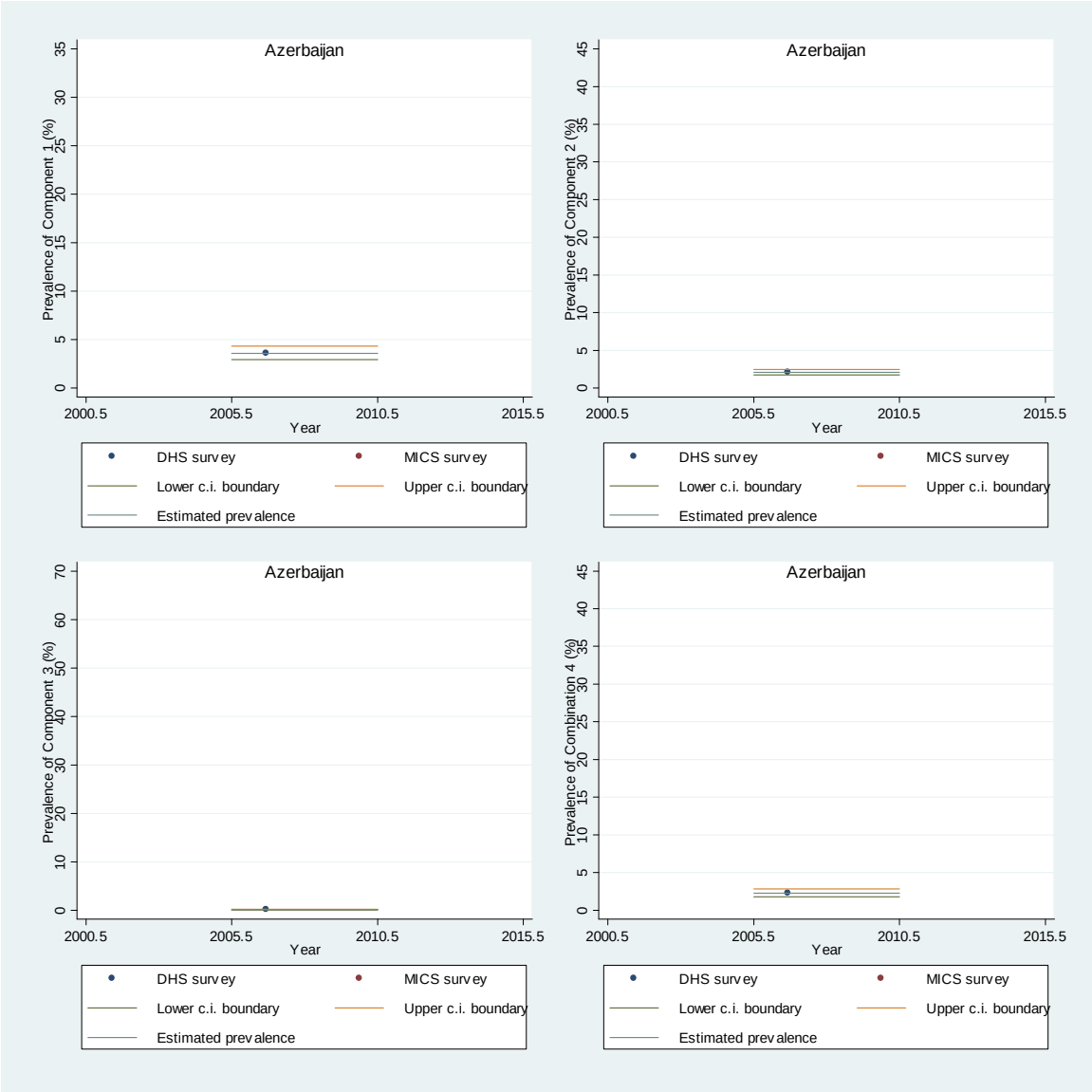


Table AZ. Fitted percentages and estimated populations of children age 0-17 in Azerbaijan with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	3.6	2.1	0.1	43.5	1.4	1.0	0.1	2.2
2005	Population	100	58	3	1219	40	28	3	63
2010	Percentage	3.6	2.1	0.1	43.5	1.4	1.0	0.1	2.2
2010	Population	93	54	3	1131	37	26	3	58

Figure BD. Observed and fitted percentages of children age 0-17 in Bangladesh with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

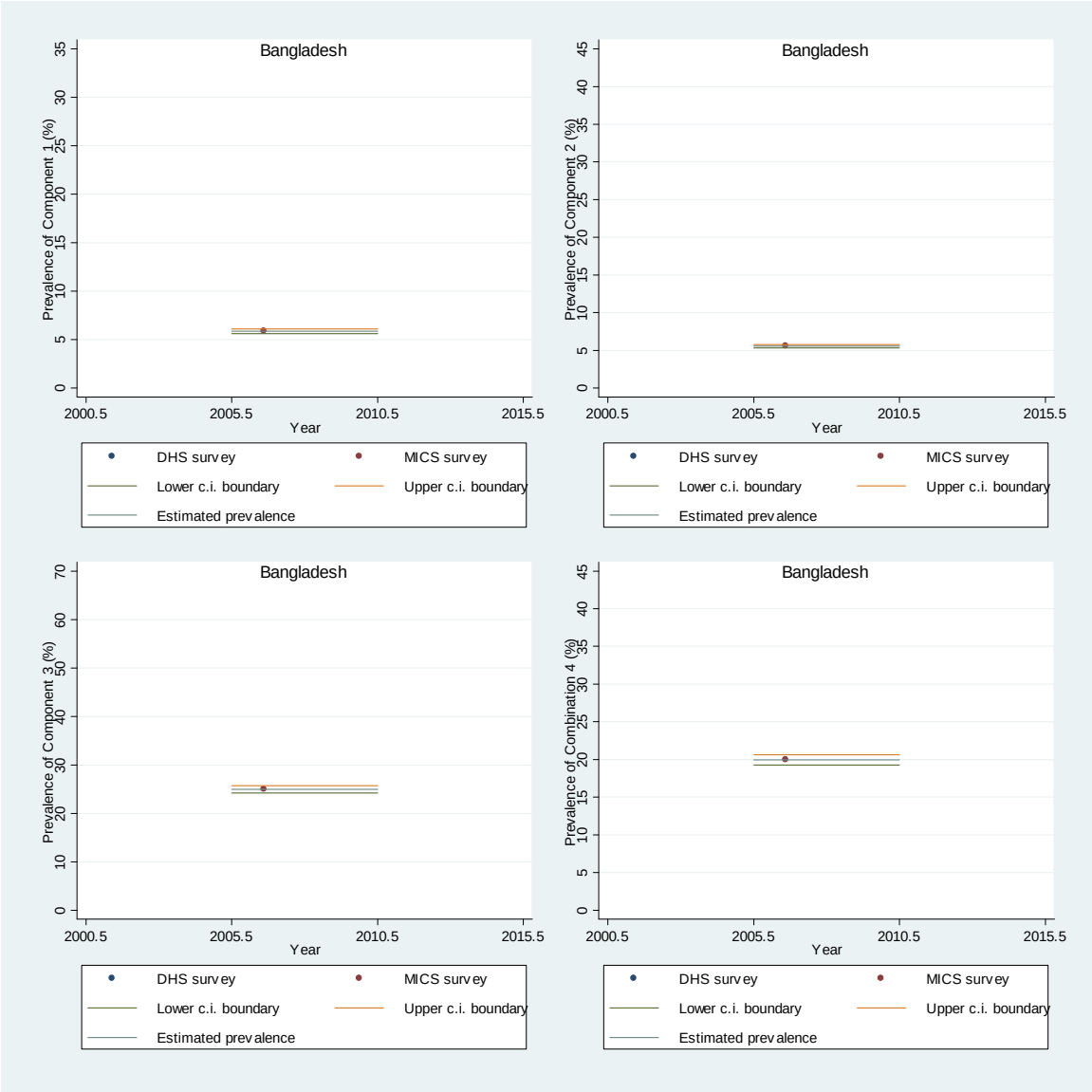


Table BD. Fitted percentages and estimated populations of children age 0-17 in Bangladesh with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	5.9	5.5	24.9	44.0	2.6	1.9	17.7	19.9
2005	Population	3,438	3,254	14,617	25,790	1,552	1,122	10,365	11,691
2010	Percentage	5.9	5.5	24.9	44.0	2.6	1.9	17.7	19.9
2010	Population	3,412	3,229	14,506	25,596	1,541	1,113	10,287	11,602

Figure BZ. Observed and fitted percentages of children age 0-17 in Belize with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

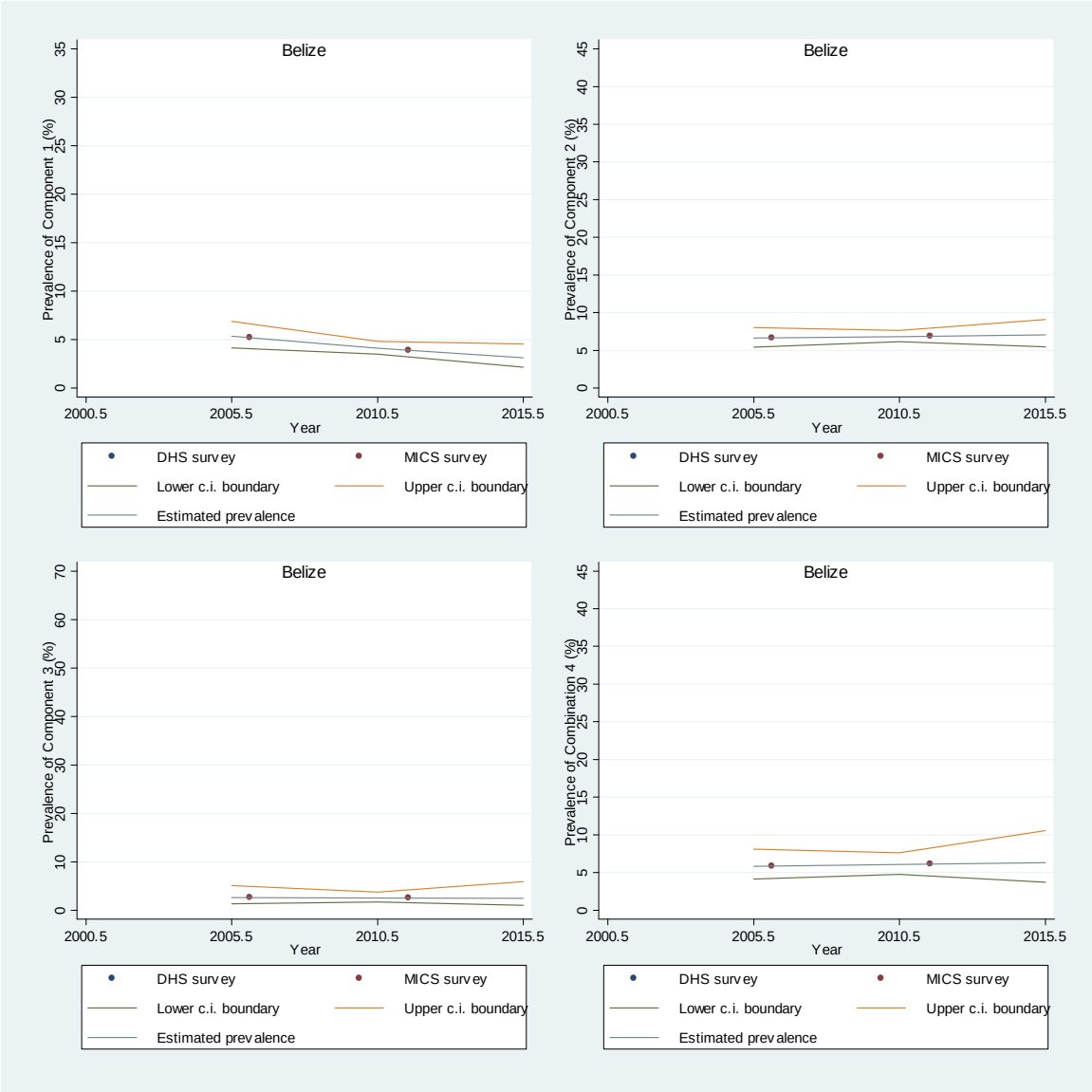


Table BZ. Fitted percentages and estimated populations of children age 0-17 in Belize with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	5.4	6.6	2.6	44.1	1.9	2.4	2.2	5.8
2005	Population	7	9	3	57	2	3	3	7
2010	Percentage	4.1	6.8	2.5	45.2	1.7	2.8	2.3	6.1
2010	Population	6	9	3	61	2	4	3	8
2015	Percentage	3.1	7.1	2.5	46.3	1.6	3.3	2.4	6.3
2015	Population	4	10	3	65	2	5	3	9

Figure BJ. Observed and fitted percentages of children age 0-17 in Benin with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

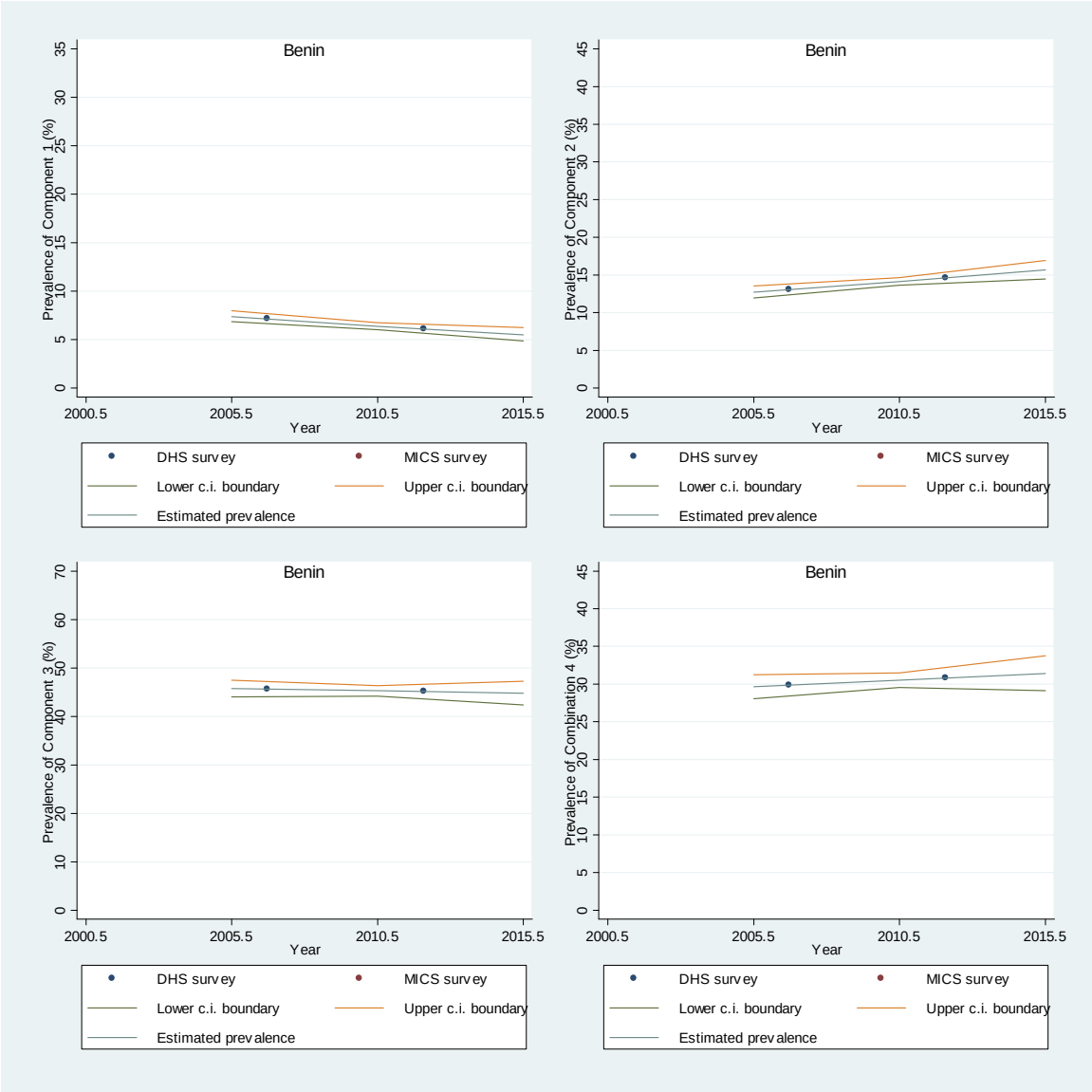


Table BJ. Fitted percentages and estimated populations of children age 0-17 in Benin with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	7.4	12.7	45.8	41.4	3.1	3.8	27.8	29.6
2005	Population	309	532	1,913	1,731	130	161	1,164	1,239
2010	Percentage	6.4	14.1	45.3	42.3	2.7	5.0	28.5	30.5
2010	Population	303	673	2,155	2,015	130	239	1,355	1,453
2015	Percentage	5.5	15.7	44.8	43.3	2.4	6.5	29.1	31.4
2015	Population	292	832	2,380	2,299	128	346	1,545	1,668

Figure BO. Observed and fitted percentages of children age 0-17 in Bolivia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

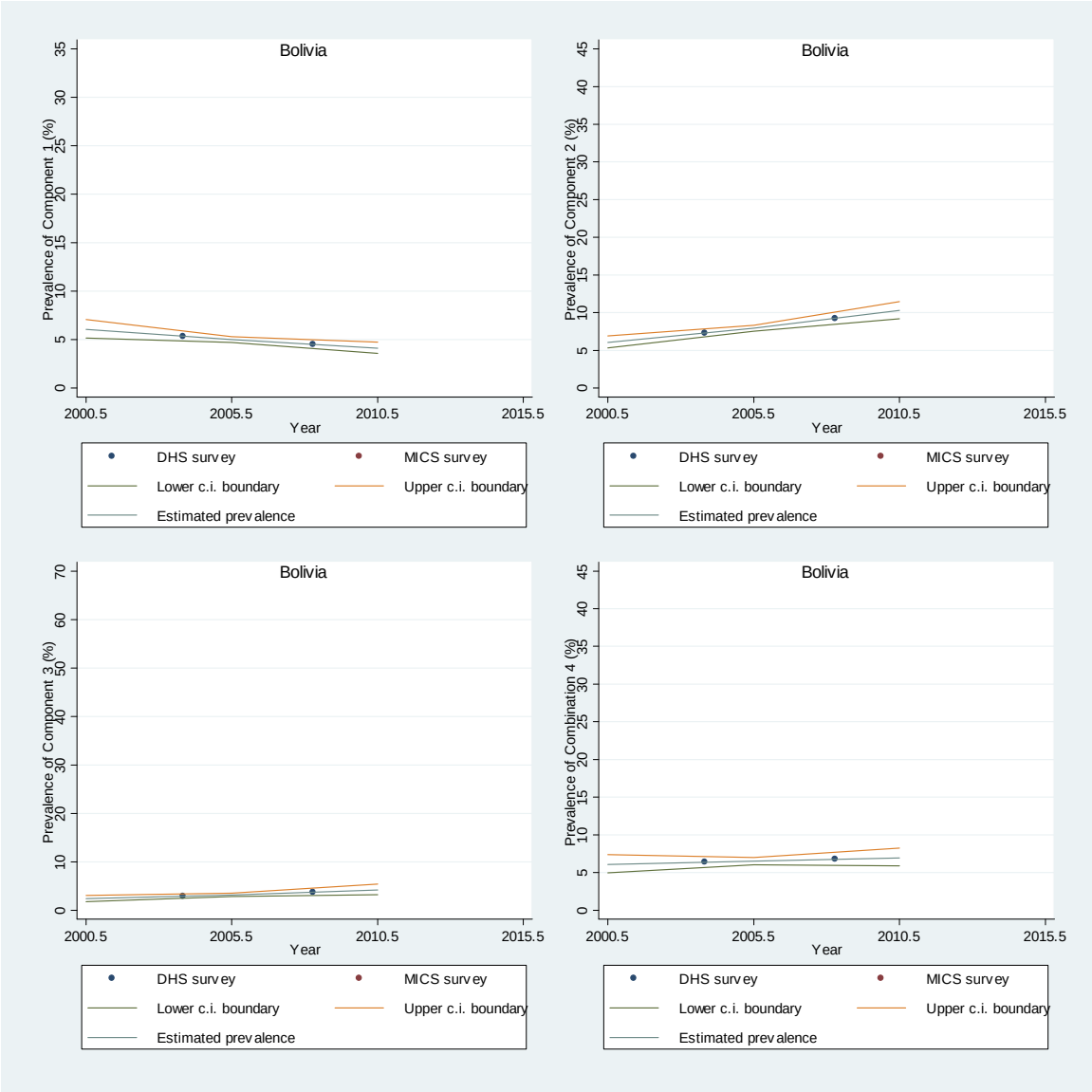


Table BO. Fitted percentages and estimated populations of children age 0-17 in Bolivia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	6.0	6.1	2.3	44.6	3.3	2.5	1.7	6.1
2000	Population	226	227	88	1,670	122	93	64	227
2005	Percentage	5.0	7.9	3.1	44.5	2.6	3.2	2.3	6.5
2005	Population	196	311	123	1,744	101	127	88	255
2010	Percentage	4.1	10.3	4.2	44.3	2.0	4.2	3.0	7.0
2010	Population	167	418	169	1,800	82	170	121	283

Figure BF. Observed and fitted percentages of children age 0-17 in Burkina Faso with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

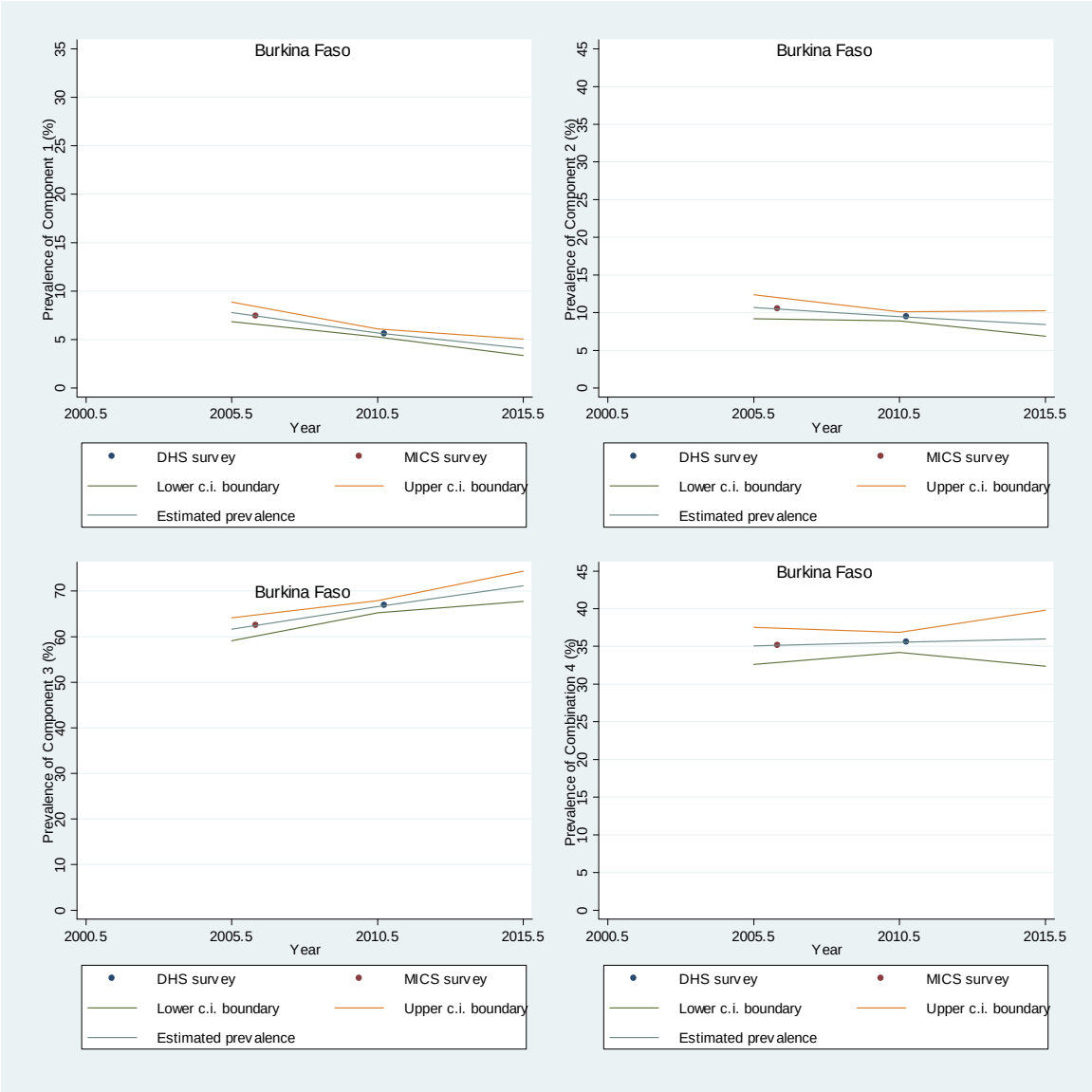


Table BF. Fitted percentages and estimated populations of children age 0-17 in Burkina Faso with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	7.8	10.7	61.6	41.3	3.1	2.5	33.7	35.1
2005	Population	557	764	4,407	2,955	219	179	2,412	2,506
2010	Percentage	5.7	9.5	66.6	41.8	2.2	3.1	34.7	35.5
2010	Population	470	787	5,519	3,462	180	255	2,878	2,945
2015	Percentage	4.1	8.4	71.2	42.2	1.5	3.8	35.7	36.0
2015	Population	389	798	6,744	3,999	145	359	3,384	3,412

Figure BU. Observed and fitted percentages of children age 0-17 in Burundi with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys. The MICS 2005 and DHS 2010 surveys are inconsistent and are not pooled.

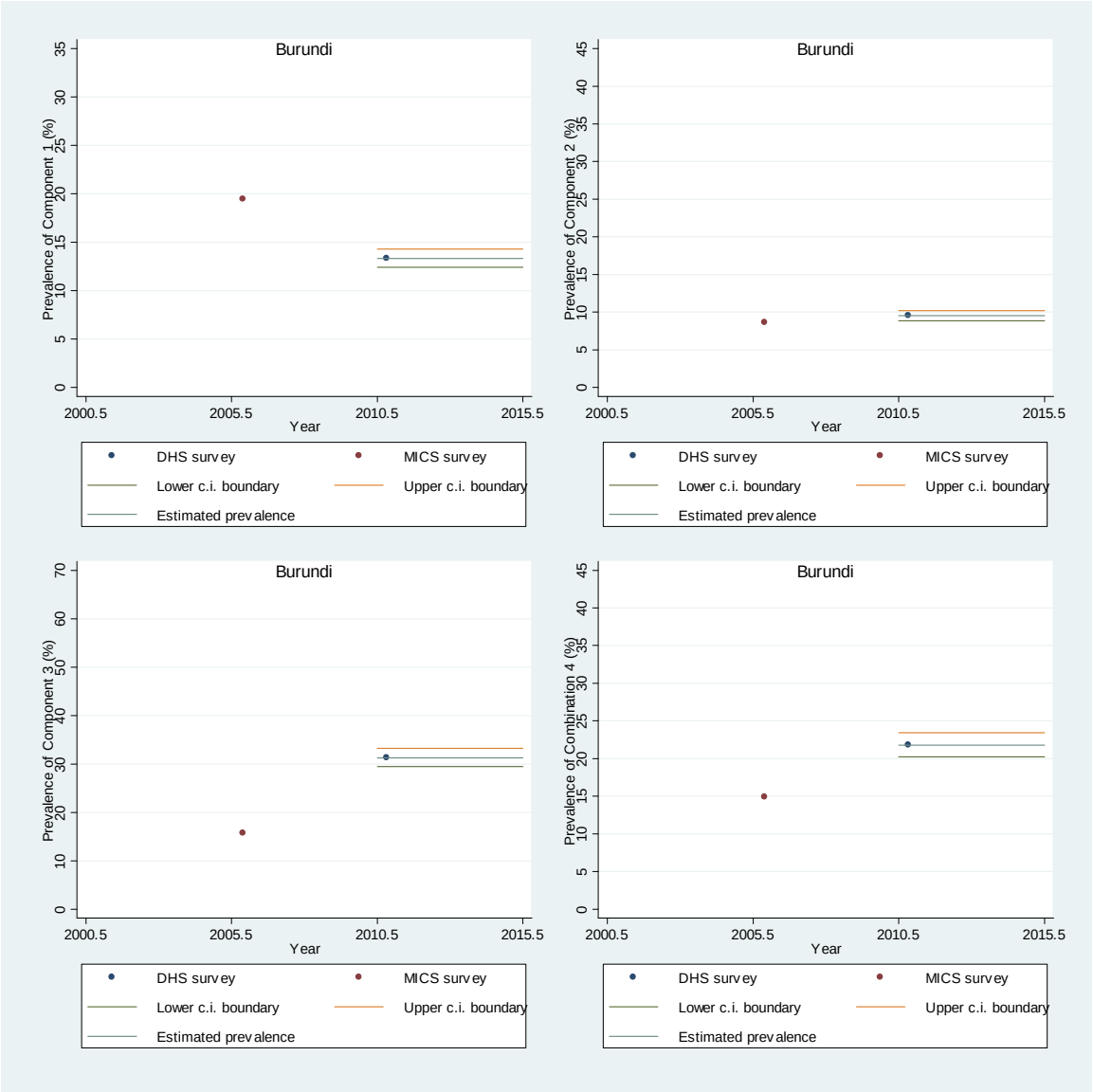


Table BU. Fitted percentages and estimated populations of children age 0-17 in Burundi with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. The MICS 2005 survey has inconsistent values for components 1 and 2. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	13.3	9.5	31.3	40.2	6.4	3.7	18.5	21.8
2010	Population	640	457	1,502	1,933	309	176	890	1,046
2015	Percentage	13.3	9.5	31.3	40.2	6.4	3.7	18.5	21.8
2015	Population	757	541	1,778	2,288	366	209	1,054	1,238

Figure KH. Observed and fitted percentages of children age 0-17 in Cambodia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

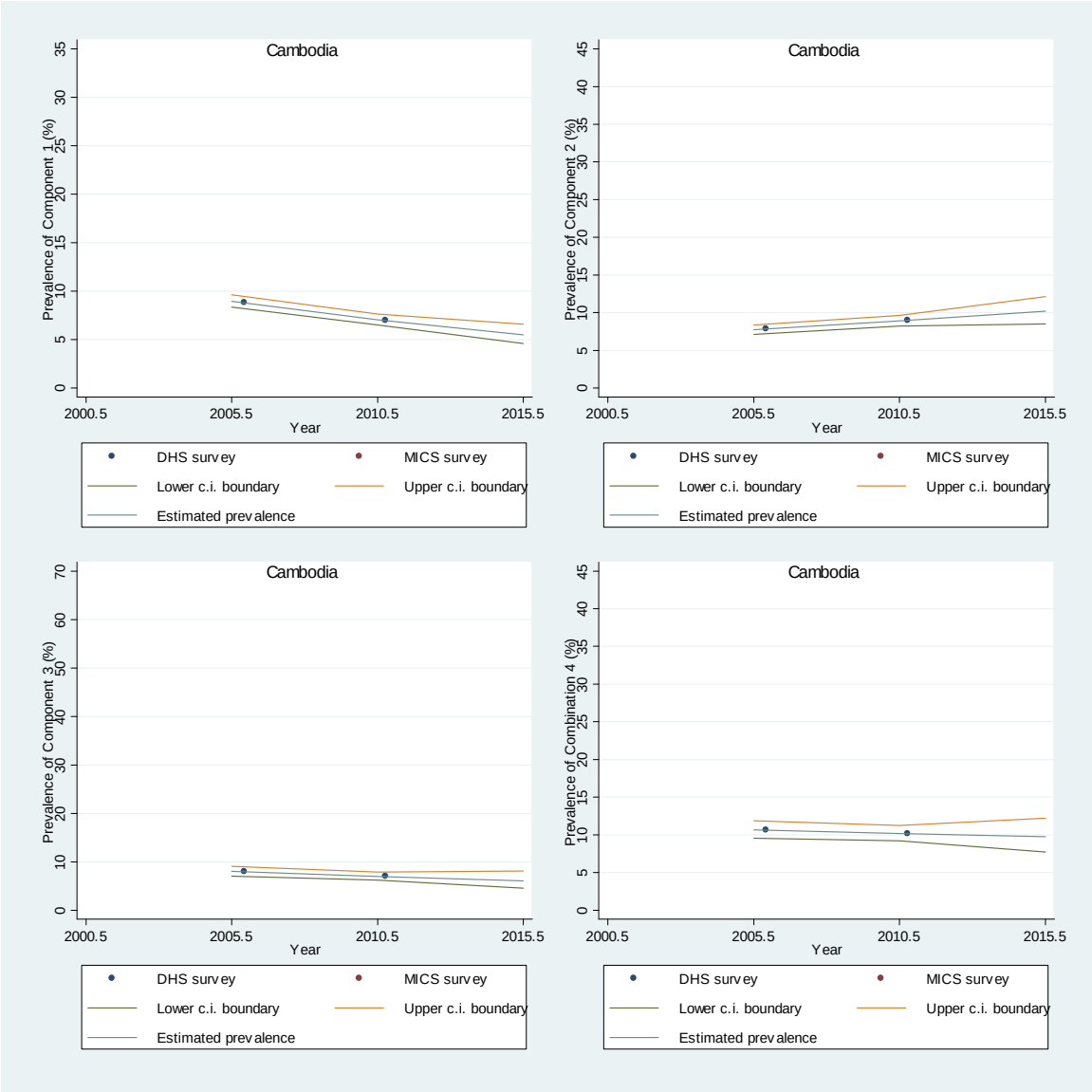


Table KH. Observed and fitted percentages of children age 0-17 in Cambodia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	9.0	7.7	8.0	43.7	4.3	2.6	6.0	10.7
2005	Population	529	456	473	2,582	254	156	354	629
2010	Percentage	7.0	8.9	7.0	44.8	3.8	3.4	5.3	10.2
2010	Population	410	518	407	2,613	222	197	311	593
2015	Percentage	5.5	10.2	6.1	45.9	3.4	4.3	4.8	9.7
2015	Population	322	596	356	2,688	197	252	278	569

Figure CM. Observed and fitted percentages of children age 0-17 in Cameroon with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

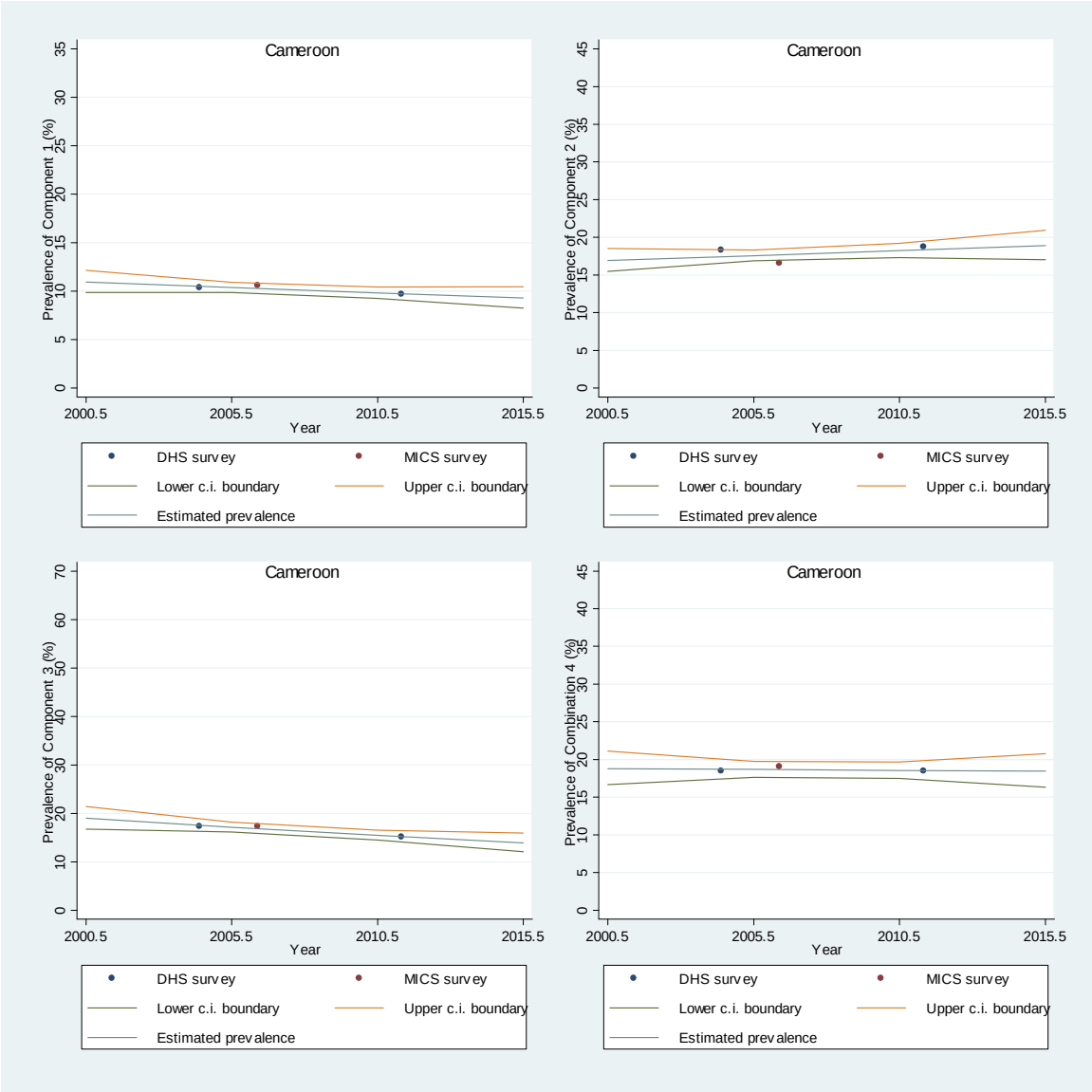


Table CM. Fitted percentages and estimated populations of children age 0-17 in Cameroon with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	10.9	16.9	19.0	42.7	4.2	5.3	14.2	18.8
2000	Population	909	1,407	1,575	3,551	345	437	1,184	1,560
2005	Percentage	10.4	17.6	17.1	43.2	4.0	5.9	13.4	18.7
2005	Population	963	1,632	1,591	4,011	375	545	1,245	1,734
2010	Percentage	9.8	18.2	15.4	43.6	3.9	6.5	12.6	18.5
2010	Population	1,014	1,883	1,595	4,505	405	674	1,300	1,916
2015	Percentage	9.3	18.9	13.9	44.0	3.8	7.2	11.8	18.4
2015	Population	1,065	2,167	1,593	5,050	437	832	1,356	2,114

Figure CF. Observed and fitted percentages of children age 0-17 in Central African Republic with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

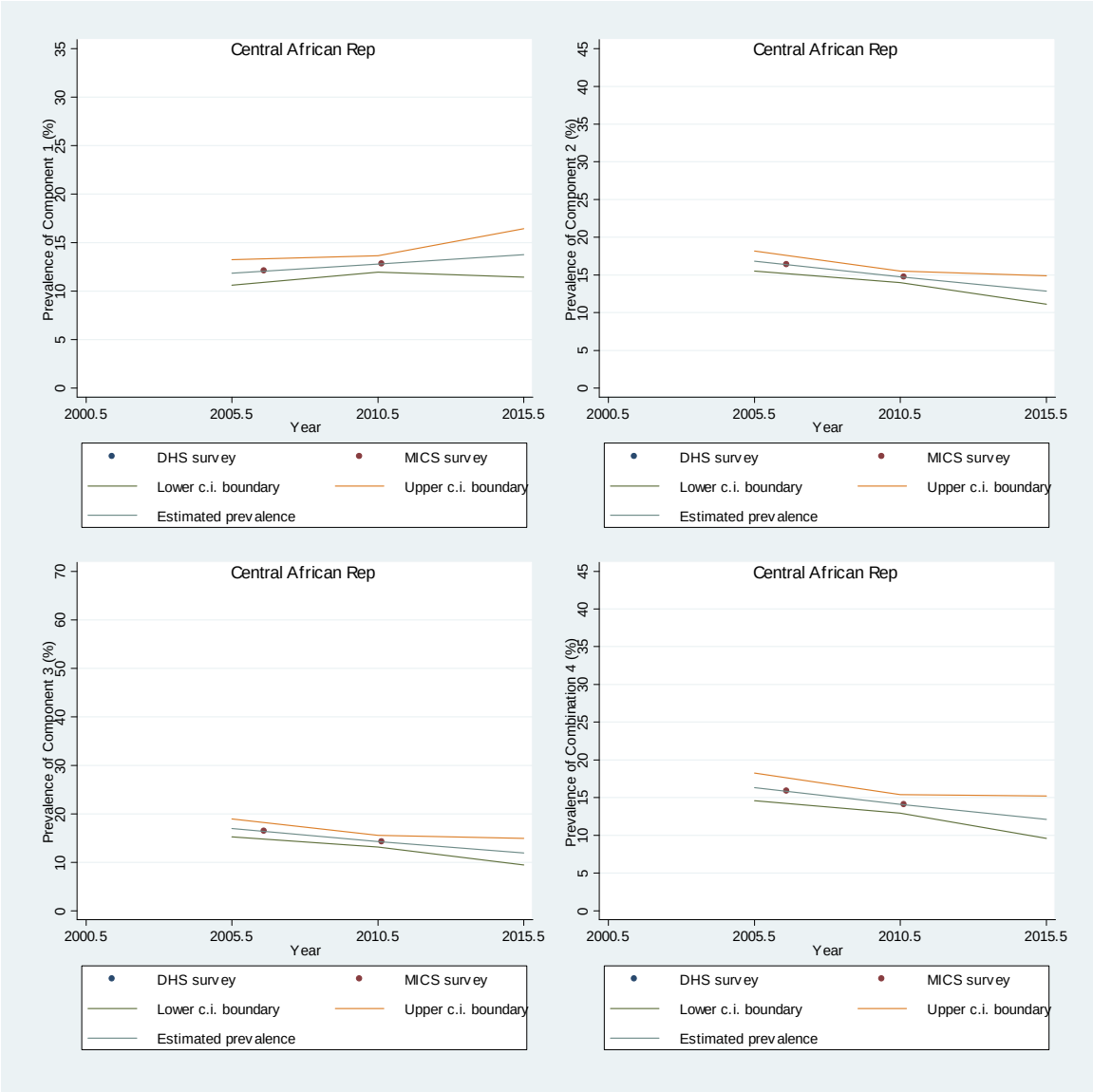


Table CF. Fitted percentages and estimated populations of children age 0-17 in Central African Republic with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	11.9	16.8	17.0	39.1	4.3	5.9	11.5	16.3
2005	Population	233	331	334	769	84	116	227	321
2010	Percentage	12.8	14.7	14.3	40.1	4.7	5.0	9.2	14.1
2010	Population	268	309	299	841	98	105	192	296
2015	Percentage	13.7	12.9	11.9	41.2	5.1	4.2	7.2	12.1
2015	Population	308	289	268	924	114	95	162	272

Figure TD. Observed and fitted percentages of children age 0-17 in Chad with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

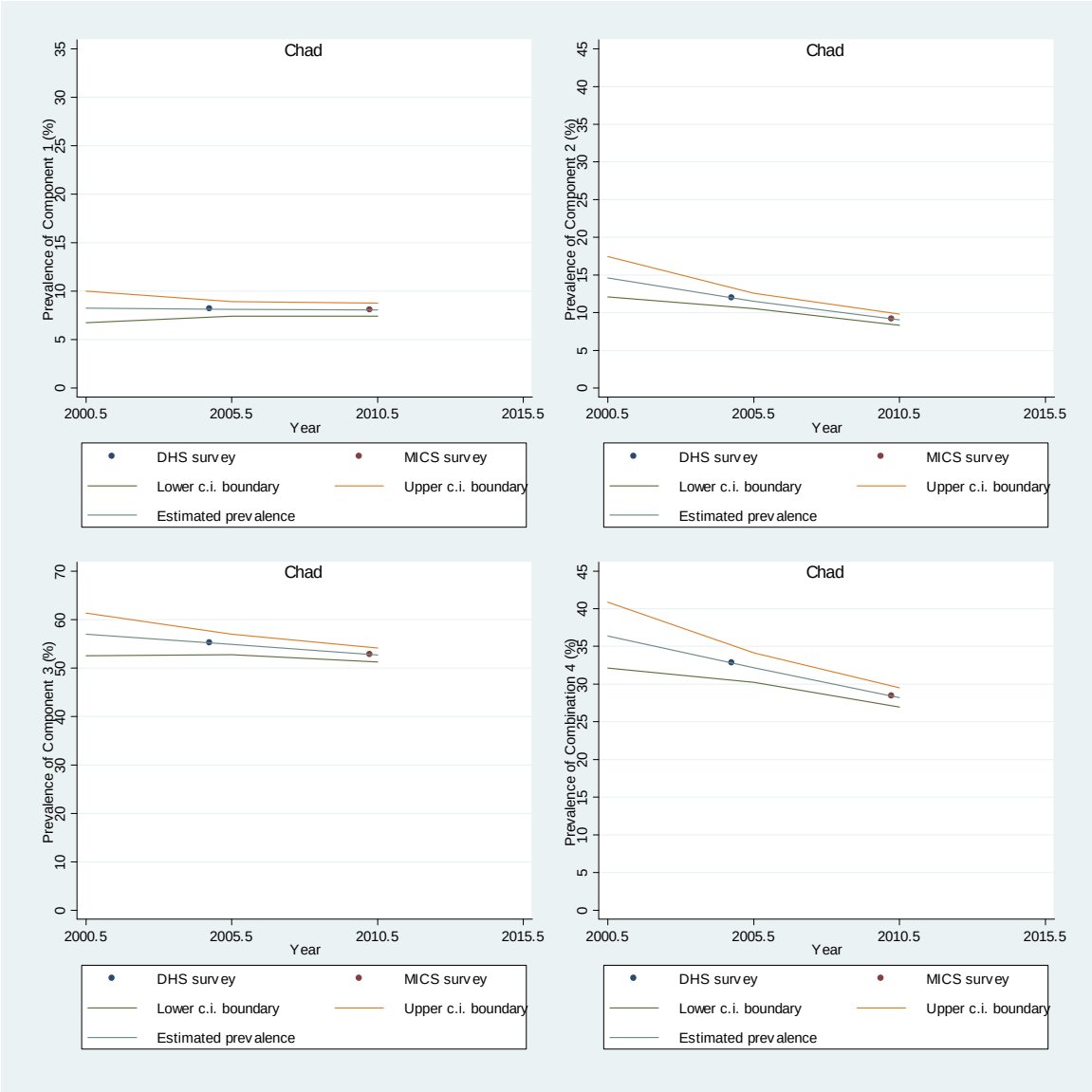


Table TD. Fitted percentages and estimated populations of children age 0-17 in Chad with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	8.2	14.6	57.0	42.0	2.8	6.0	34.8	36.4
2000	Population	380	673	2,633	1,942	130	279	1,606	1,681
2005	Percentage	8.1	11.5	54.8	41.3	3.1	4.3	30.6	32.2
2005	Population	456	646	3,076	2,317	175	240	1,718	1,804
2010	Percentage	8.0	9.0	52.7	40.6	3.5	3.0	26.8	28.2
2010	Population	531	596	3,475	2,678	228	199	1,769	1,862

Figure CO. Observed and fitted percentages of children age 0-17 in Colombia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

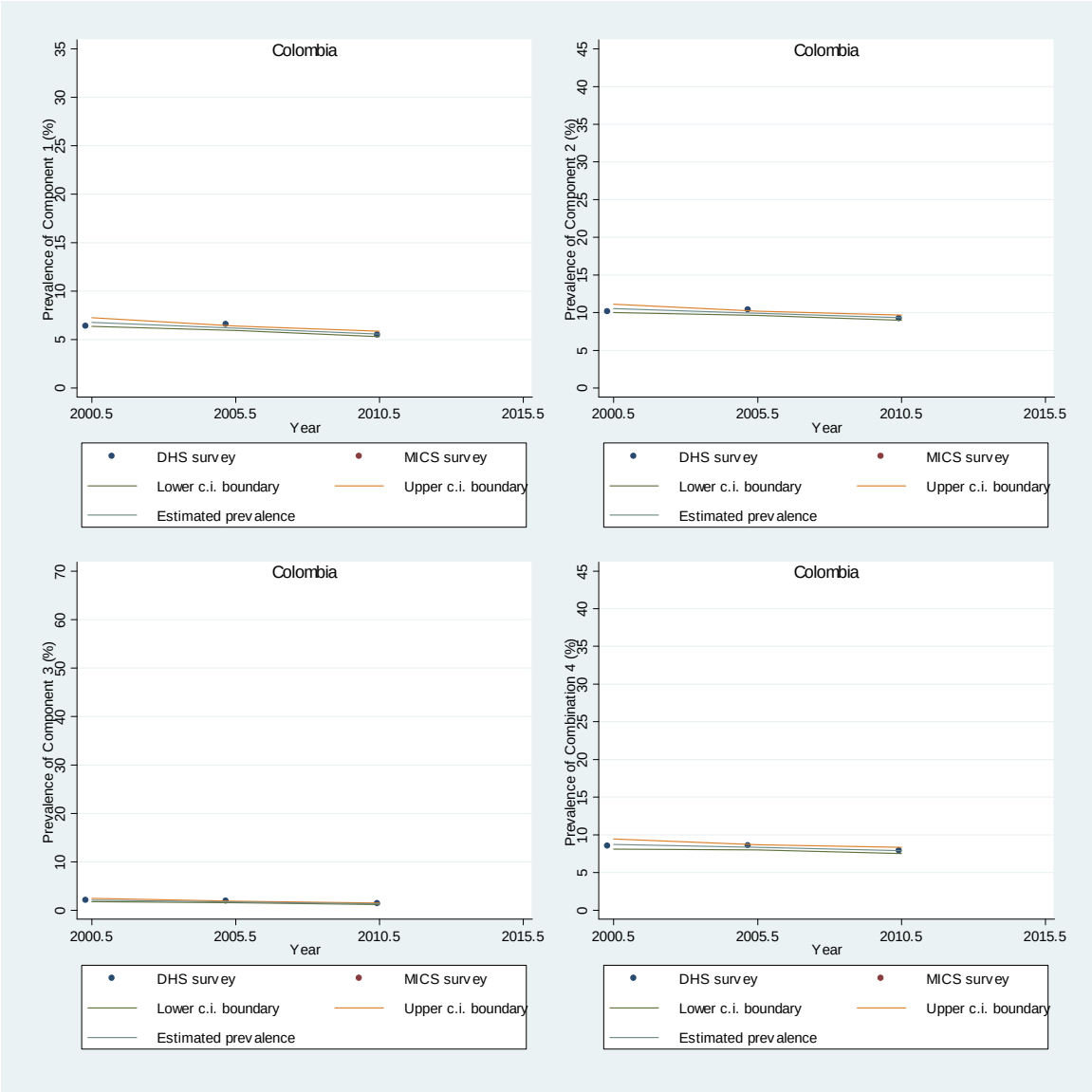


Table CO. Fitted percentages and estimated populations of children age 0-17 in Colombia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	6.8	10.5	2.1	45.1	3.2	5.1	1.8	8.7
2000	Population	1,035	1,608	321	6,892	490	785	277	1,333
2005	Percentage	6.1	9.9	1.7	45.8	3.0	5.3	1.4	8.3
2005	Population	927	1,494	252	6,910	452	792	218	1,255
2010	Percentage	5.6	9.3	1.3	46.5	2.8	5.4	1.2	7.9
2010	Population	818	1,368	195	6,825	410	787	169	1,163

Figure KM. Observed and fitted percentages of children age 0-17 in Comoros with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

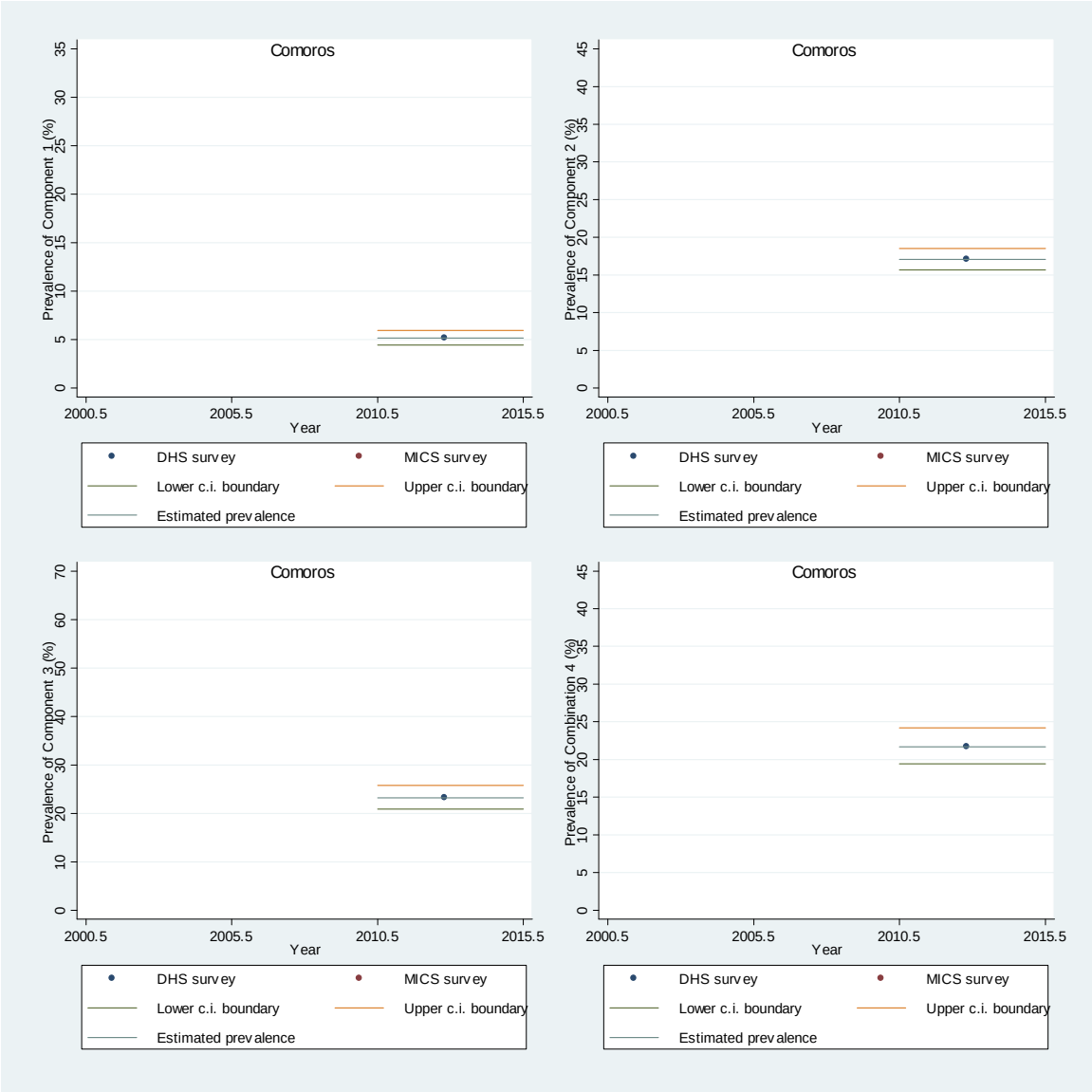


Table KM. Fitted percentages and estimated populations of children age 0-17 in Comoros with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	5.1	17.0	23.2	45.6	2.1	6.6	16.7	21.7
2010	Population	17	57	77	152	7	22	56	72
2015	Percentage	5.1	17.0	23.2	45.6	2.1	6.6	16.7	21.7
2015	Population	19	63	85	168	8	24	61	80

Figure CG. Observed and fitted percentages of children age 0-17 in Congo with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

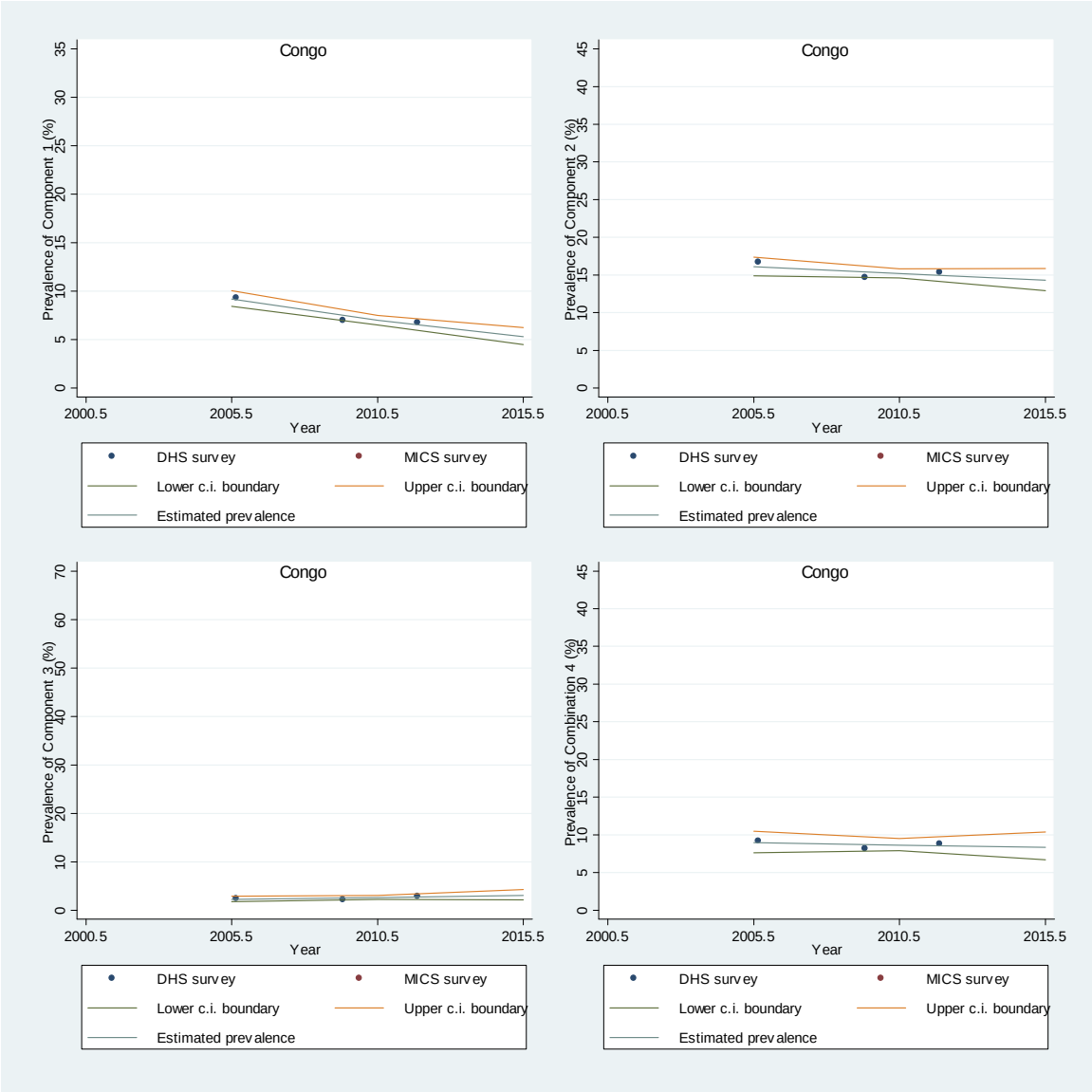


Table CG. Fitted percentages and estimated populations of children age 0-17 in Congo with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	9.2	16.1	2.3	42.8	3.6	6.0	1.7	8.9
2005	Population	156	272	38	724	61	102	30	152
2010	Percentage	7.0	15.2	2.6	42.9	3.0	5.8	2.1	8.7
2010	Population	137	298	51	841	59	113	41	170
2015	Percentage	5.3	14.3	3.0	43.0	2.5	5.5	2.4	8.4
2015	Population	119	323	68	971	57	125	55	189

Figure CR. Observed and fitted percentages of children age 0-17 in Costa Rica with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

Table CR. Fitted percentages and estimated populations of children age 0-17 in Costa Rica with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	3.0	4.2	0.7	48.5	1.5	2.4	0.6	4.0
2010	Population	41	57	10	662	21	33	8	55
2015	Percentage	3.0	4.2	0.7	48.5	1.5	2.4	0.6	4.0
2015	Population	39	55	10	635	20	31	8	53

Figure CI. Observed and fitted percentages of children age 0-17 in Côte d'Ivoire with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

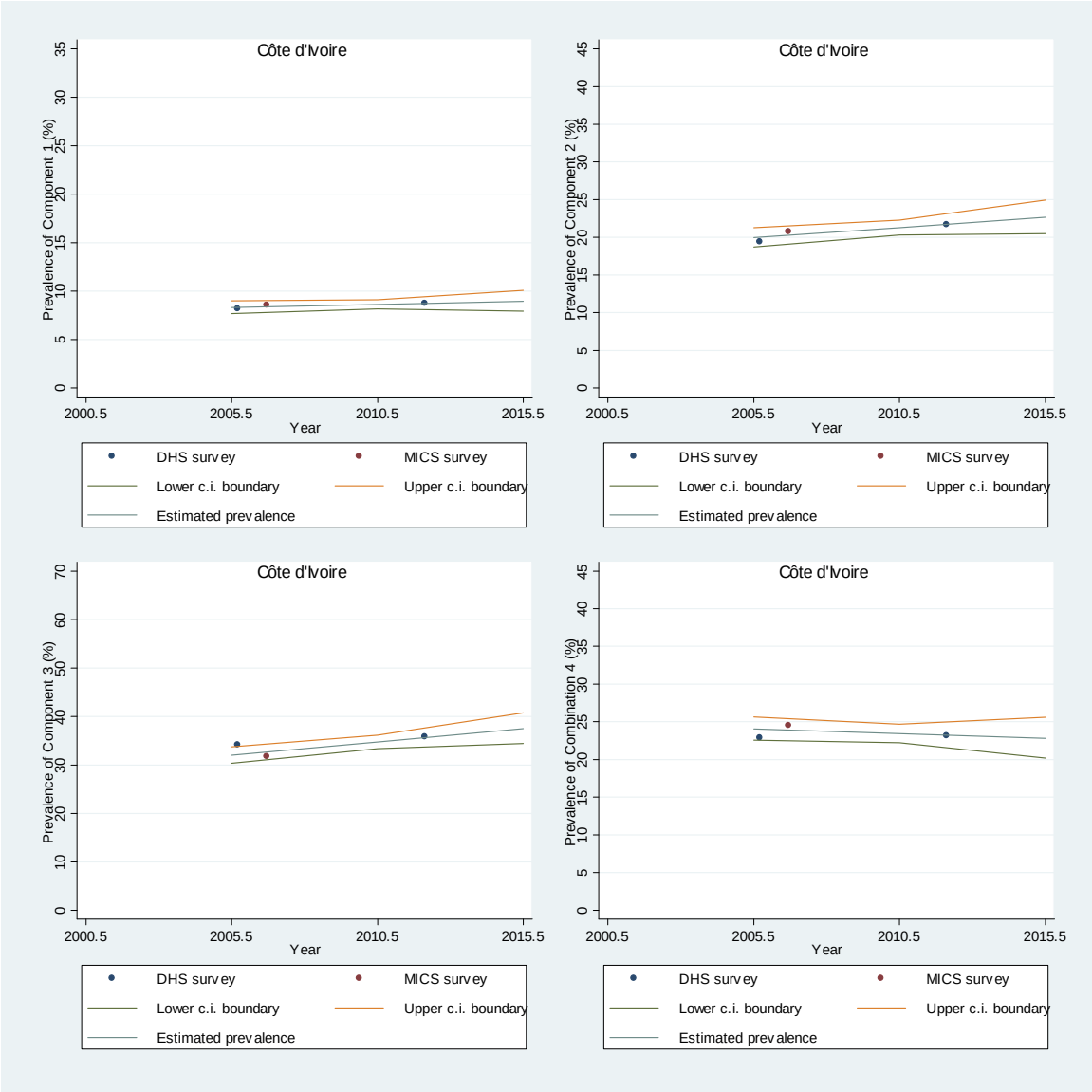


Table CI. Fitted percentages and estimated populations of children age 0-17 in Côte d'Ivoire with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	8.3	20.0	32.0	42.7	3.3	6.4	19.6	24.1
2005	Population	761	1,829	2,932	3,907	299	585	1,799	2,205
2010	Percentage	8.6	21.3	34.7	41.8	3.2	7.8	18.5	23.4
2010	Population	873	2,156	3,515	4,237	327	789	1,879	2,373
2015	Percentage	8.9	22.7	37.5	41.0	3.2	9.5	17.5	22.8
2015	Population	1,002	2,536	4,197	4,589	358	1,060	1,959	2,552

Figure DR. Observed and fitted percentages of children age 0-17 in Democratic Republic of the Congo with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

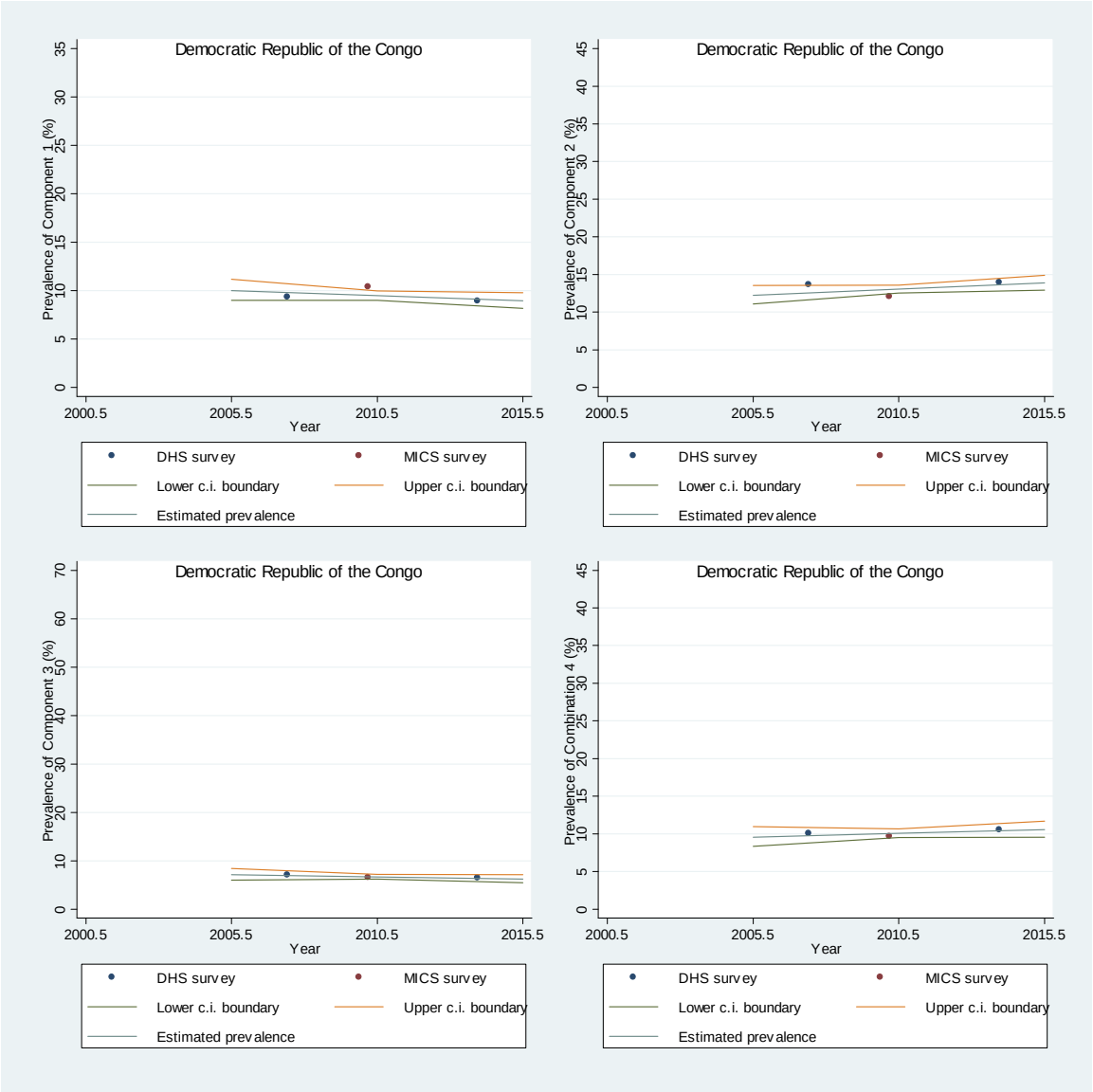


Table DR. Fitted percentages and estimated populations of children age 0-17 in Democratic Republic of the Congo with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	10.0	12.3	7.1	39.3	4.3	4.0	4.2	9.6
2005	Population	2,990	3,656	2,117	11,716	1,279	1,186	1,241	2,855
2010	Percentage	9.5	13.0	6.7	40.3	4.2	4.6	4.3	10.1
2010	Population	3,311	4,560	2,328	14,107	1,472	1,610	1,513	3,519
2015	Percentage	8.9	13.9	6.2	41.4	4.1	5.3	4.5	10.6
2015	Population	3,632	5,632	2,536	16,827	1,680	2,163	1,827	4,298

Figure EG. Observed and fitted percentages of children age 0-17 in Egypt with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

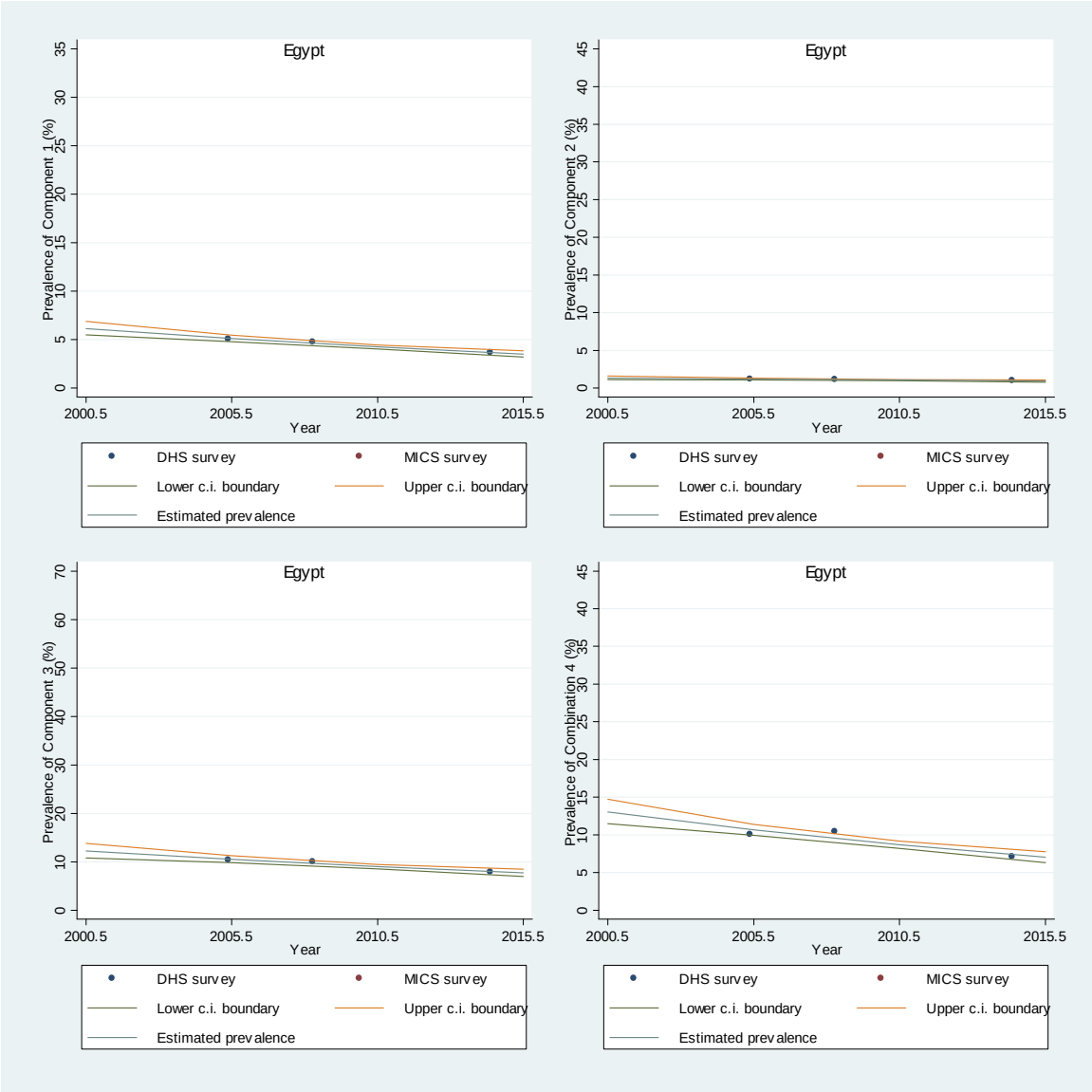


Table EG. Fitted percentages and estimated populations of children age 0-17 in Egypt with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	6.1	1.3	12.2	45.1	3.5	0.9	10.1	13.0
2000	Population	1,817	393	3,616	13,342	1,021	274	2,996	3,853
2005	Percentage	5.1	1.2	10.5	43.8	2.7	0.7	8.3	10.6
2005	Population	1,533	353	3,152	13,162	806	206	2,485	3,195
2010	Percentage	4.2	1.0	9.0	42.6	2.1	0.5	6.7	8.7
2010	Population	1,314	323	2,790	13,210	647	158	2,091	2,683
2015	Percentage	3.5	0.9	7.7	41.4	1.6	0.4	5.5	7.0
2015	Population	1,233	324	2,702	14,533	568	132	1,923	2,461

Figure ET. Observed and fitted percentages of children age 0-17 in Ethiopia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

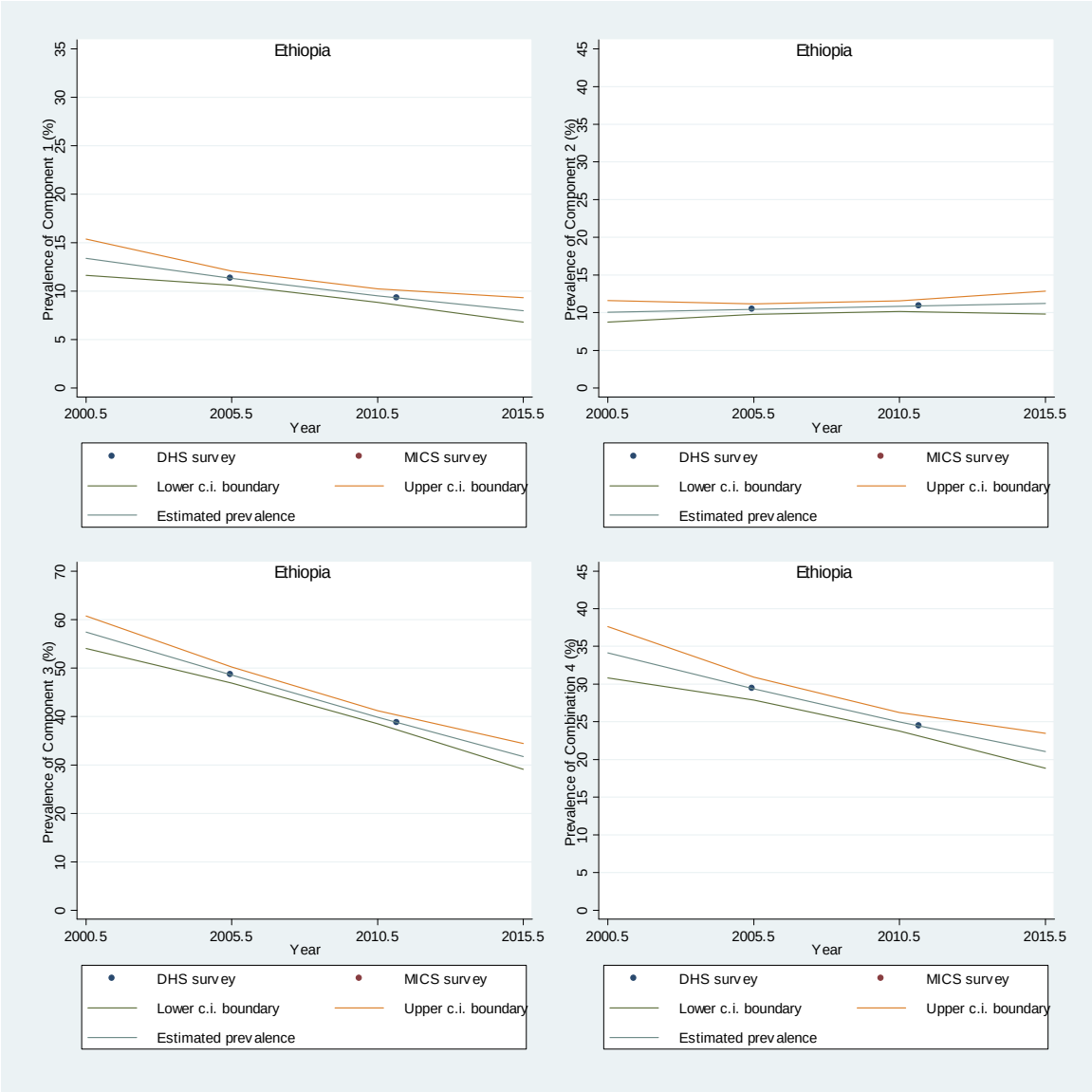


Table ET. Fitted percentages and estimated populations of children age 0-17 in Ethiopia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	13.4	10.1	57.4	40.7	5.6	3.6	33.1	34.2
2000	Population	4,739	3,568	20,318	14,424	1,984	1,272	11,700	12,092
2005	Percentage	11.3	10.5	48.6	41.3	4.8	3.6	27.5	29.4
2005	Population	4,573	4,227	19,640	16,718	1,936	1,442	11,141	11,874
2010	Percentage	9.5	10.8	39.8	41.9	4.1	3.5	22.6	25.0
2010	Population	4,289	4,884	17,948	18,901	1,840	1,594	10,210	11,260
2015	Percentage	8.0	11.2	31.7	42.5	3.5	3.5	18.4	21.1
2015	Population	3,866	5,441	15,342	20,599	1,685	1,698	8,913	10,199

Figure GA. Observed and fitted percentages of children age 0-17 in Gabon with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

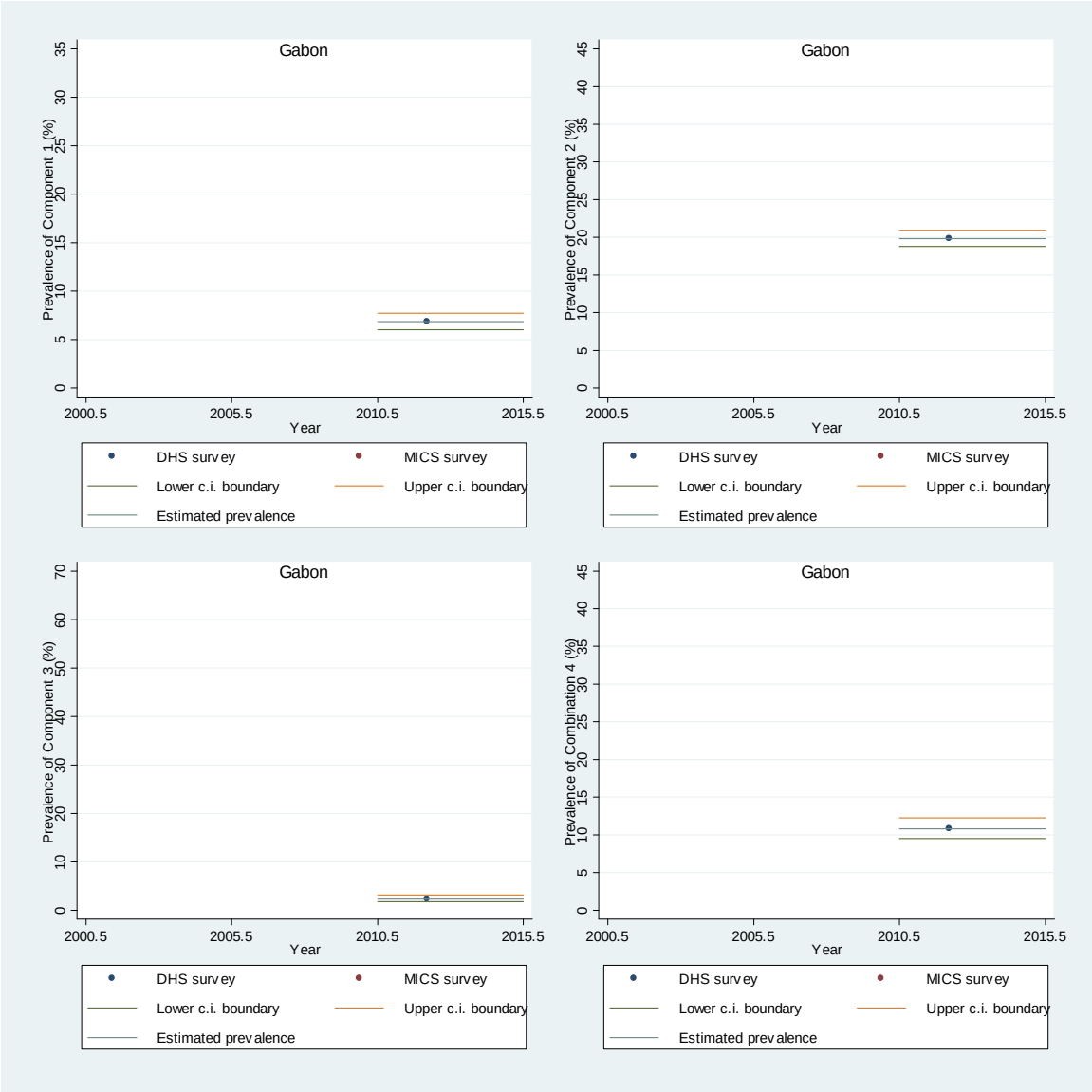


Table GA. Fitted percentages and estimated populations of children age 0-17 in Gabon with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	6.8	19.8	2.3	41.6	2.6	8.9	1.2	10.8
2010	Population	47	136	16	284	18	61	8	74
2015	Percentage	6.8	19.8	2.3	41.6	2.6	8.9	1.2	10.8
2015	Population	51	148	17	311	20	66	9	81

Figure GM. Observed and fitted percentages of children age 0-17 in Gambia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

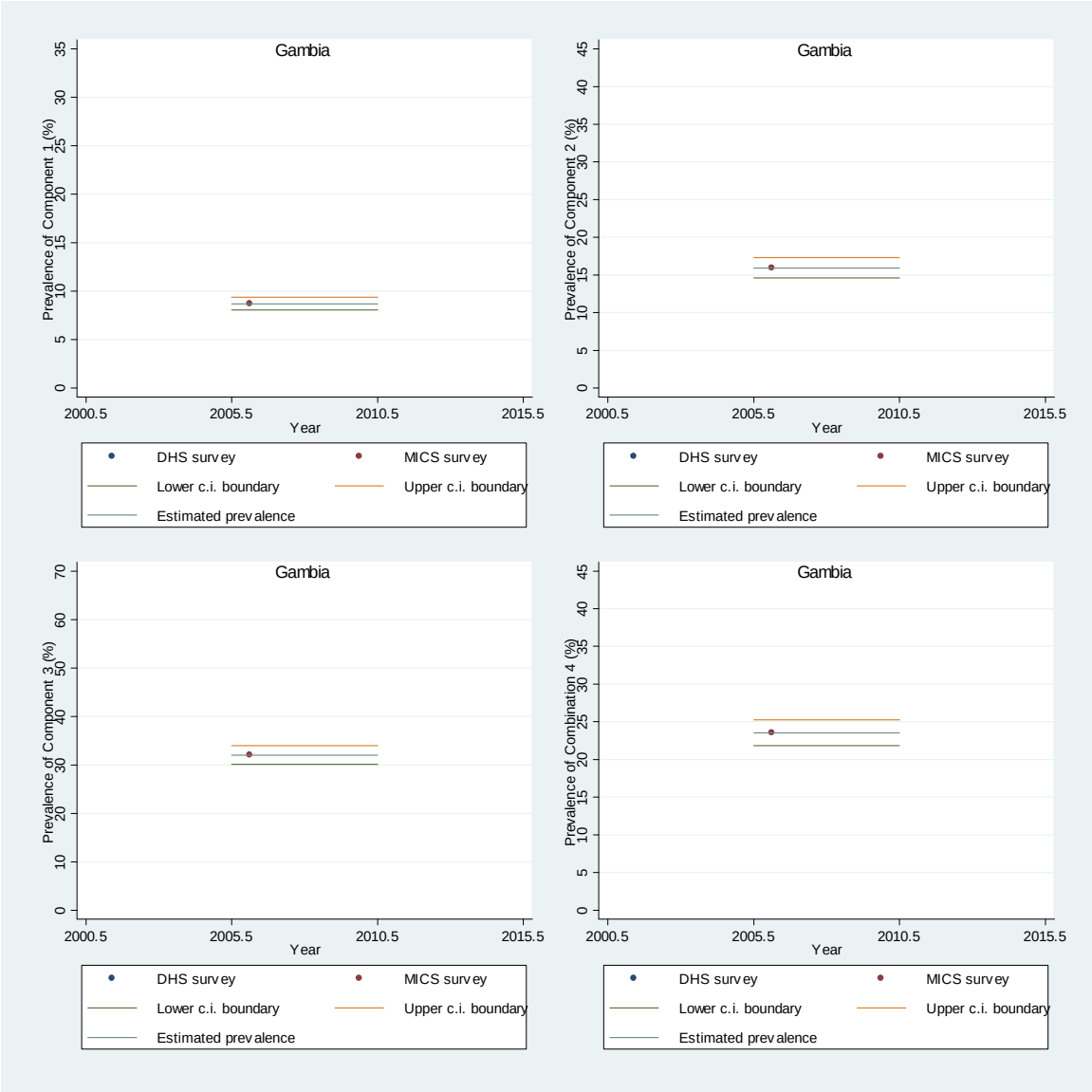


Table GM. Fitted percentages and estimated populations of children age 0-17 in Gambia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	8.7	15.9	32.0	43.0	3.6	5.7	18.5	23.5
2005	Population	66	121	243	326	27	43	140	178
2010	Percentage	8.7	15.9	32.0	43.0	3.6	5.7	18.5	23.5
2010	Population	78	142	286	385	32	51	166	210

Figure GE. Observed and fitted percentages of children age 0-17 in Georgia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

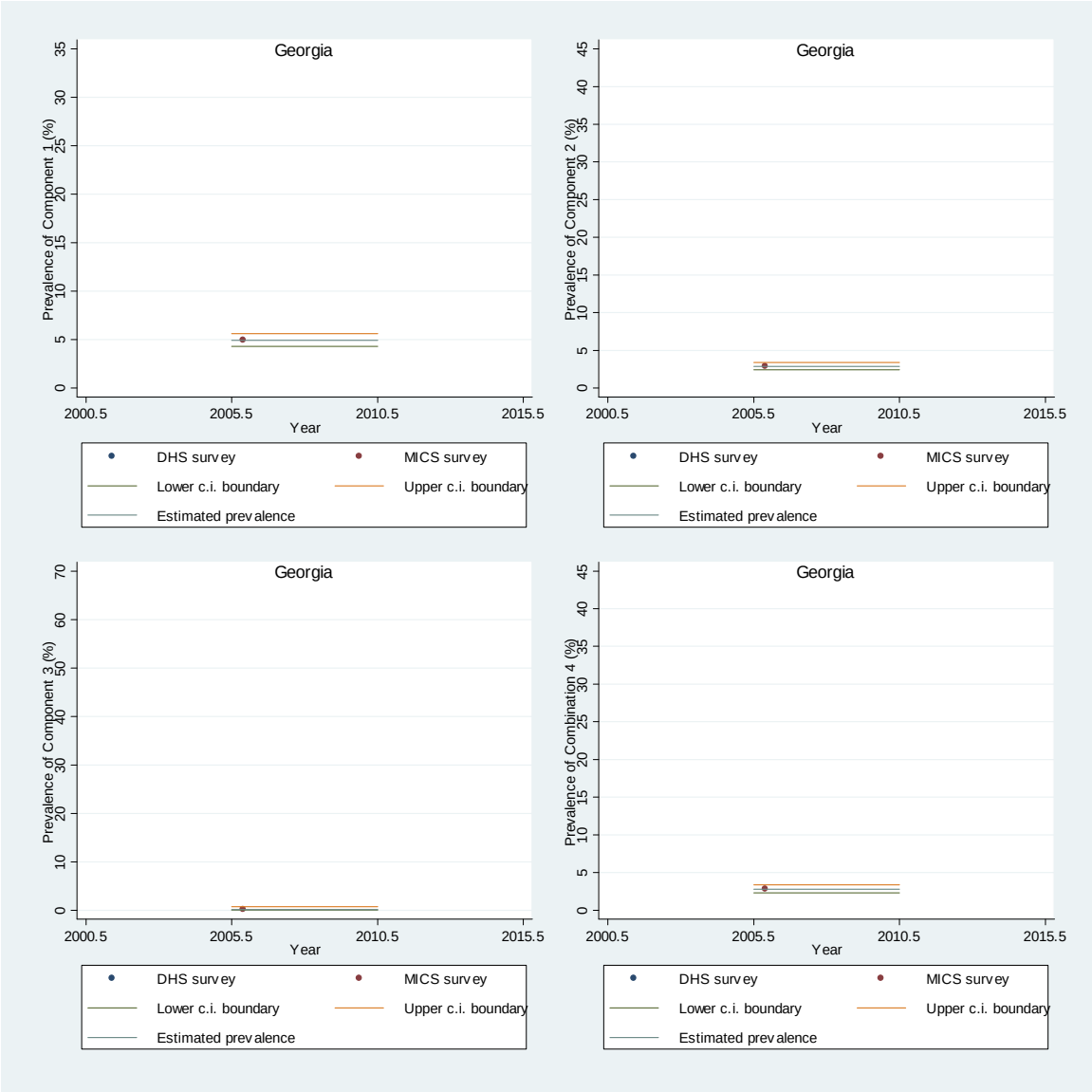


Table GE. Fitted percentages and estimated populations of children age 0-17 in Georgia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	4.9	2.9	0.1	39.0	2.1	1.0	0.1	2.8
2005	Population	52	30	1	413	22	11	1	30
2010	Percentage	4.9	2.9	0.1	39.0	2.1	1.0	0.1	2.8
2010	Population	45	26	1	353	19	9	1	25

Figure GH. Observed and fitted percentages of children age 0-17 in Ghana with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

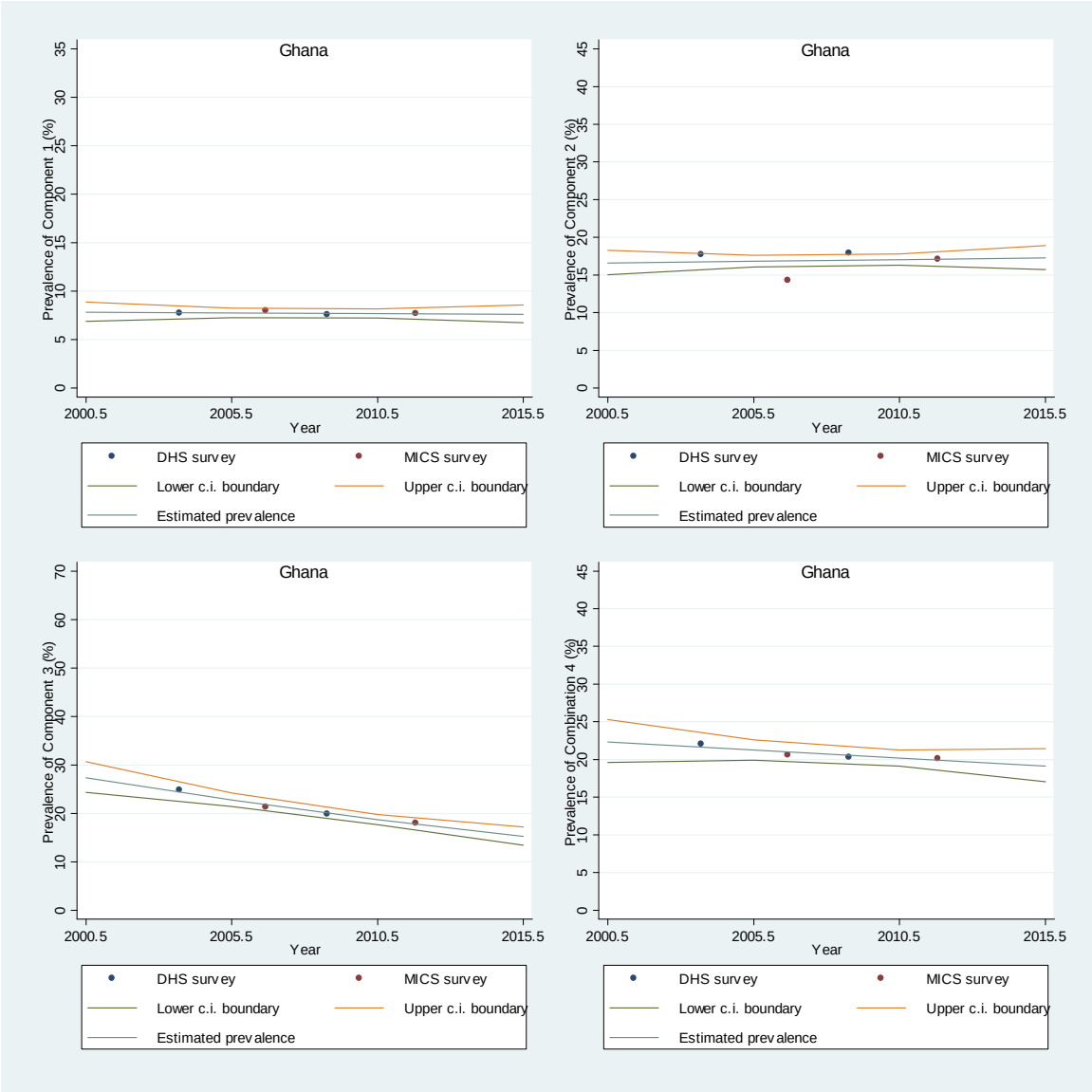


Table GH. Fitted percentages and estimated populations of children age 0-17 in Ghana with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	7.8	16.6	27.4	43.3	2.9	4.8	18.8	22.3
2000	Population	708	1,505	2,482	3,925	261	439	1,709	2,025
2005	Percentage	7.7	16.8	22.7	43.8	3.3	5.5	16.7	21.2
2005	Population	777	1,686	2,281	4,395	330	554	1,671	2,129
2010	Percentage	7.7	17.0	18.7	44.3	3.8	6.3	14.7	20.2
2010	Population	853	1,890	2,076	4,924	418	699	1,629	2,239
2015	Percentage	7.6	17.2	15.2	44.9	4.3	7.2	12.9	19.1
2015	Population	939	2,126	1,877	5,533	530	884	1,589	2,360

Figure GN. Observed and fitted percentages of children age 0-17 in Guinea with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

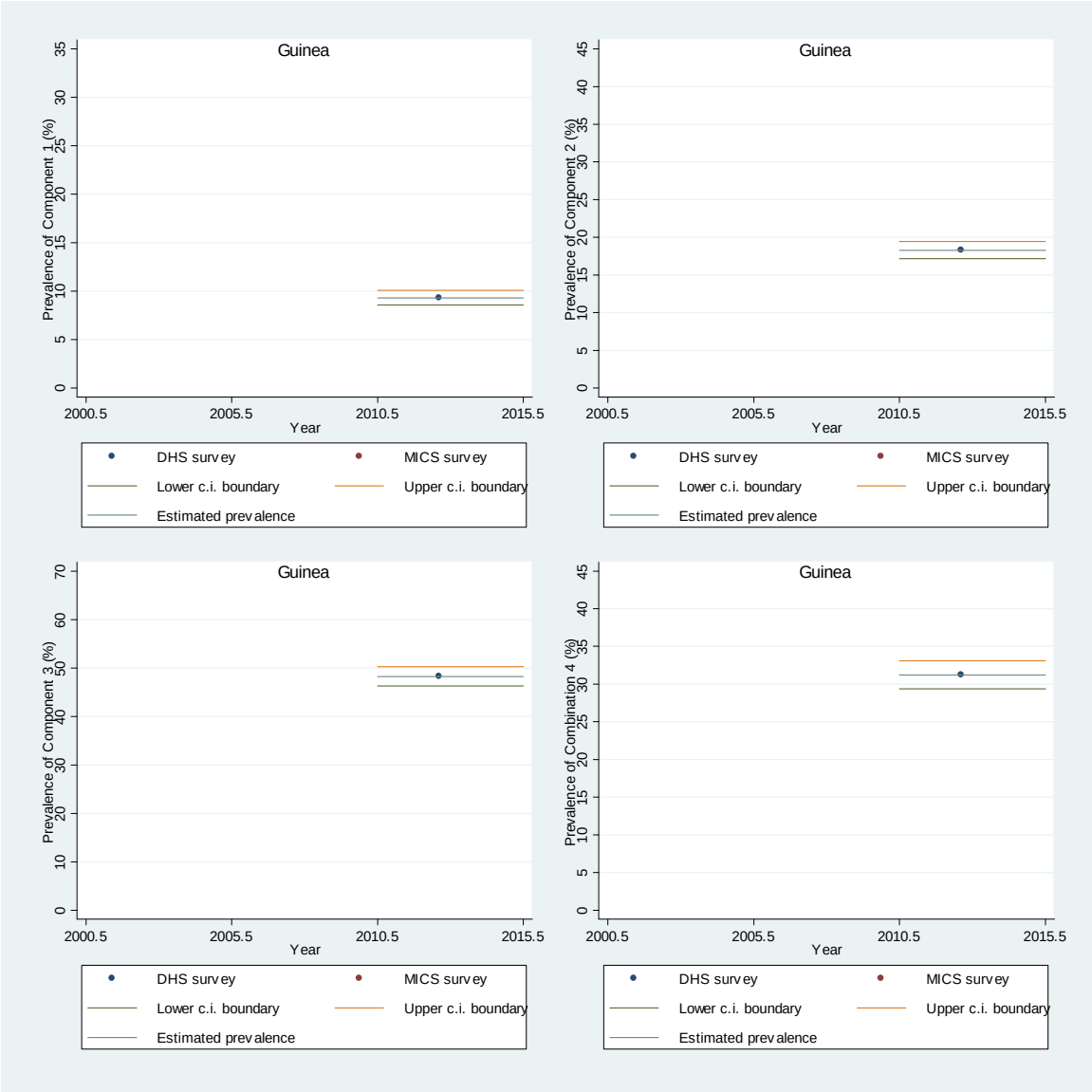


Table GN. Fitted percentages and estimated populations of children age 0-17 in Guinea with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	9.3	18.3	48.3	41.5	3.5	5.9	28.7	31.2
2010	Population	511	1,005	2,654	2,284	192	323	1,577	1,716
2015	Percentage	9.3	18.3	48.3	41.5	3.5	5.9	28.7	31.2
2015	Population	576	1,132	2,991	2,573	217	364	1,777	1,933

Figure GW. Observed and fitted percentages of children age 0-17 in Guinea-Bissau with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

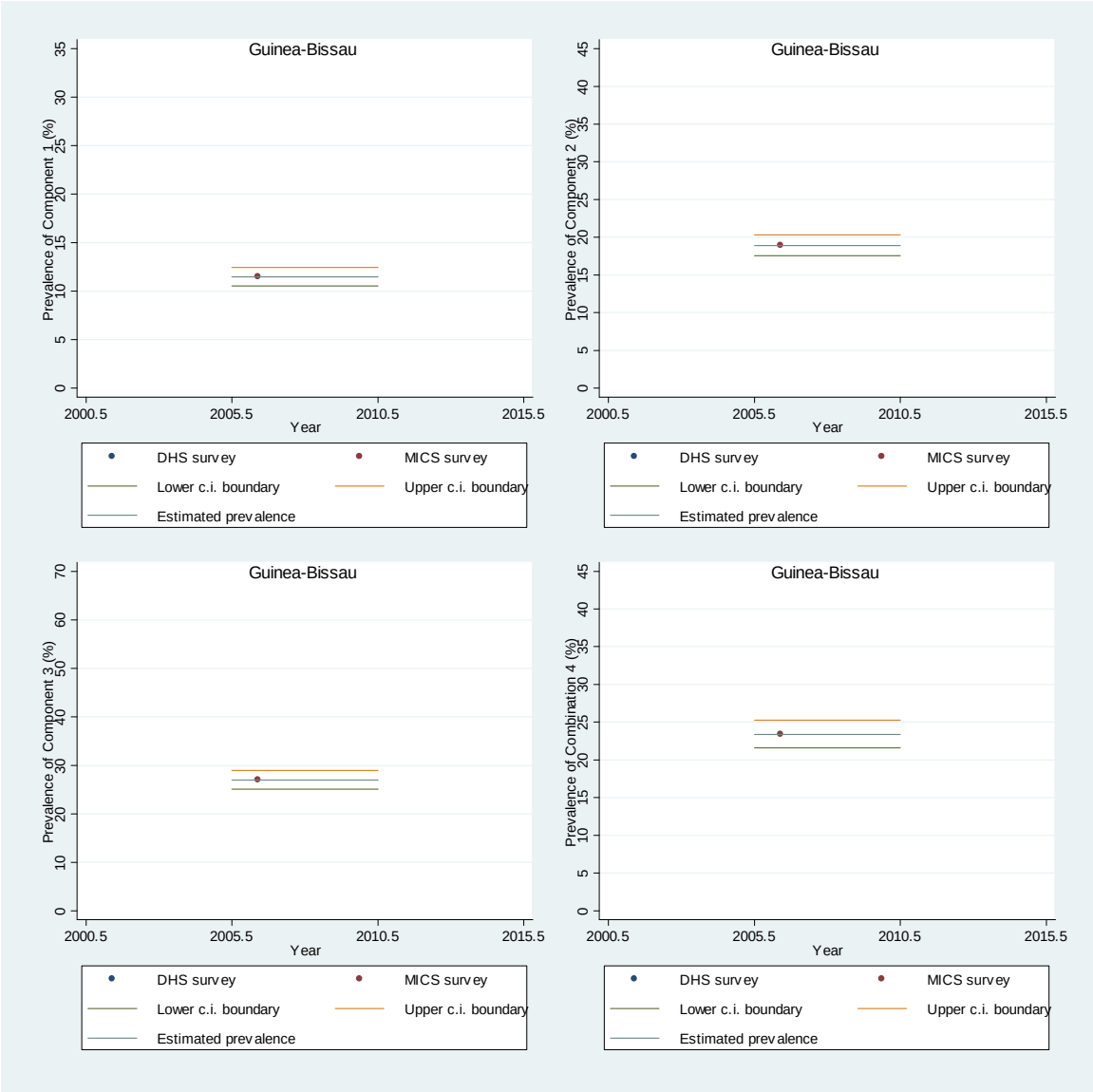


Table GW. Fitted percentages and estimated populations of children age 0-17 in Guinea-Bissau with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	11.5	18.9	26.9	40.9	4.4	7.4	17.3	23.4
2005	Population	83	136	194	295	31	53	125	169
2010	Percentage	11.5	18.9	26.9	40.9	4.4	7.4	17.3	23.4
2010	Population	90	149	212	322	34	58	137	184

Figure GY. Observed and fitted percentages of children age 0-17 in Guyana with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

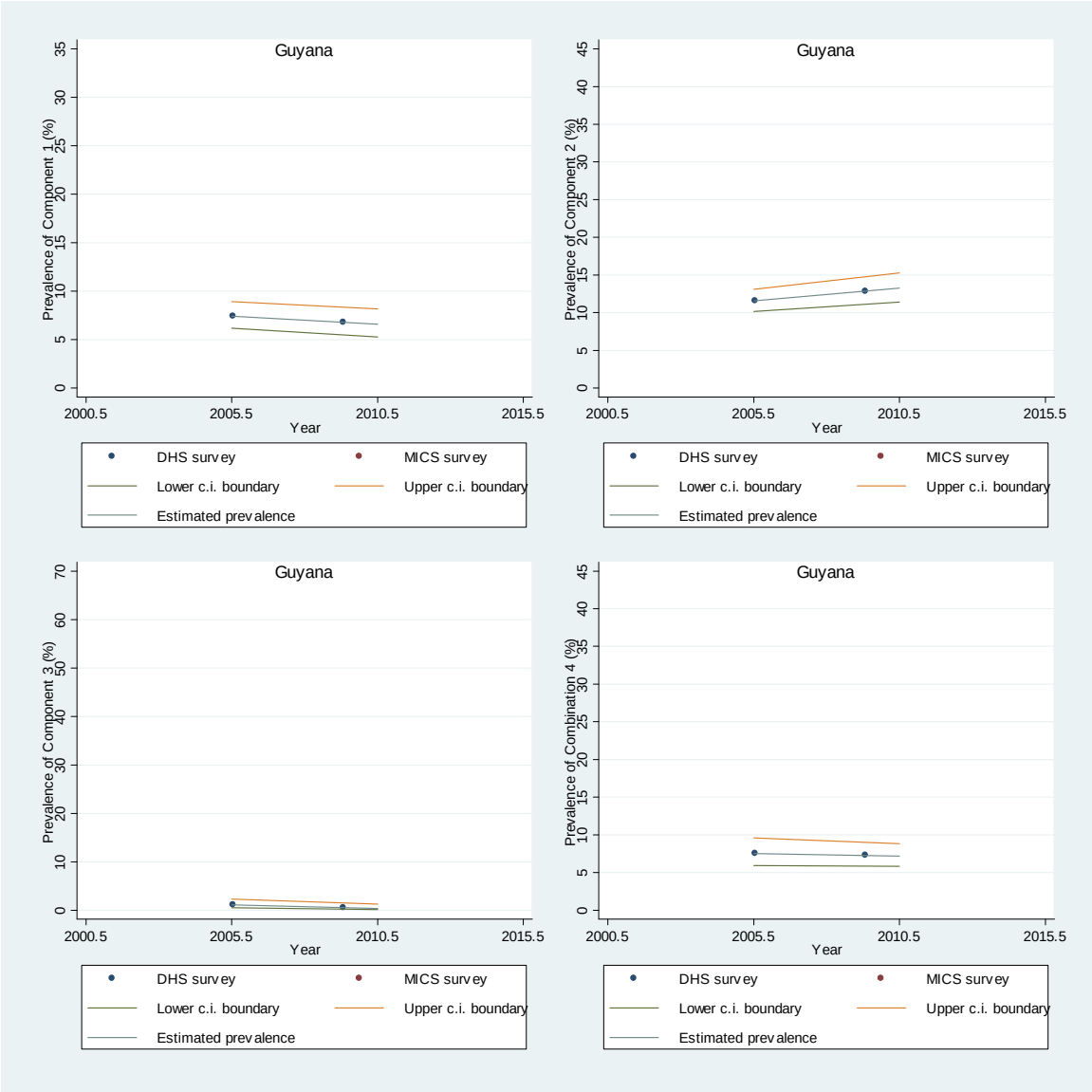


Table GY. Fitted percentages and estimated populations of children age 0-17 in Guyana with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	7.4	11.5	1.1	47.2	3.8	4.4	1.0	7.5
2005	Population	23	36	3	147	12	14	3	24
2010	Percentage	6.6	13.2	0.4	45.7	2.8	5.6	0.4	7.2
2010	Population	20	40	1	140	8	17	1	22

Figure HT. Observed and fitted percentages of children age 0-17 in Haiti with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

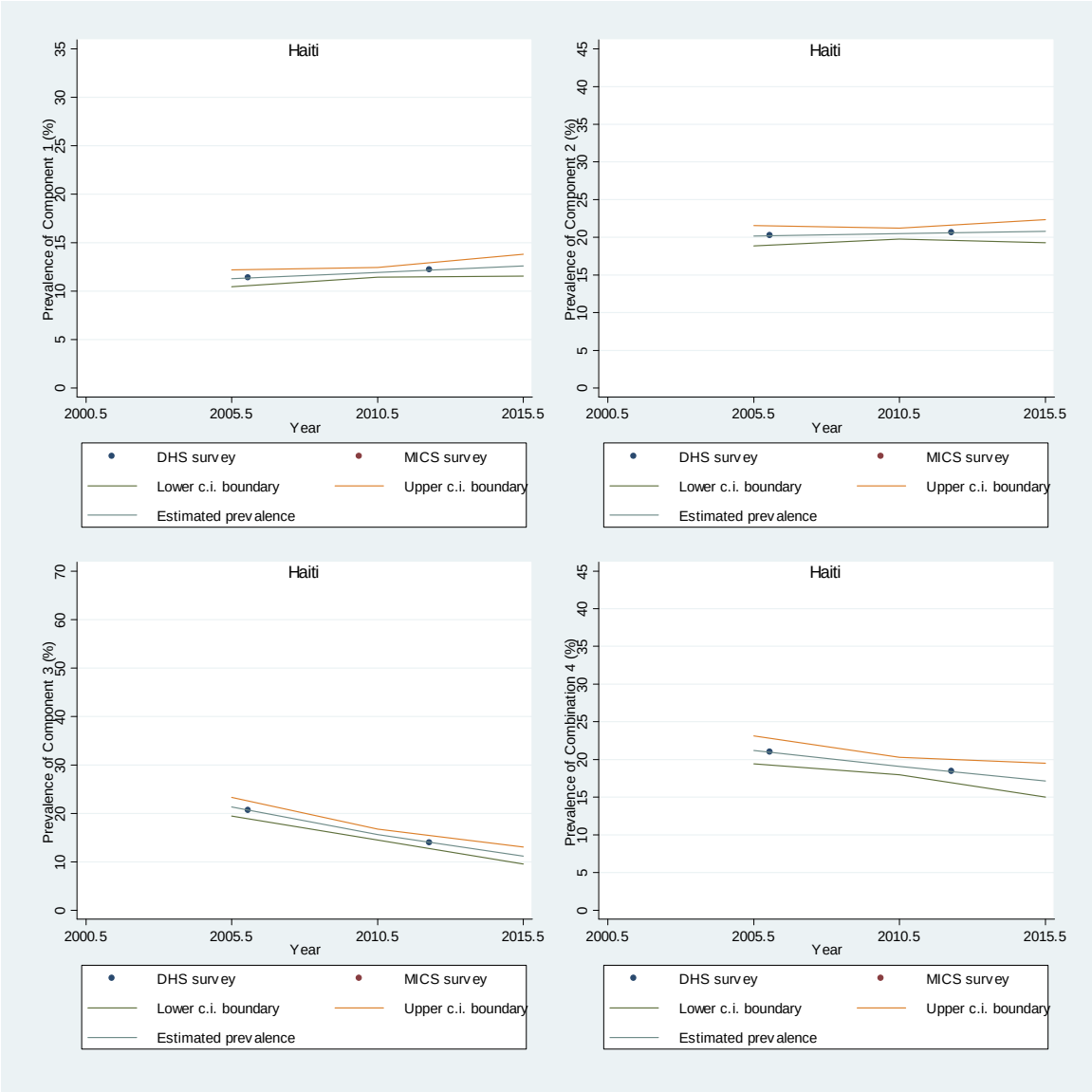


Table HT. Fitted percentages and estimated populations of children age 0-17 in Haiti with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	11.3	20.2	21.3	43.3	4.4	6.7	15.9	21.2
2005	Population	469	839	886	1,803	185	277	661	882
2010	Percentage	11.9	20.5	15.6	44.5	4.8	8.0	11.9	19.1
2010	Population	507	870	662	1,889	203	339	506	811
2015	Percentage	12.6	20.8	11.2	45.6	5.1	9.5	8.8	17.1
2015	Population	542	892	480	1,959	220	409	379	736

Figure HN. Observed and fitted percentages of children age 0-17 in Honduras with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

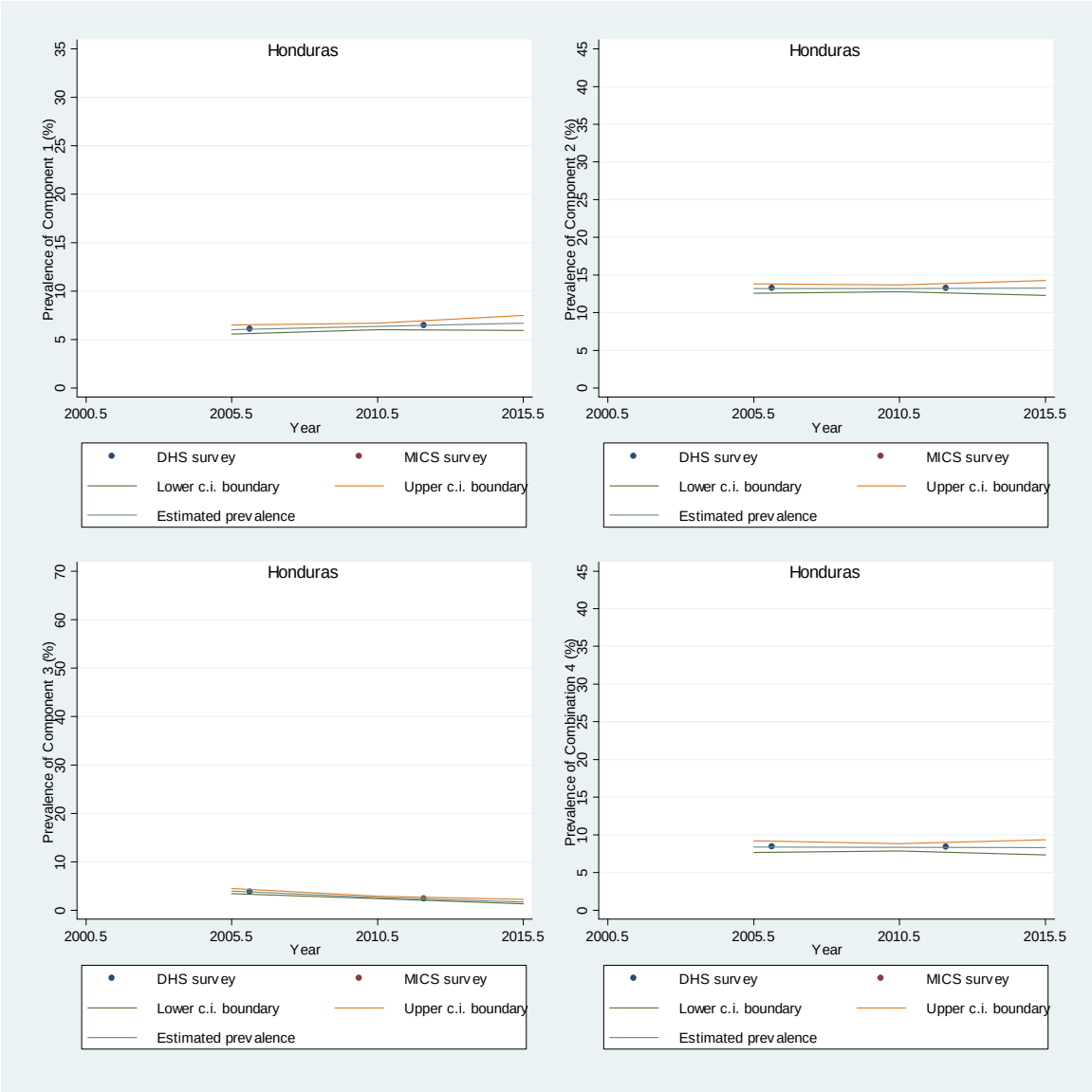


Table HN. Fitted percentages and estimated populations of children age 0-17 in Honduras with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	6.0	13.2	3.9	44.5	2.5	4.6	3.0	8.4
2005	Population	193	423	126	1,427	81	148	97	269
2010	Percentage	6.3	13.2	2.6	44.8	2.9	5.0	2.1	8.3
2010	Population	204	425	84	1,440	92	162	67	268
2015	Percentage	6.7	13.2	1.7	45.0	3.2	5.5	1.5	8.3
2015	Population	208	411	54	1,400	100	169	45	258

Figure IA. Observed and fitted percentages of children age 0-17 in India with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

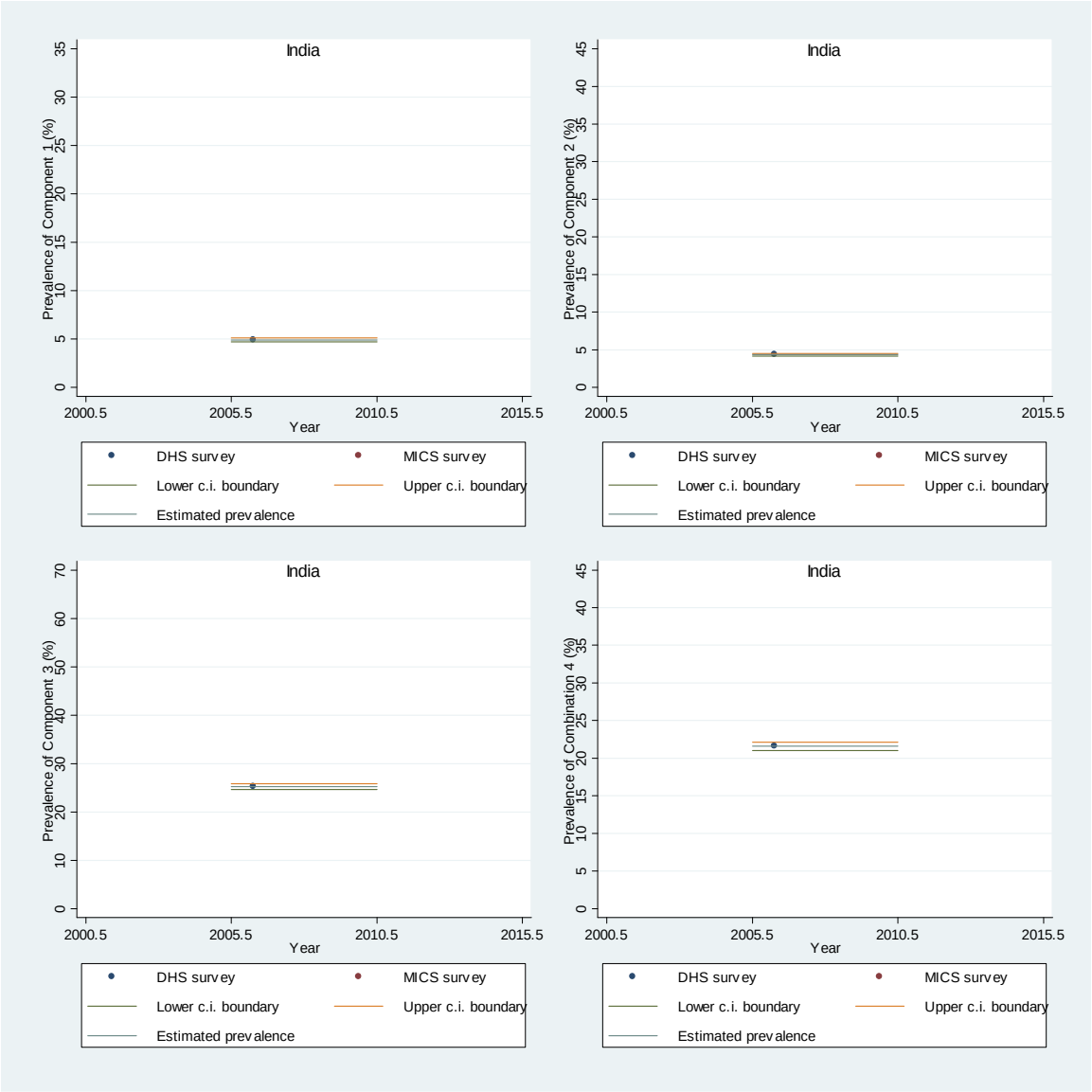


Table IA. Fitted percentages and estimated populations of children age 0-17 in India with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	4.9	4.3	25.2	46.1	2.7	1.8	19.6	21.6
2005	Population	21,805	19,288	112,284	205,199	11,931	8,112	87,118	96,050
2010	Percentage	4.9	4.3	25.2	46.1	2.7	1.8	19.6	21.6
2010	Population	22,153	19,596	114,078	208,478	12,122	8,242	88,510	97,584

Figure IQ. Observed and fitted percentages of children age 0-17 in Iraq with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

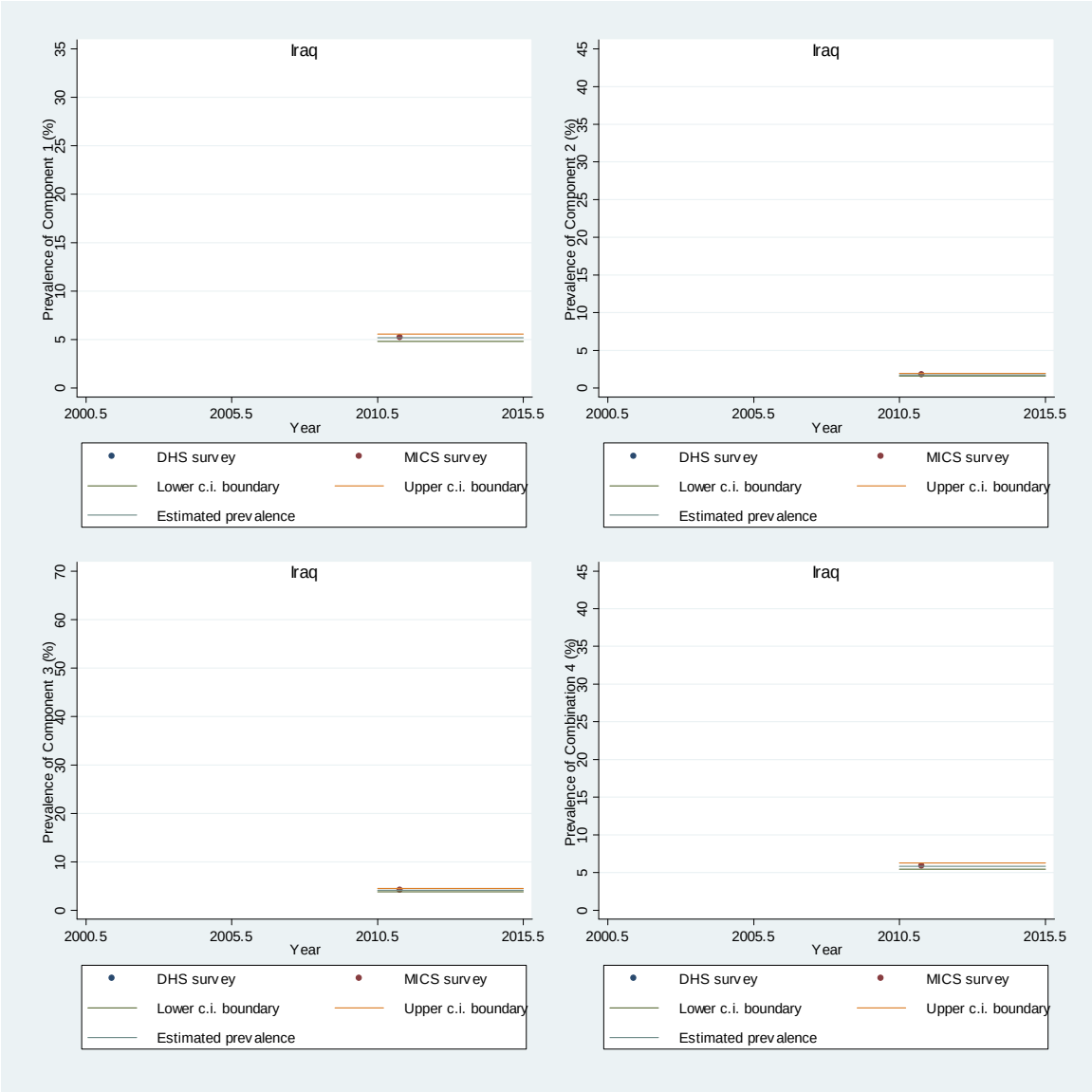


Table IQ. Fitted percentages and estimated populations of children age 0-17 in Iraq with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	5.2	1.8	4.1	44.8	2.2	0.7	3.6	5.8
2010	Population	774	261	617	6,689	333	97	543	870
2015	Percentage	5.2	1.8	4.1	44.8	2.2	0.7	3.6	5.8
2015	Population	895	302	713	7,736	386	113	628	1,007

Figure JM. Observed and fitted percentages of children age 0-17 in Jamaica with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

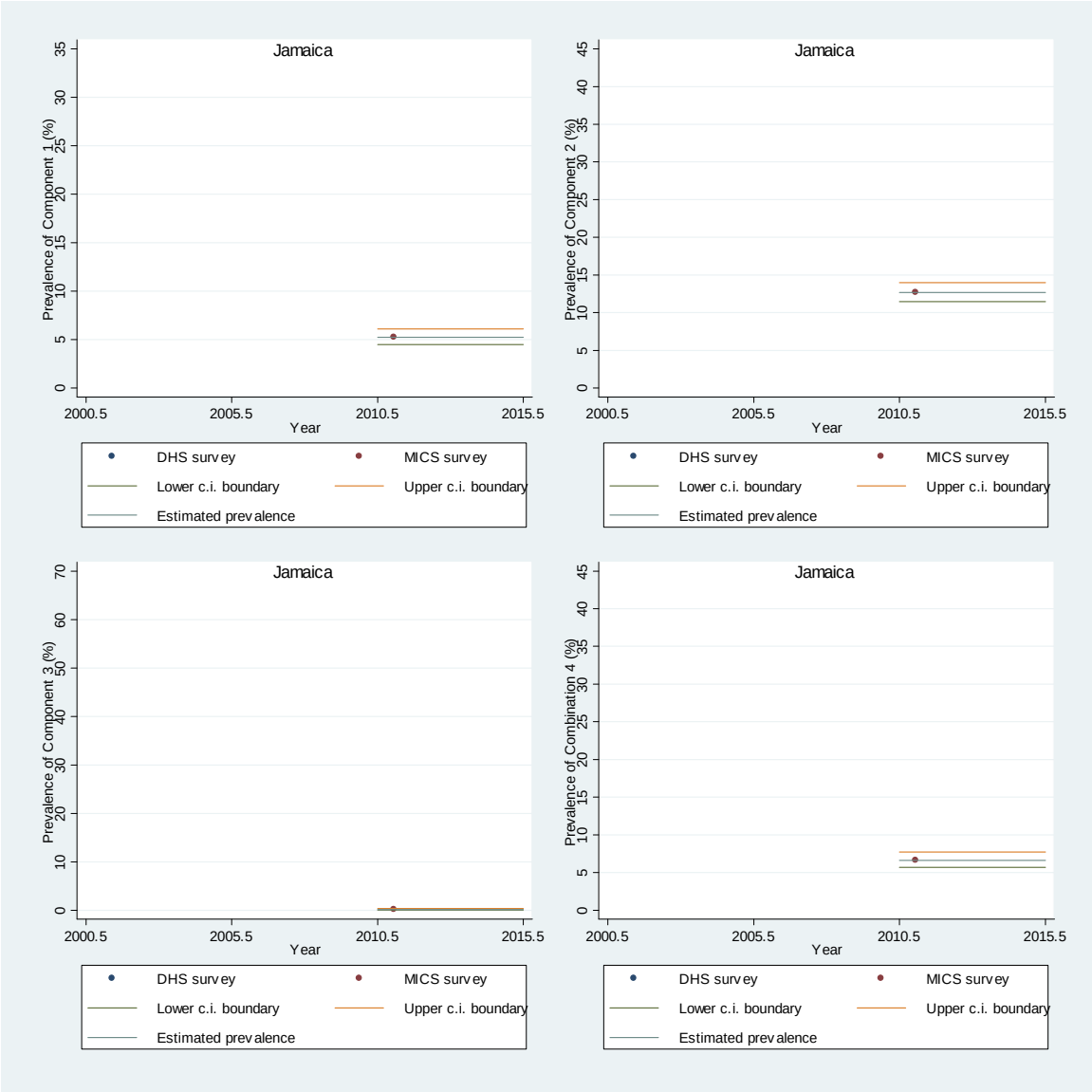


Table JM. Fitted percentages and estimated populations of children age 0-17 in Jamaica with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	5.2	12.7	0.1	45.7	2.5	4.8	0.1	6.6
2010	Population	48	115	1	416	23	44	1	60
2015	Percentage	5.2	12.7	0.1	45.7	2.5	4.8	0.1	6.6
2015	Population	43	104	1	375	21	40	1	54

Figure JO. Observed and fitted percentages of children age 0-17 in Jordan with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

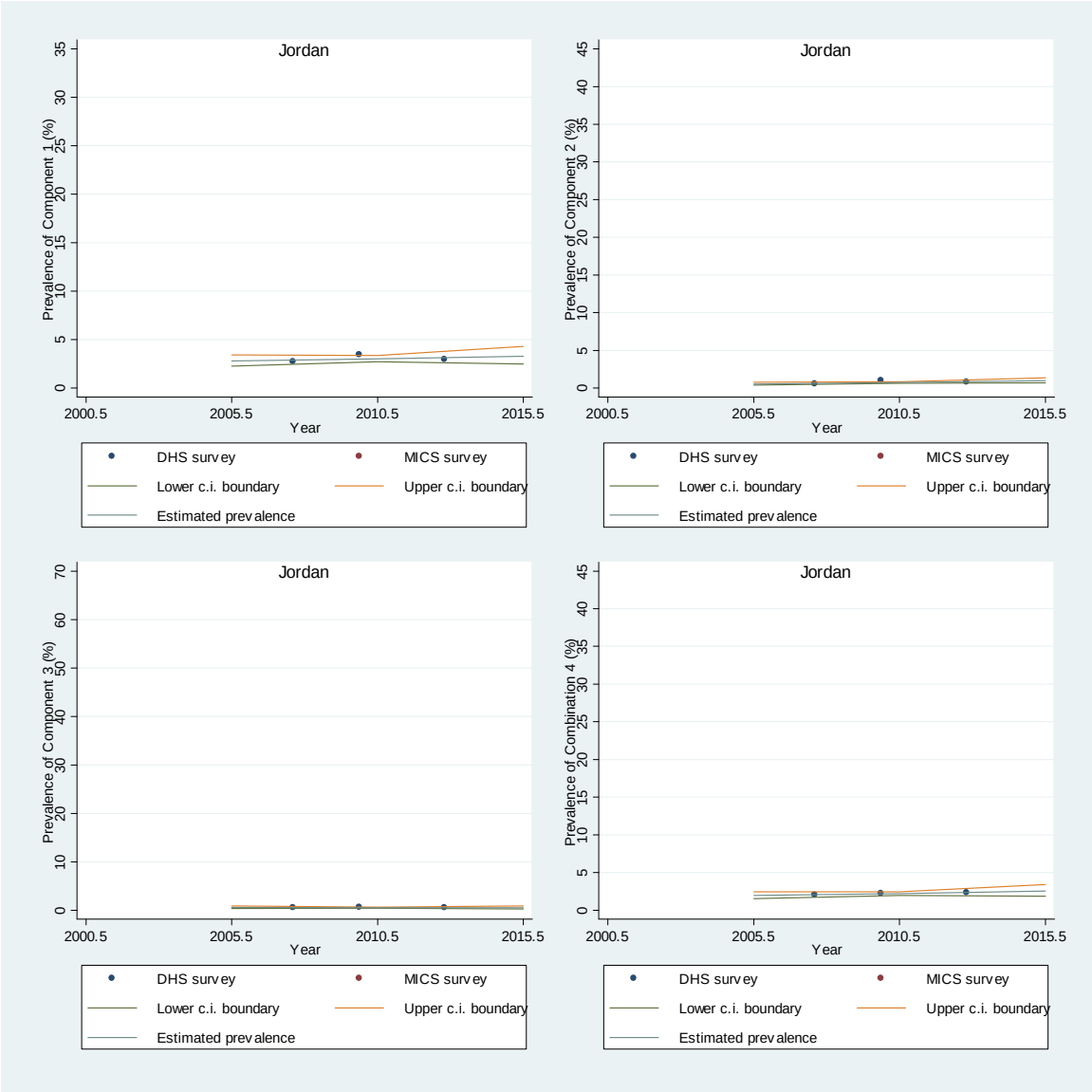
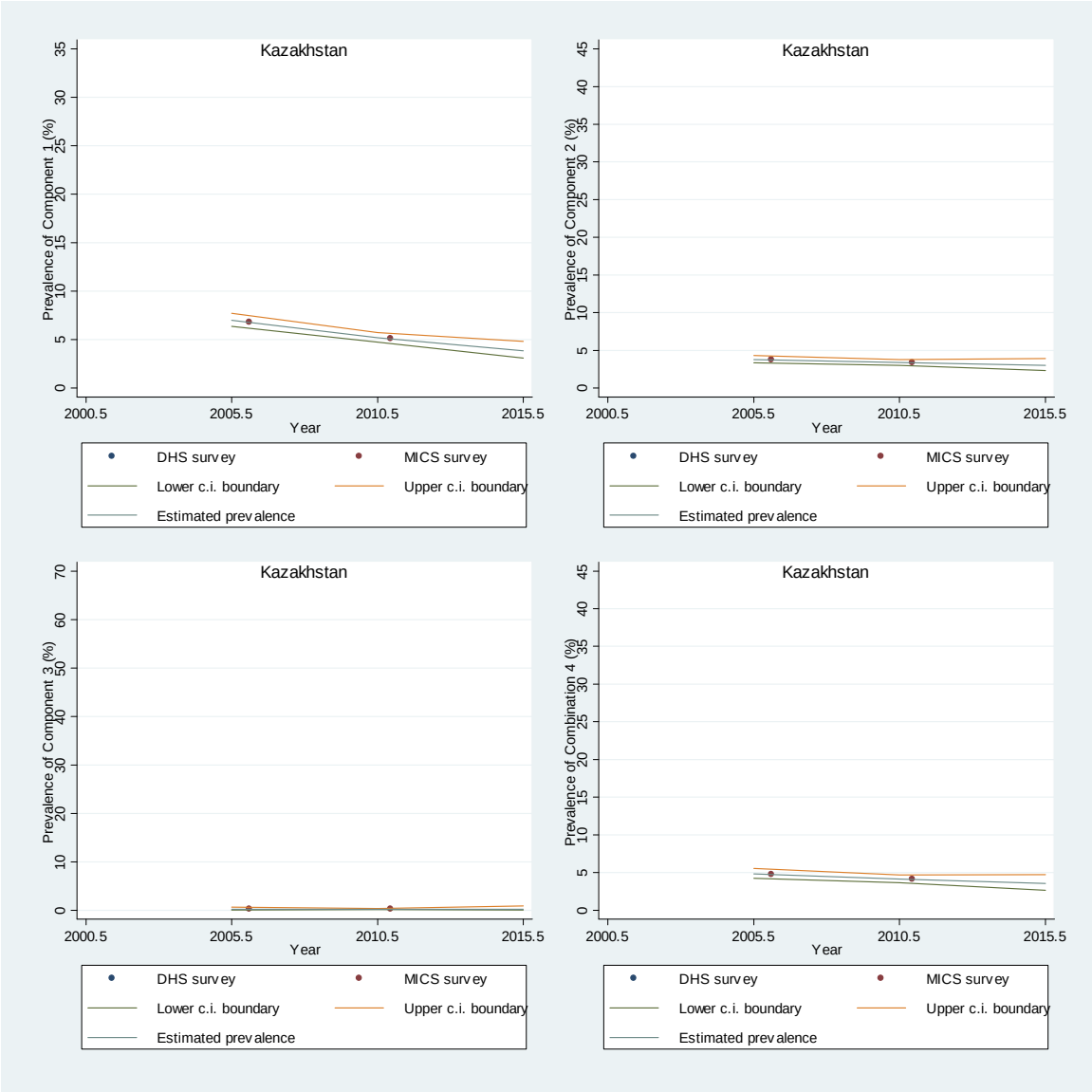


Table JO. Fitted percentages and estimated populations of children age 0-17 in Jordan with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	2.8	0.6	0.6	42.6	1.3	0.2	0.6	1.9
2005	Population	65	13	13	1,001	30	5	13	46
2010	Percentage	3.0	0.7	0.5	43.3	1.6	0.4	0.5	2.2
2010	Population	84	20	14	1,210	44	11	13	62
2015	Percentage	3.3	1.0	0.5	44.1	2.0	0.6	0.4	2.5
2015	Population	103	30	15	1,393	62	20	11	80

Figure KK. Observed and fitted percentages of children age 0-17 in Kazakhstan with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys



KK. Fitted percentages and estimated populations of children age 0-17 in Kazakhstan with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	7.0	3.8	0.2	47.2	3.5	1.8	0.1	4.8
2005	Population	334	181	10	2,250	165	87	6	230
2010	Percentage	5.2	3.4	0.2	46.7	2.6	1.7	0.1	4.1
2010	Population	250	162	9	2,241	127	84	5	198
2015	Percentage	3.8	3.0	0.2	46.2	2.0	1.7	0.1	3.5
2015	Population	206	161	10	2,477	108	89	5	189

Figure KY. Observed and fitted percentages of children age 0-17 in Kyrgyz Republic with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys. The MICS 2005 and DHS 2012 surveys are inconsistent and are not pooled.

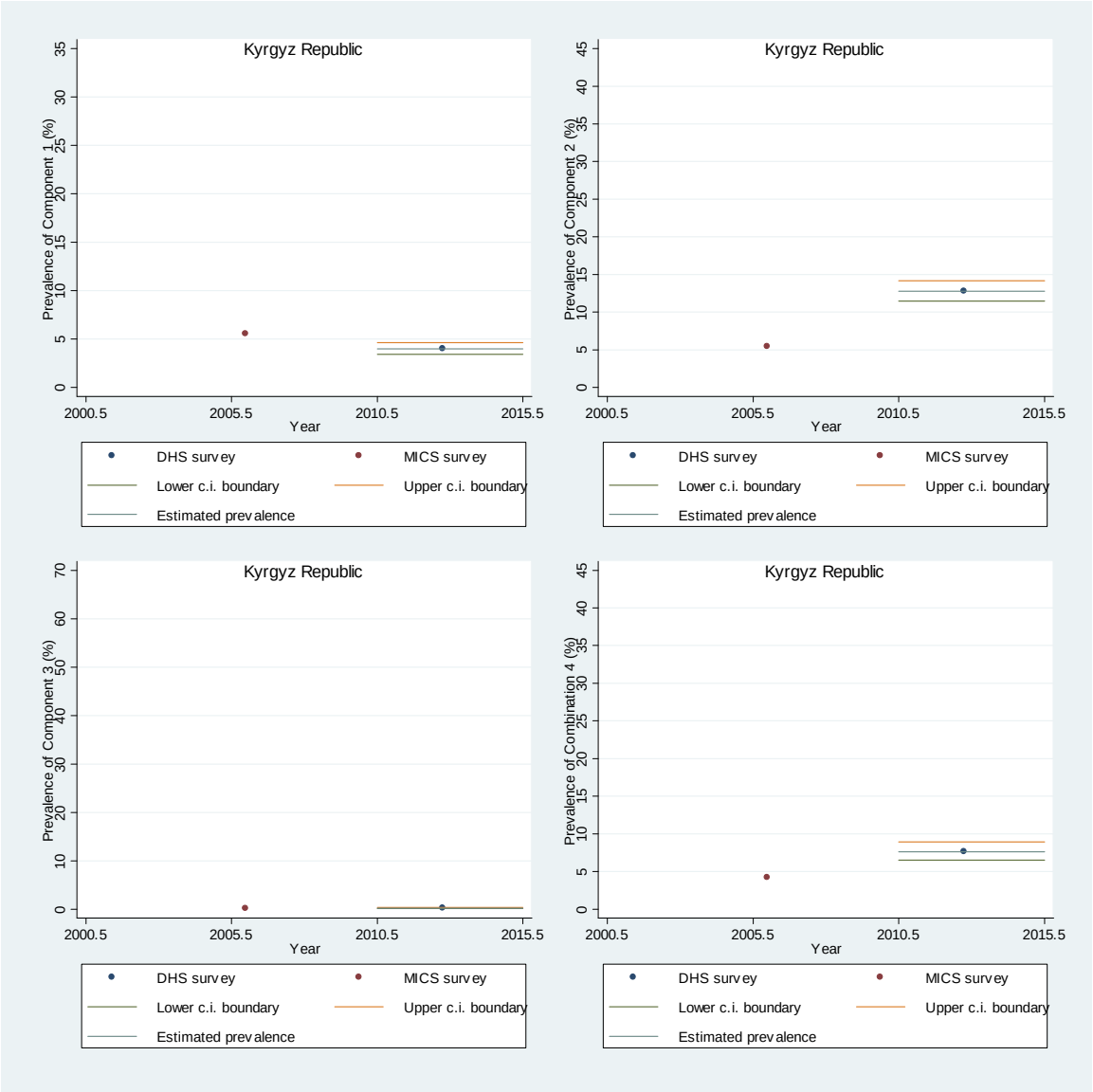


Table KY. Fitted percentages and estimated populations of children age 0-17 in Kyrgyz Republic with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. The MICS 2005 survey has an inconsistent value for component 2. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	4.0	12.8	0.2	43.1	1.3	6.8	0.1	7.6
2010	Population	80	254	4	858	25	136	2	152
2015	Percentage	4.0	12.8	0.2	43.1	1.3	6.8	0.1	7.6
2015	Population	87	277	4	935	28	148	2	165

Figure LA. Observed and fitted percentages of children age 0-17 in Lao with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

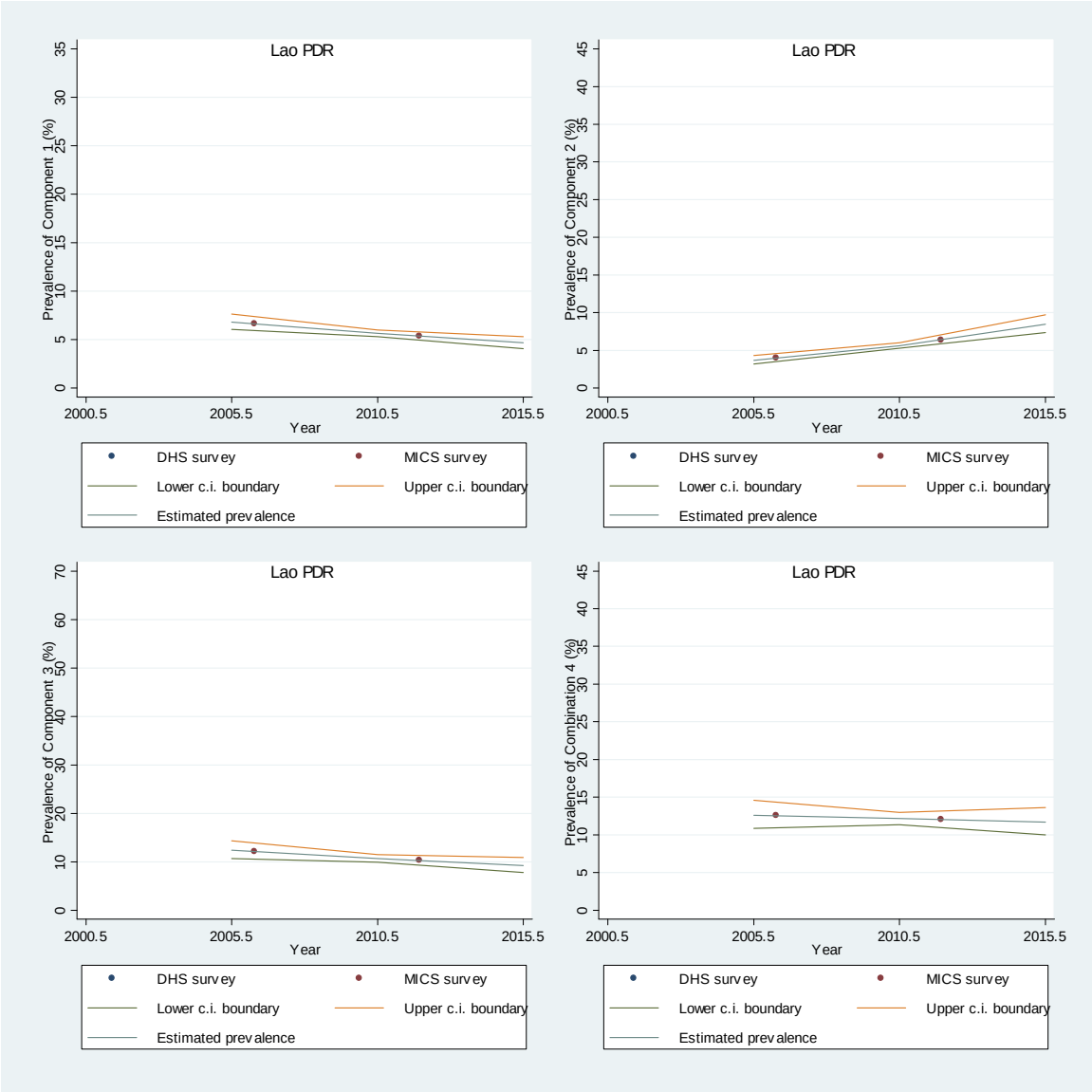


Table LA. Fitted percentages and estimated populations of children age 0-17 in Lao with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	6.8	3.7	12.3	45.2	3.2	1.1	10.2	12.6
2005	Population	187	102	340	1,246	87	31	281	347
2010	Percentage	5.6	5.6	10.7	46.8	3.0	1.7	9.2	12.1
2010	Population	157	157	298	1,306	83	48	255	339
2015	Percentage	4.6	8.5	9.2	48.4	2.8	2.6	8.2	11.7
2015	Population	131	238	259	1,361	80	74	231	329

Figure LS. Observed and fitted percentages of children age 0-17 in Lesotho with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

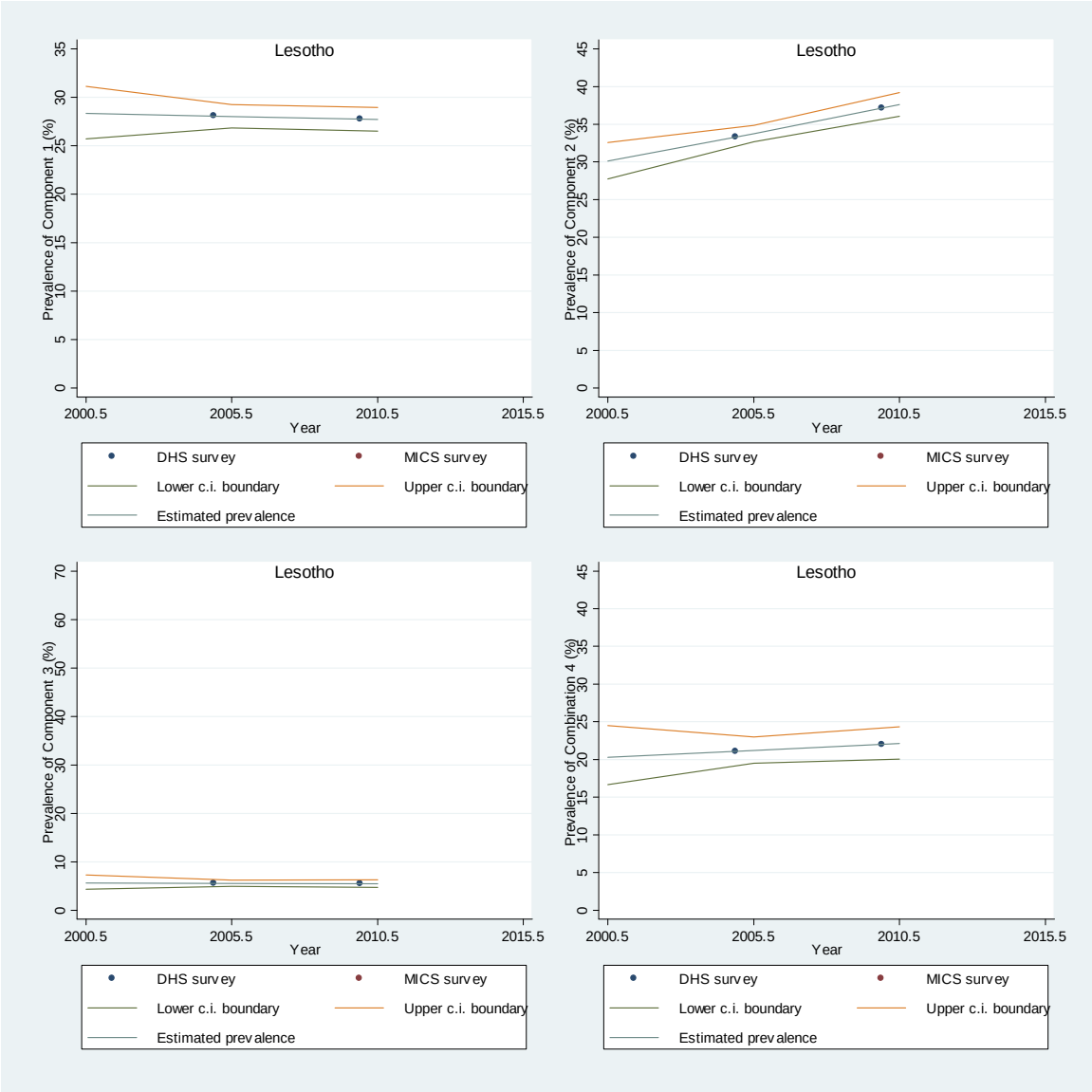


Table LS. Fitted percentages and estimated populations of children age 0-17 in Lesotho with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	28.4	30.1	5.6	39.7	12.8	12.2	3.6	20.3
2000	Population	255	271	50	357	115	110	33	183
2005	Percentage	28.0	33.8	5.5	41.8	12.5	14.6	3.5	21.2
2005	Population	254	306	50	379	113	132	32	192
2010	Percentage	27.7	37.6	5.4	44.0	12.2	17.3	3.4	22.1
2010	Population	251	341	49	398	110	157	31	200

Figure LB. Observed and fitted percentages of children age 0-17 in Liberia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

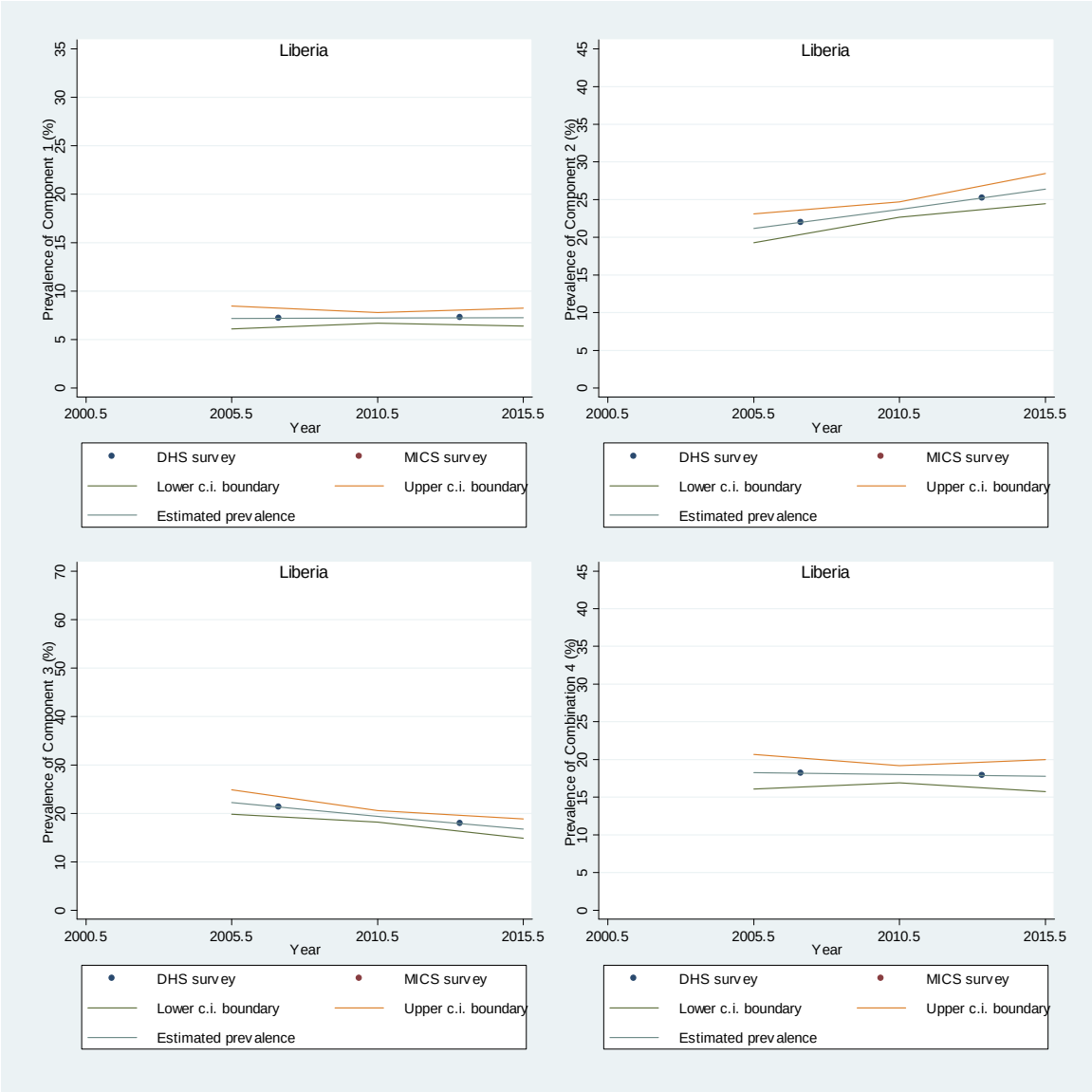


Table LB. Fitted percentages and estimated populations of children age 0-17 in Liberia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	7.2	21.2	22.2	39.7	3.1	6.2	14.2	18.3
2005	Population	117	344	362	646	51	101	232	297
2010	Percentage	7.2	23.7	19.3	40.2	2.9	7.3	12.7	18.0
2010	Population	142	465	380	789	57	144	250	353
2015	Percentage	7.3	26.4	16.8	40.6	2.8	8.6	11.3	17.8
2015	Population	160	582	369	895	61	190	249	391

Figure MD. Observed and fitted percentages of children age 0-17 in Madagascar with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

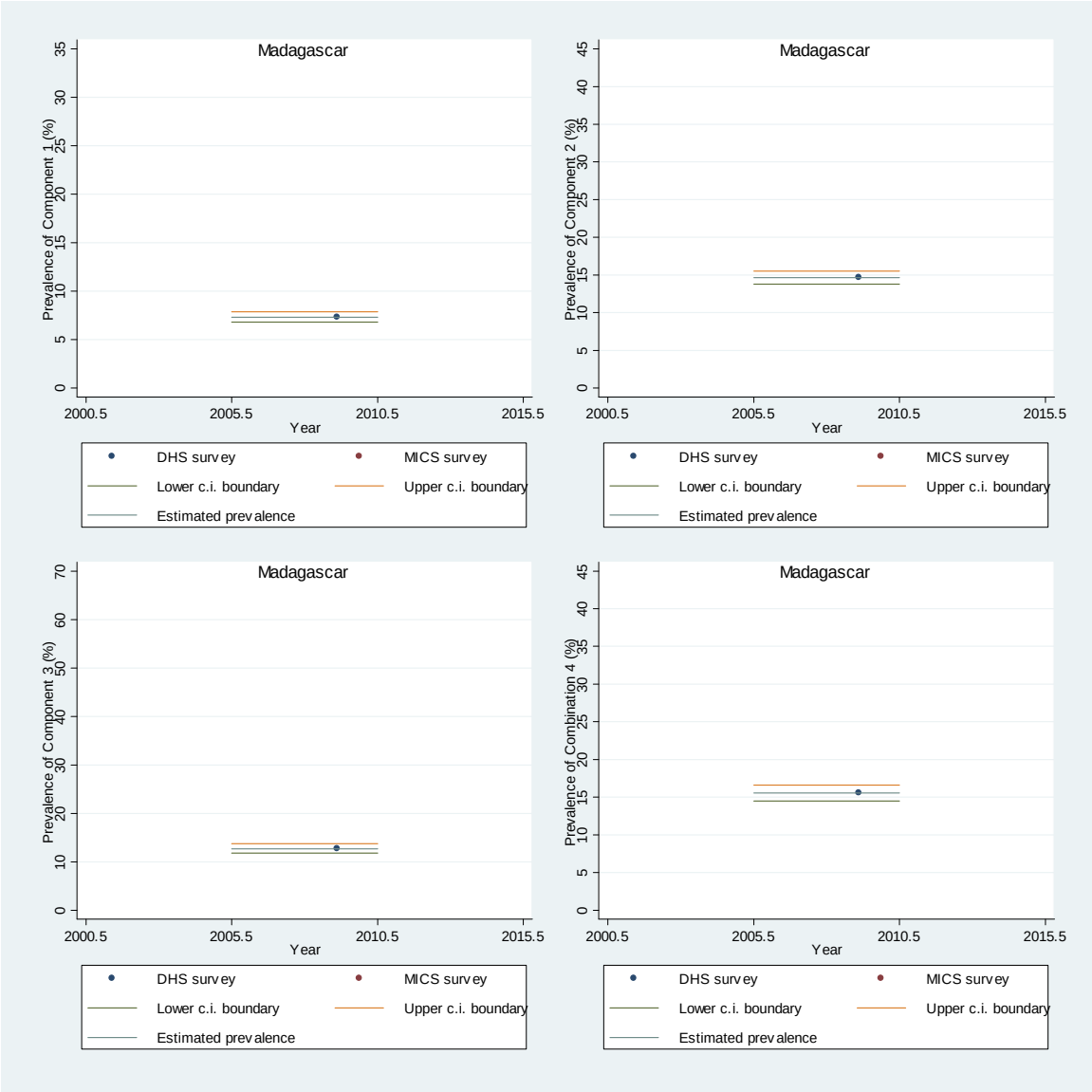


Table MD. Fitted percentages and estimated populations of children age 0-17 in Madagascar with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	7.3	14.6	12.7	43.3	3.6	5.7	10.2	15.5
2005	Population	688	1,377	1,195	4,075	338	538	963	1,462
2010	Percentage	7.3	14.6	12.7	43.3	3.6	5.7	10.2	15.5
2010	Population	774	1,549	1,344	4,583	381	605	1,083	1,644

Figure MW. Observed and fitted percentages of children age 0-17 in Malawi with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

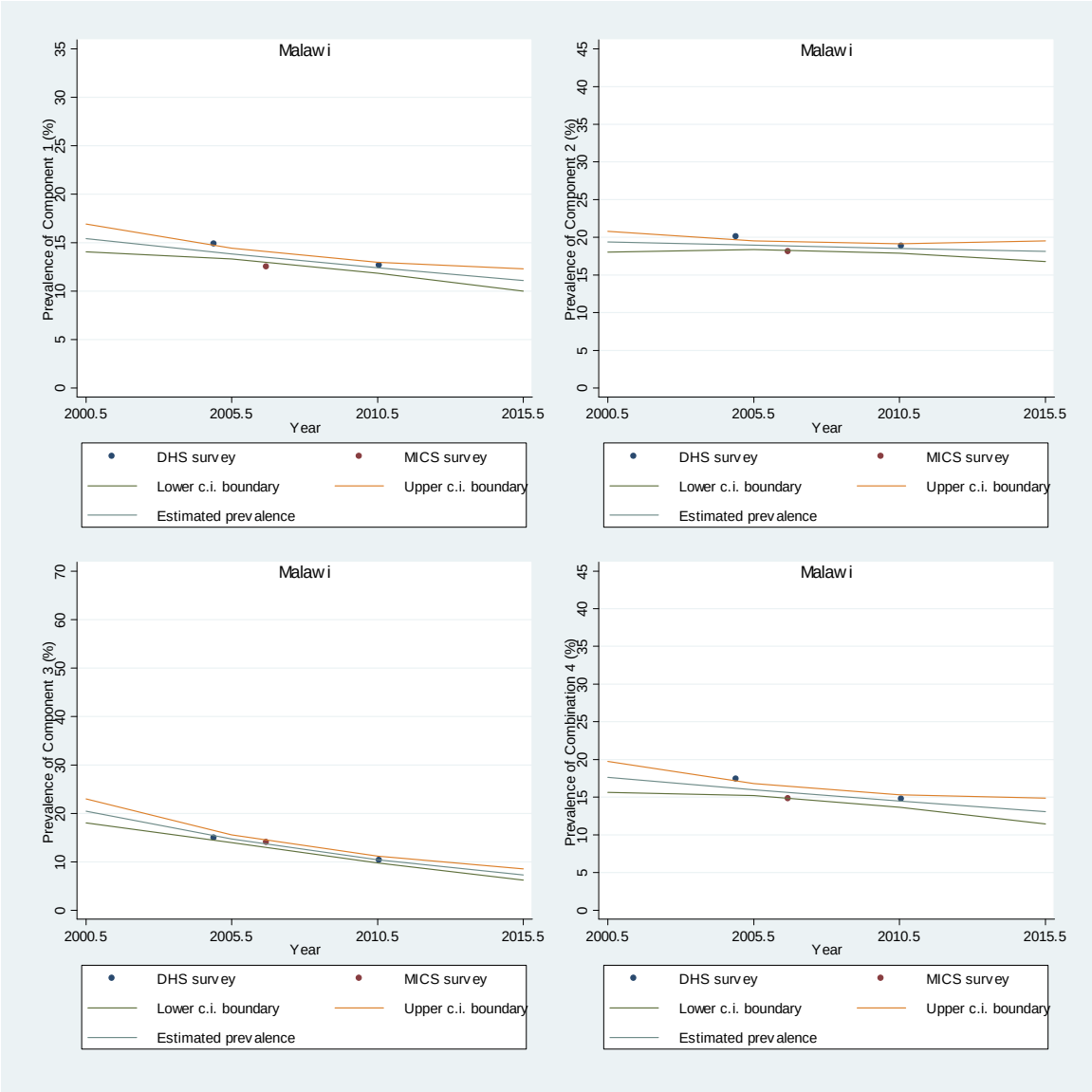


Table MW. Fitted percentages and estimated populations of children age 0-17 in Malawi with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	15.4	19.4	20.4	40.1	6.1	8.4	11.9	17.6
2000	Population	926	1,163	1,225	2,404	369	507	716	1,057
2005	Percentage	13.8	18.9	14.7	40.8	5.8	7.8	9.4	16.0
2005	Population	949	1,299	1,011	2,796	399	536	645	1,095
2010	Percentage	12.4	18.5	10.4	41.5	5.5	7.2	7.4	14.5
2010	Population	974	1,454	819	3,258	433	567	579	1,135
2015	Percentage	11.1	18.1	7.3	42.2	5.2	6.7	5.7	13.1
2015	Population	993	1,620	652	3,779	468	597	515	1,169

Figure MV. Observed and fitted percentages of children age 0-17 in Maldives with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

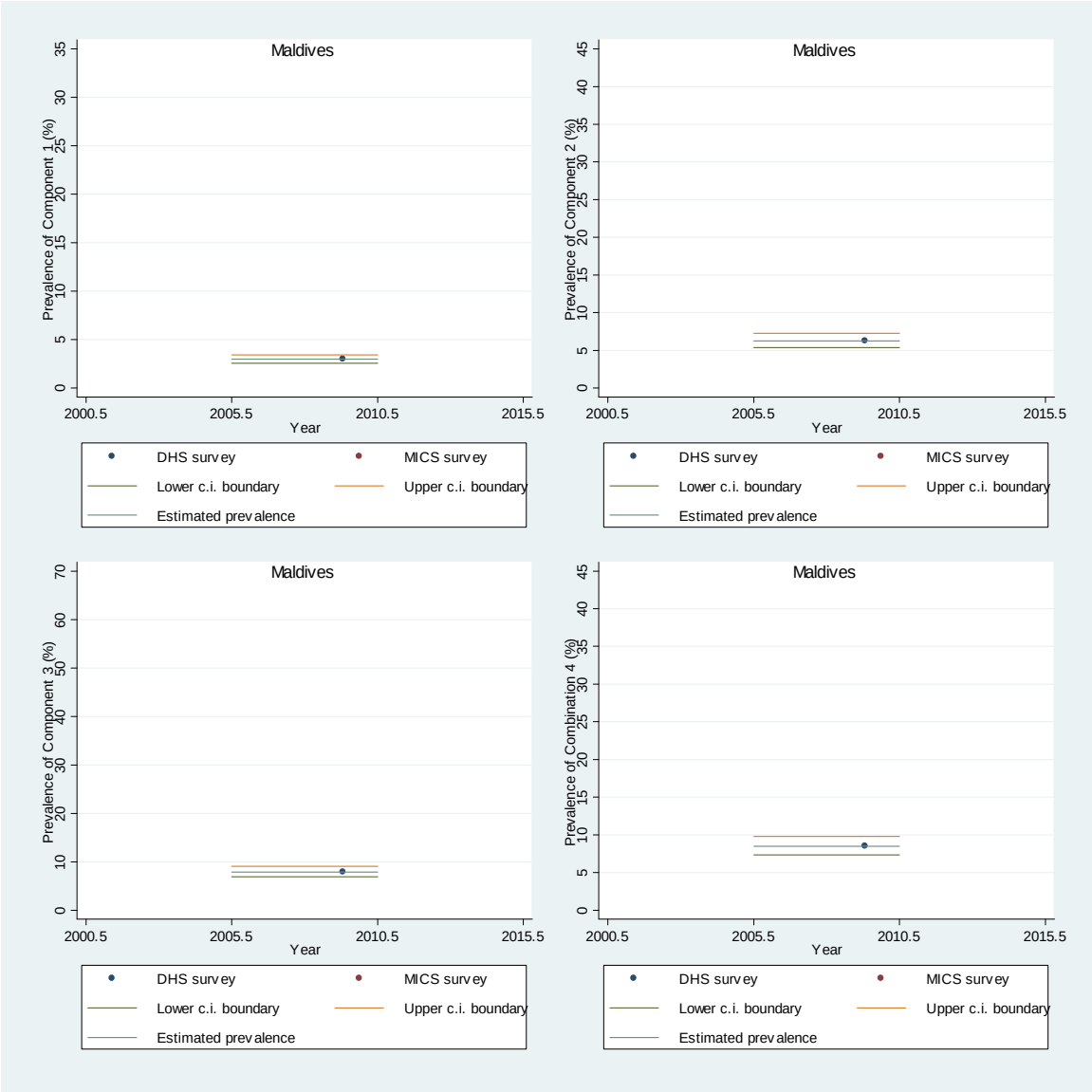


Table MV. Fitted percentages and estimated populations of children age 0-17 in Maldives with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	3.0	6.2	7.9	44.5	1.7	1.8	5.7	8.5
2005	Population	4	8	10	57	2	2	7	11
2010	Percentage	3.0	6.2	7.9	44.5	1.7	1.8	5.7	8.5
2010	Population	3	7	9	53	2	2	7	10

Figure ML. Observed and fitted percentages of children age 0-17 in Mali with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

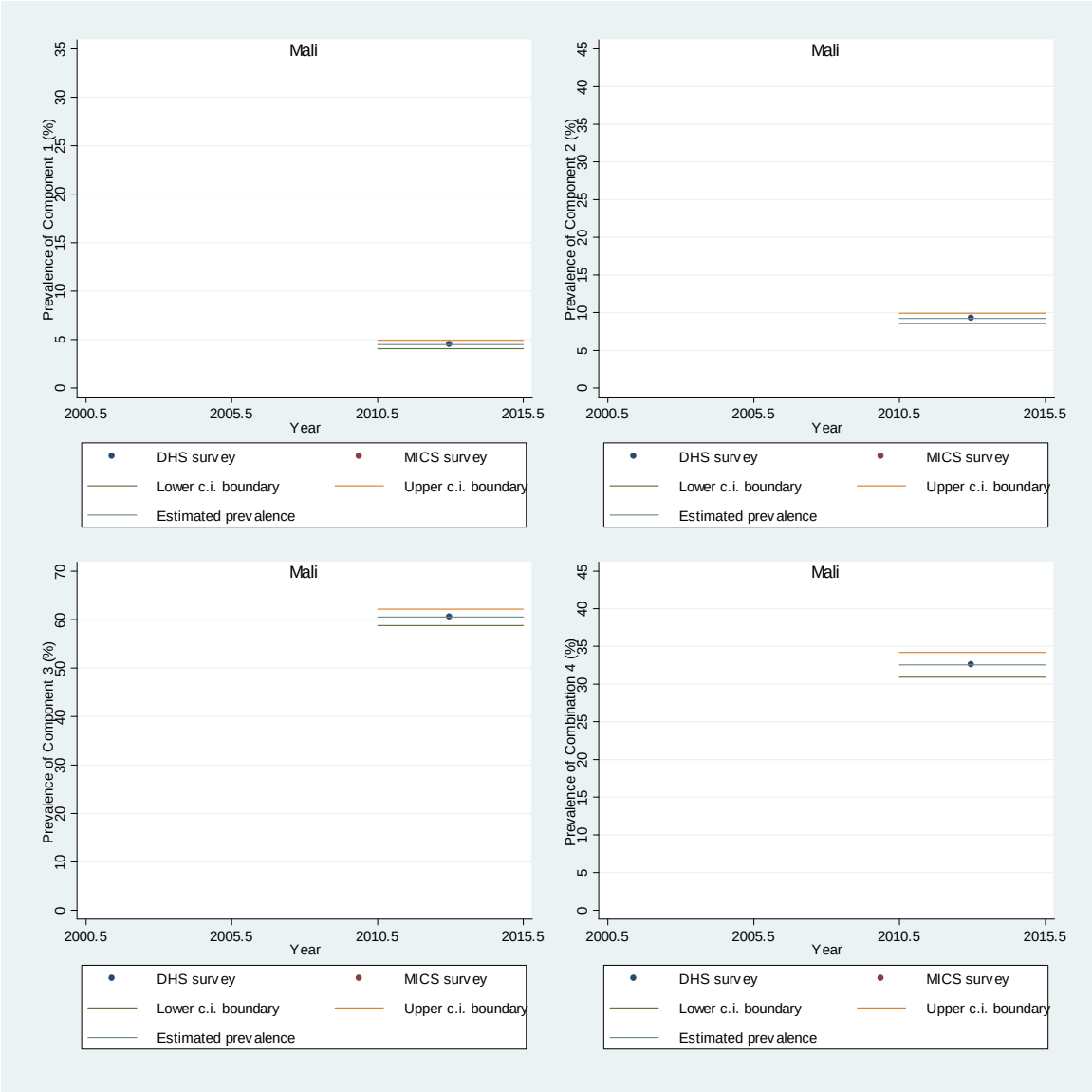


Table ML. Fitted percentages and estimated populations of children age 0-17 in Mali with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	4.5	9.2	60.5	40.7	1.8	3.3	31.8	32.5
2010	Population	364	750	4,920	3,311	143	270	2,583	2,646
2015	Percentage	4.5	9.2	60.5	40.7	1.8	3.3	31.8	32.5
2015	Population	426	879	5,764	3,878	167	316	3,026	3,100

Figure MR. Observed and fitted percentages of children age 0-17 in Mauritania with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

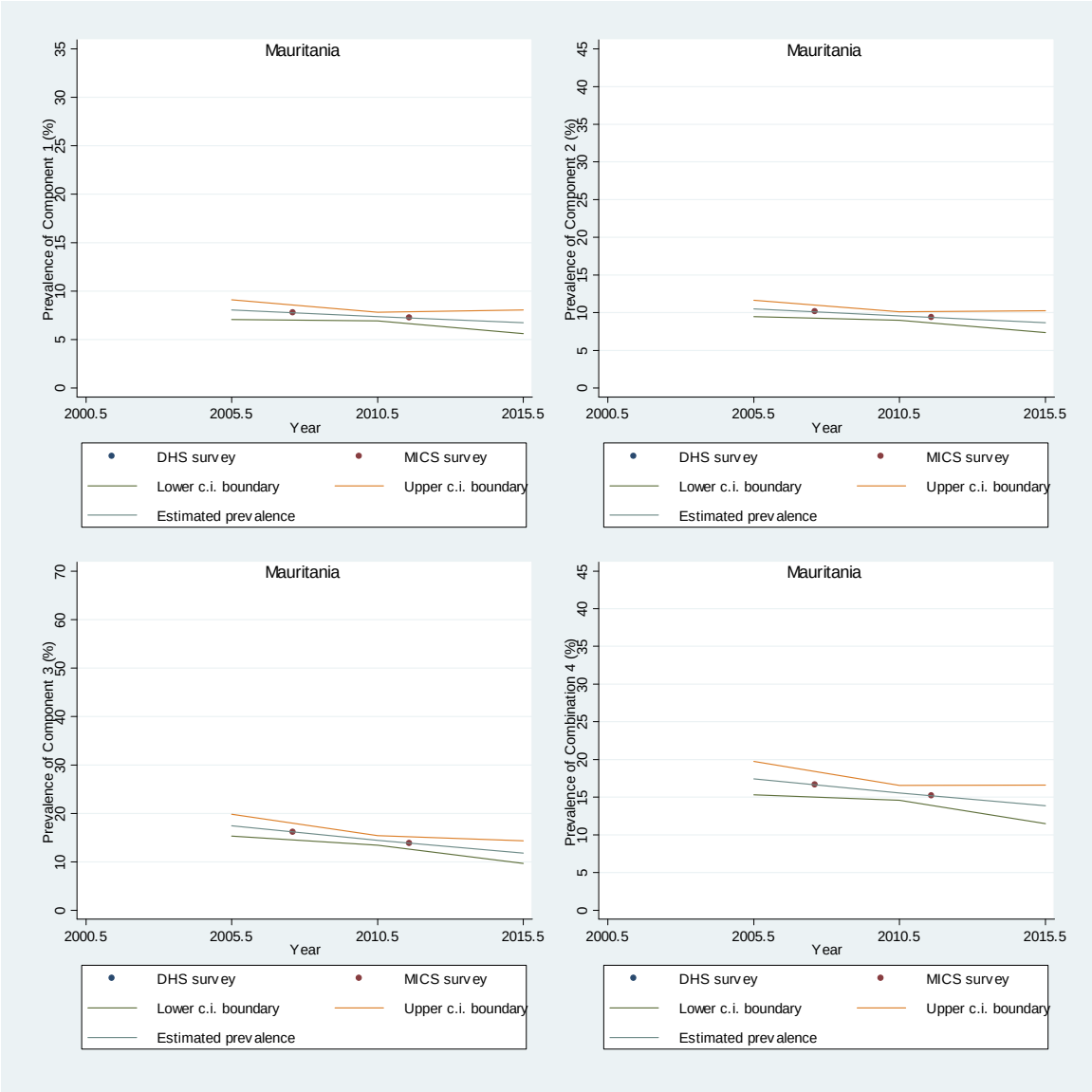


Table MR. Fitted percentages and estimated populations of children age 0-17 in Mauritania with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	8.0	10.5	17.4	43.5	4.0	4.5	12.6	17.4
2005	Population	122	160	265	662	61	69	192	265
2010	Percentage	7.4	9.6	14.4	44.6	3.1	4.7	10.5	15.5
2010	Population	125	163	245	760	54	80	179	265
2015	Percentage	6.7	8.7	11.8	45.7	2.4	4.9	8.7	13.8
2015	Population	127	164	222	864	46	92	164	262

Figure MB. Observed and fitted percentages of children age 0-17 in Moldova with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

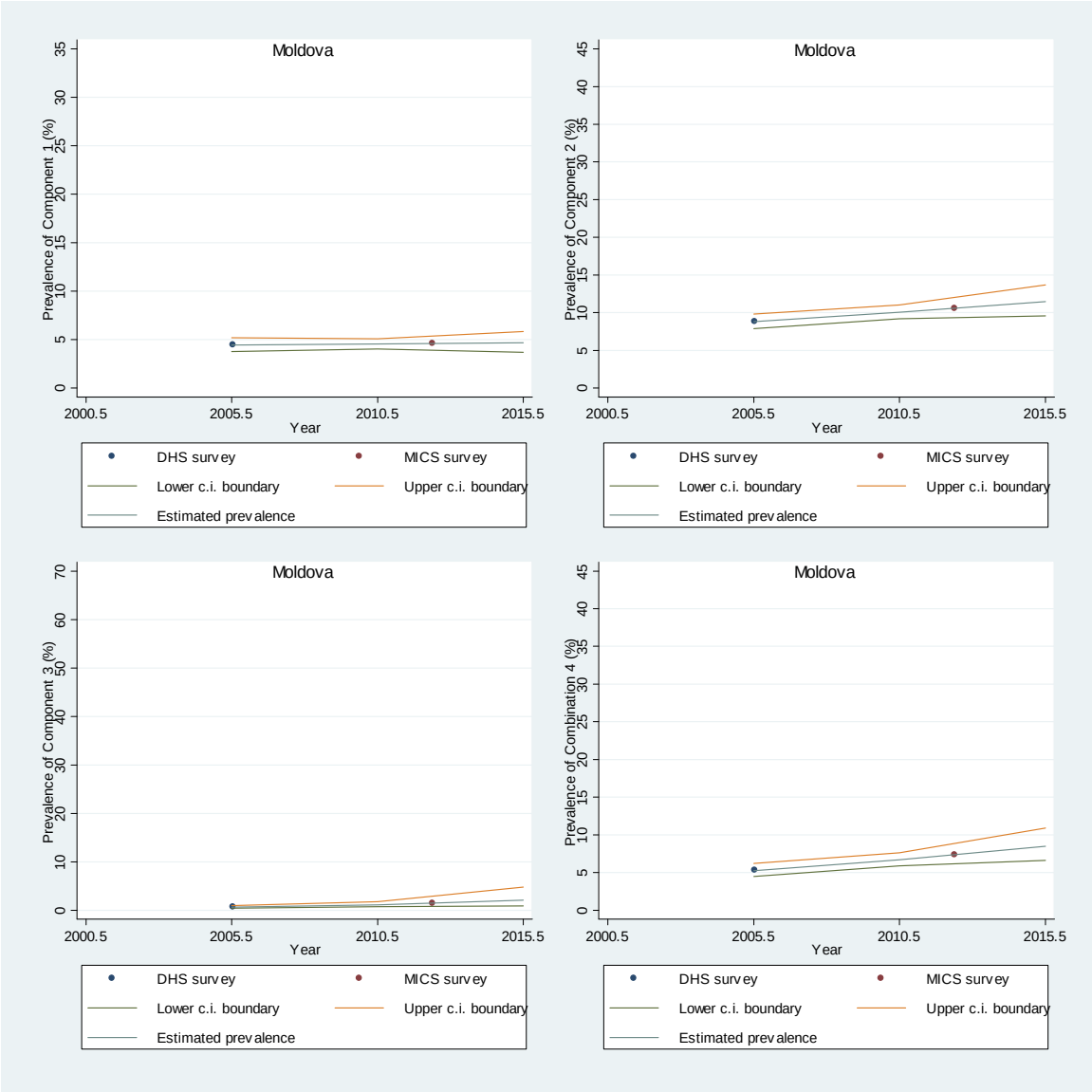


Table MB. Fitted percentages and estimated populations of children age 0-17 in Moldova with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	4.4	8.8	0.6	41.1	2.3	3.5	0.1	5.3
2005	Population	45	89	6	418	23	36	1	54
2010	Percentage	4.5	10.0	1.1	38.8	2.5	4.6	0.4	6.7
2010	Population	39	87	10	335	22	39	3	58
2015	Percentage	4.6	11.5	2.0	36.6	2.7	5.9	1.2	8.5
2015	Population	36	89	16	284	21	46	9	66

Figure MZ. Observed and fitted percentages of children age 0-17 in Mozambique with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

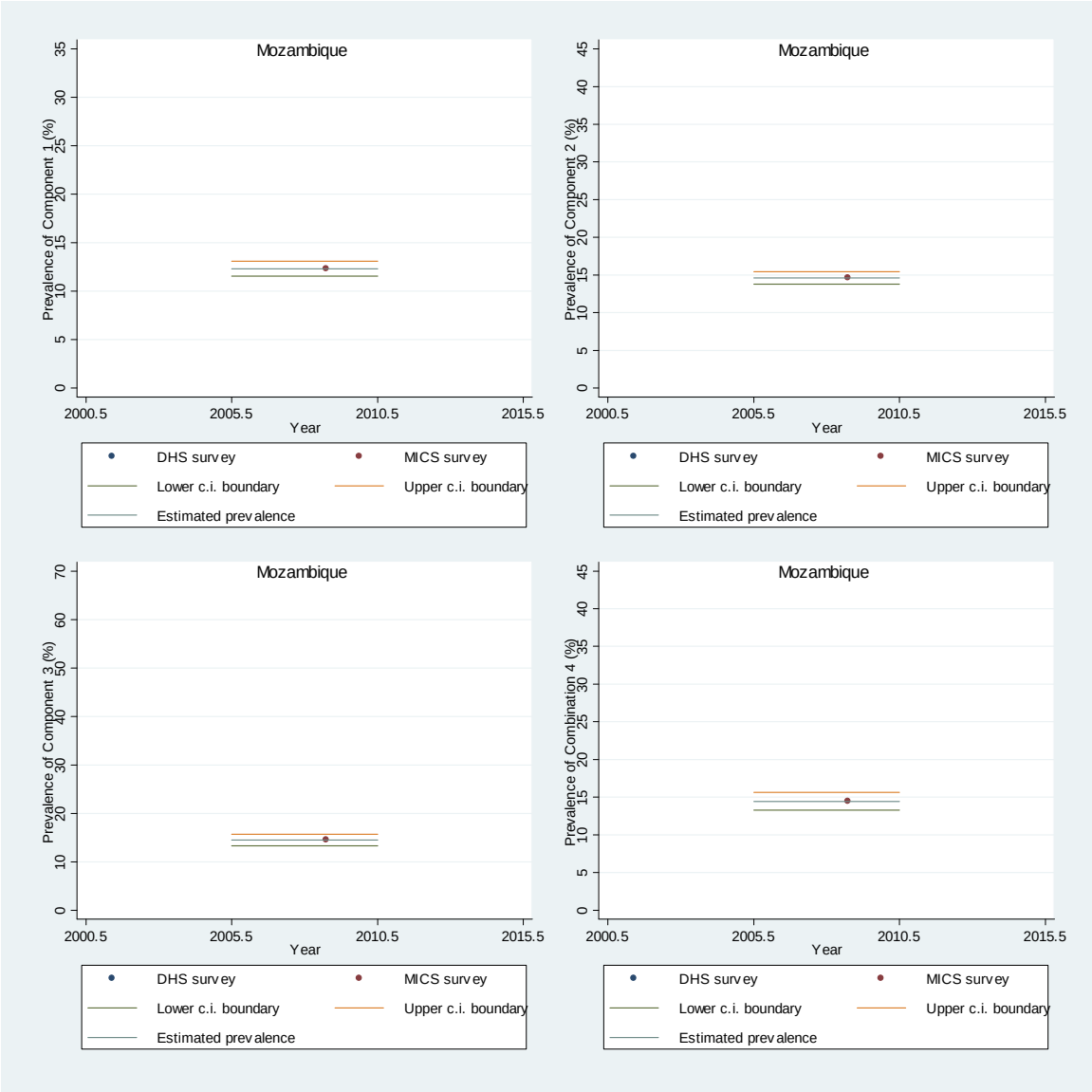


Table MZ. Fitted percentages and estimated populations of children age 0-17 in Mozambique with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	12.3	14.6	14.4	41.5	4.8	4.8	9.1	14.4
2005	Population	1,350	1,600	1,585	4,554	526	524	996	1,583
2010	Percentage	12.3	14.6	14.4	41.5	4.8	4.8	9.1	14.4
2010	Population	1,569	1,861	1,843	5,296	611	610	1,158	1,841

Figure NM. Observed and fitted percentages of children age 0-17 in Namibia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

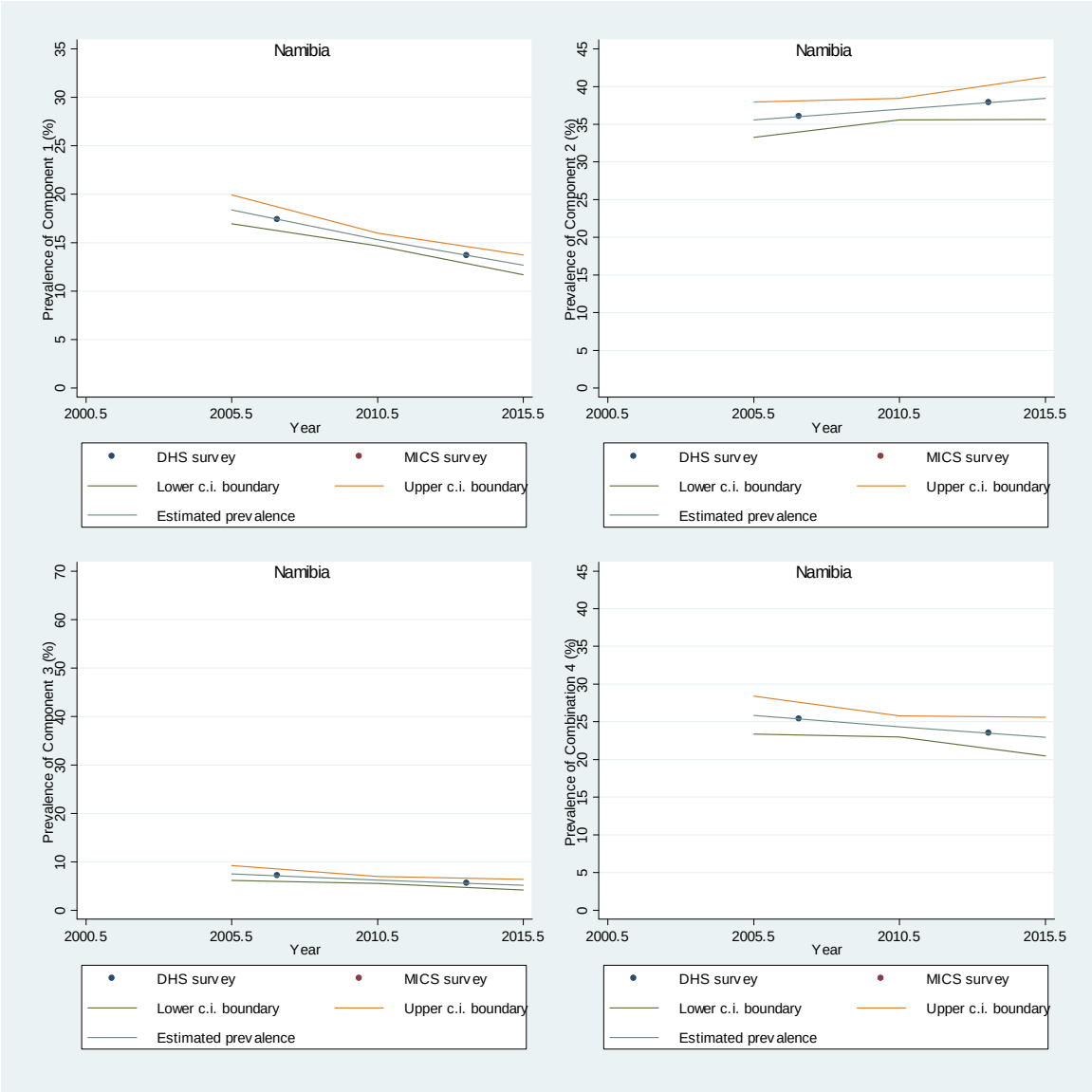


Table NM. Fitted percentages and estimated populations of children age 0-17 in Namibia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	18.4	35.6	7.5	46.8	10.9	19.3	5.4	25.8
2005	Population	174	337	71	443	103	183	51	245
2010	Percentage	15.3	37.0	6.2	46.4	8.1	19.3	4.8	24.4
2010	Population	152	367	62	460	80	191	48	241
2015	Percentage	12.7	38.4	5.1	46.0	6.0	19.3	4.3	22.9
2015	Population	135	408	55	489	64	205	46	244

Figure NP. Observed and fitted percentages of children age 0-17 in Nepal with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

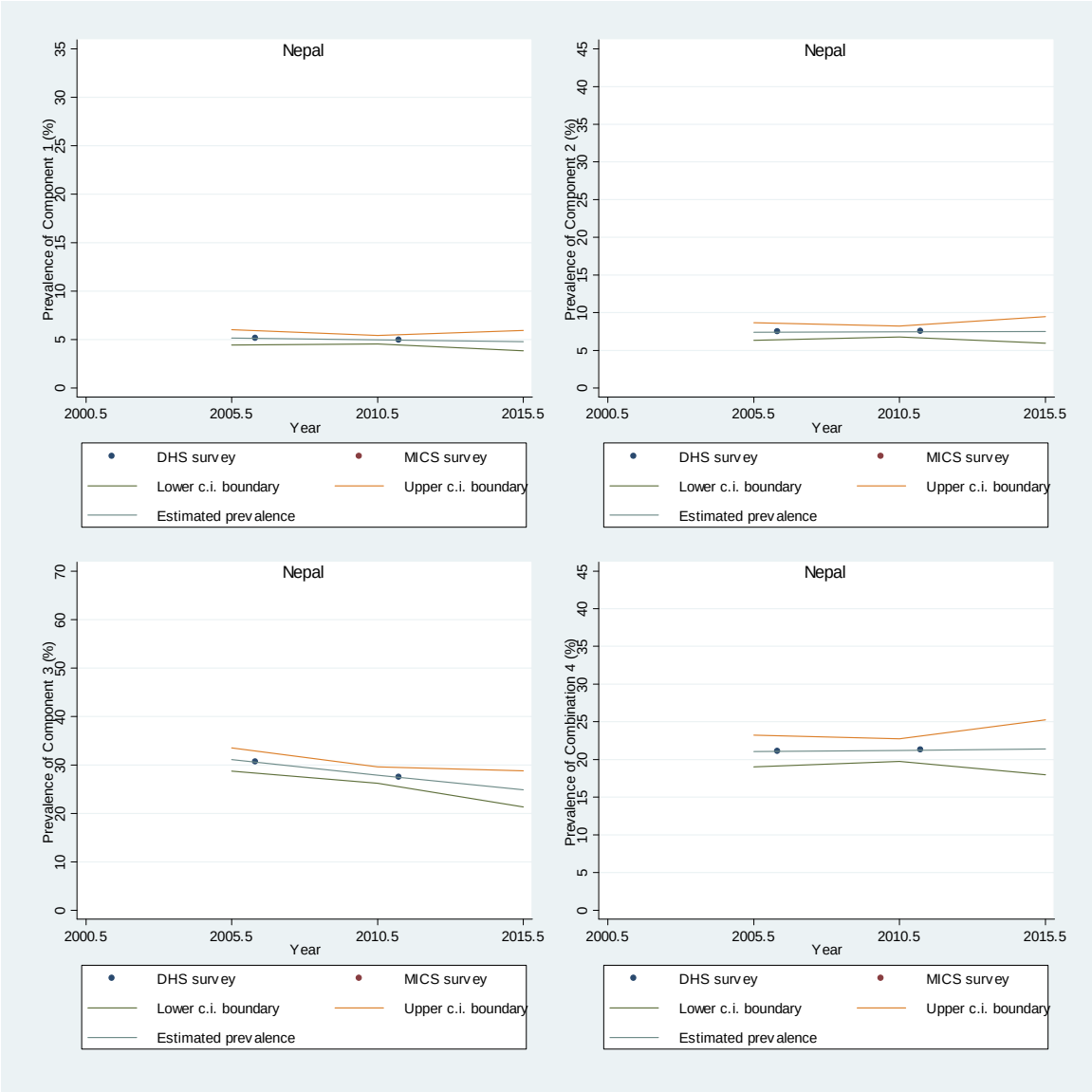


Table NP. Fitted percentages and estimated populations of children age 0-17 in Nepal with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	5.2	7.4	31.1	43.8	2.6	2.2	19.3	21.0
2005	Population	609	875	3,668	5,173	303	259	2,273	2,483
2010	Percentage	5.0	7.5	27.9	45.2	2.6	2.3	19.0	21.2
2010	Population	586	881	3,290	5,336	310	277	2,245	2,503
2015	Percentage	4.8	7.5	24.9	46.6	2.7	2.5	18.8	21.4
2015	Population	540	851	2,815	5,273	304	284	2,126	2,418

Figure NI. Observed and fitted percentages of children age 0-17 in Niger with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

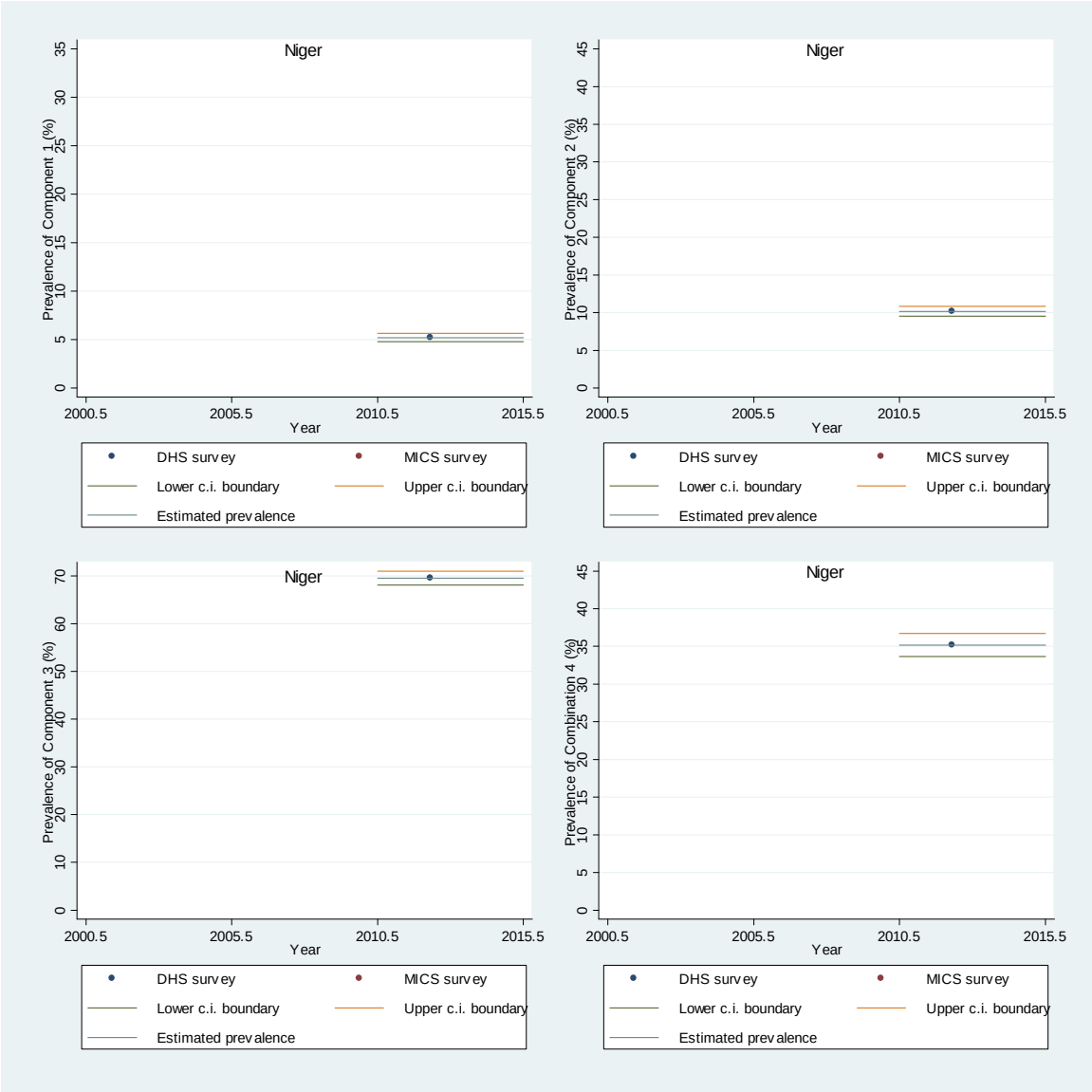


Table NI. Fitted percentages and estimated populations of children age 0-17 in Niger with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	5.2	10.2	69.6	41.1	2.3	4.4	34.5	35.2
2010	Population	476	930	6,372	3,763	213	404	3,159	3,220
2015	Percentage	5.2	10.2	69.6	41.1	2.3	4.4	34.5	35.2
2015	Population	589	1,150	7,886	4,656	263	500	3,909	3,985

Figure NG. Observed and fitted percentages of children age 0-17 in Nigeria with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

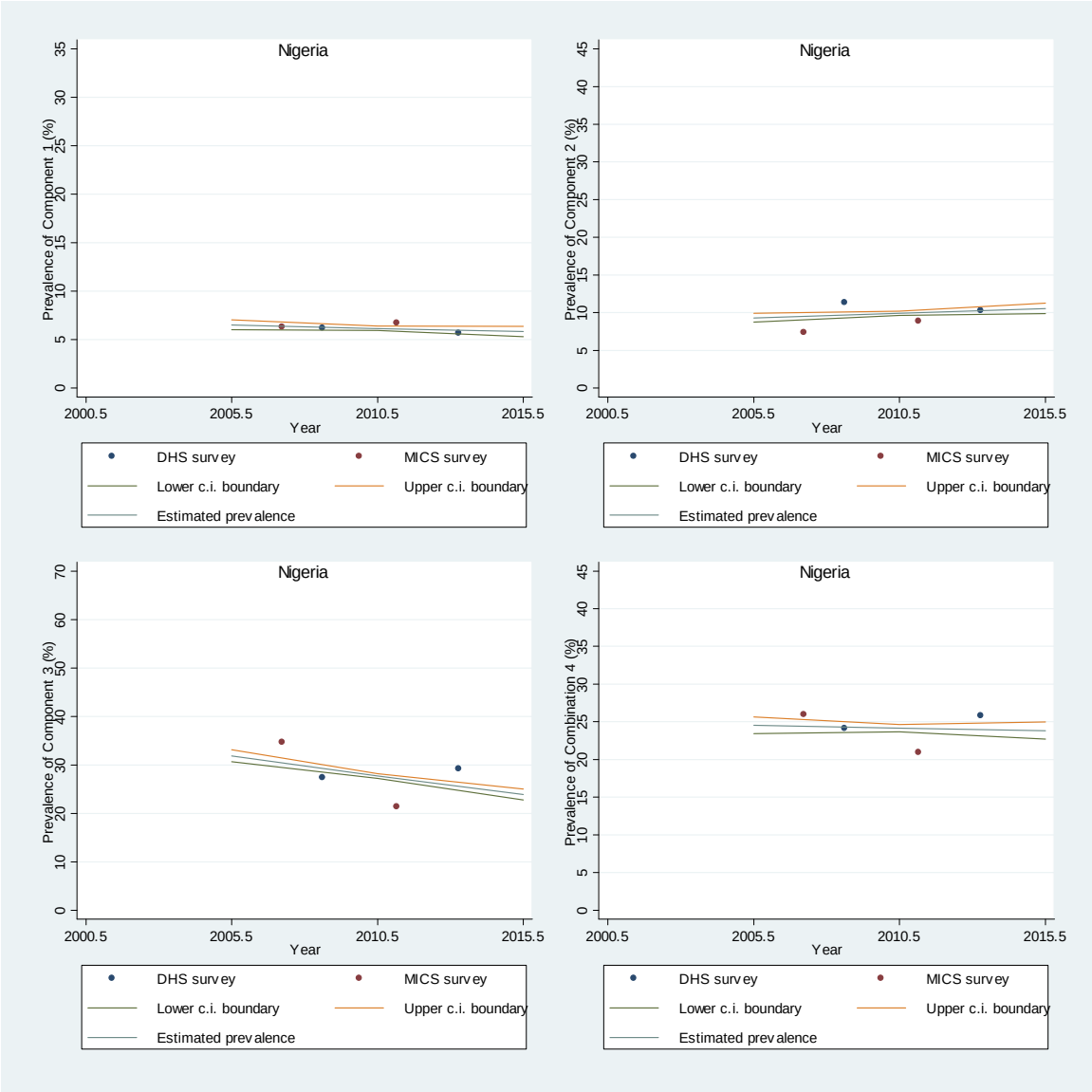


Table NG. Fitted percentages and estimated populations of children age 0-17 in Nigeria with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	6.5	9.3	31.9	42.2	2.2	2.6	22.3	24.5
2005	Population	4,543	6,502	22,272	29,520	1,562	1,801	15,601	17,131
2010	Percentage	6.1	9.9	27.7	43.1	2.2	3.3	21.7	24.2
2010	Population	4,925	7,943	22,184	34,557	1,730	2,617	17,371	19,363
2015	Percentage	5.8	10.6	23.9	44.0	2.1	4.1	21.0	23.8
2015	Population	5,338	9,698	21,917	40,433	1,915	3,795	19,333	21,881

Figure PK. Observed and fitted percentages of children age 0-17 in Pakistan with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

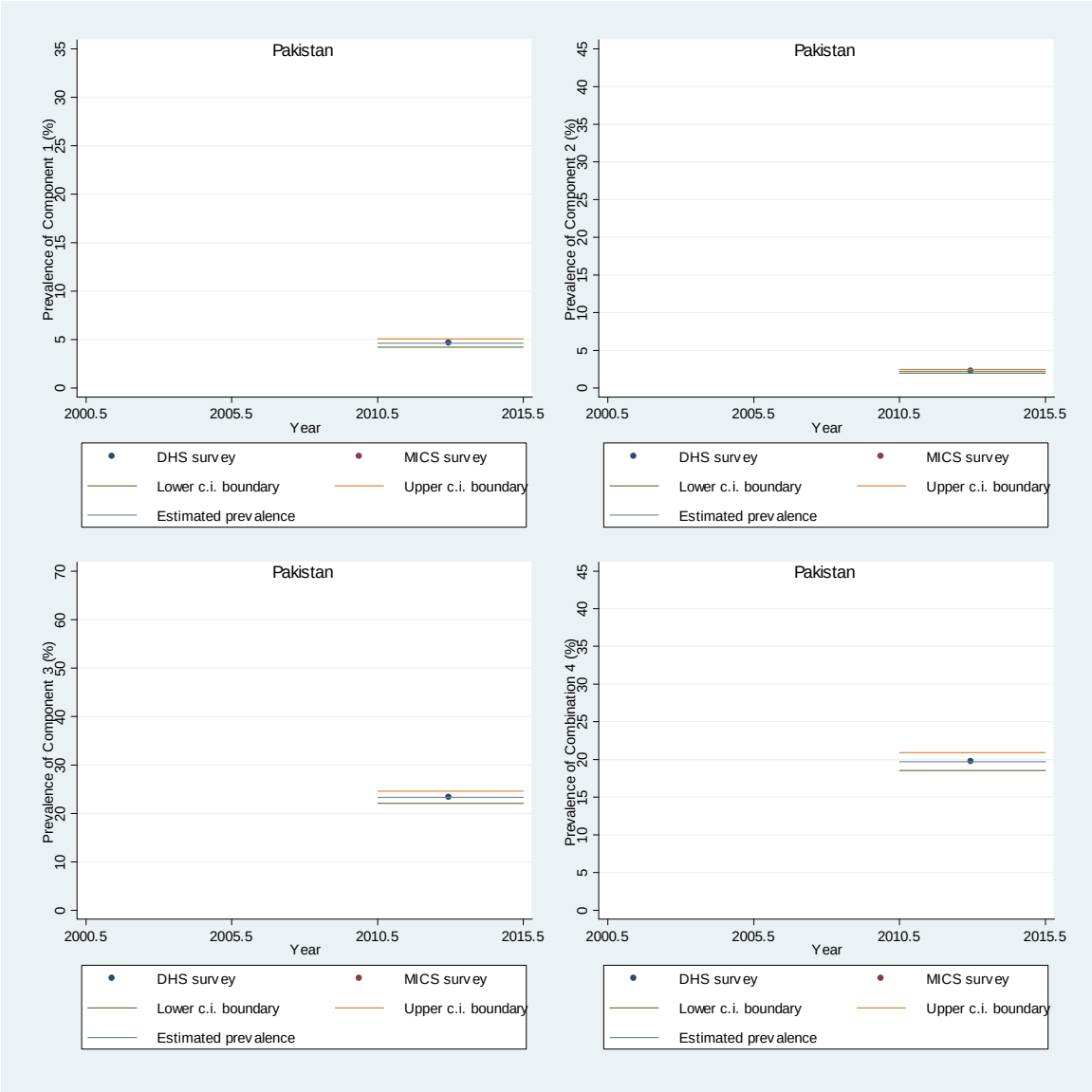


Table PK. Fitted percentages and estimated populations of children age 0-17 in Pakistan with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	4.6	2.2	23.3	44.5	2.3	1.0	18.0	19.7
2010	Population	3,372	1,614	16,962	32,403	1,671	726	13,088	14,343
2015	Percentage	4.6	2.2	23.3	44.5	2.3	1.0	18.0	19.7
2015	Population	3,602	1,724	18,116	34,609	1,784	775	13,979	15,320

Figure RW. Observed and fitted percentages of children age 0-17 in Rwanda with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

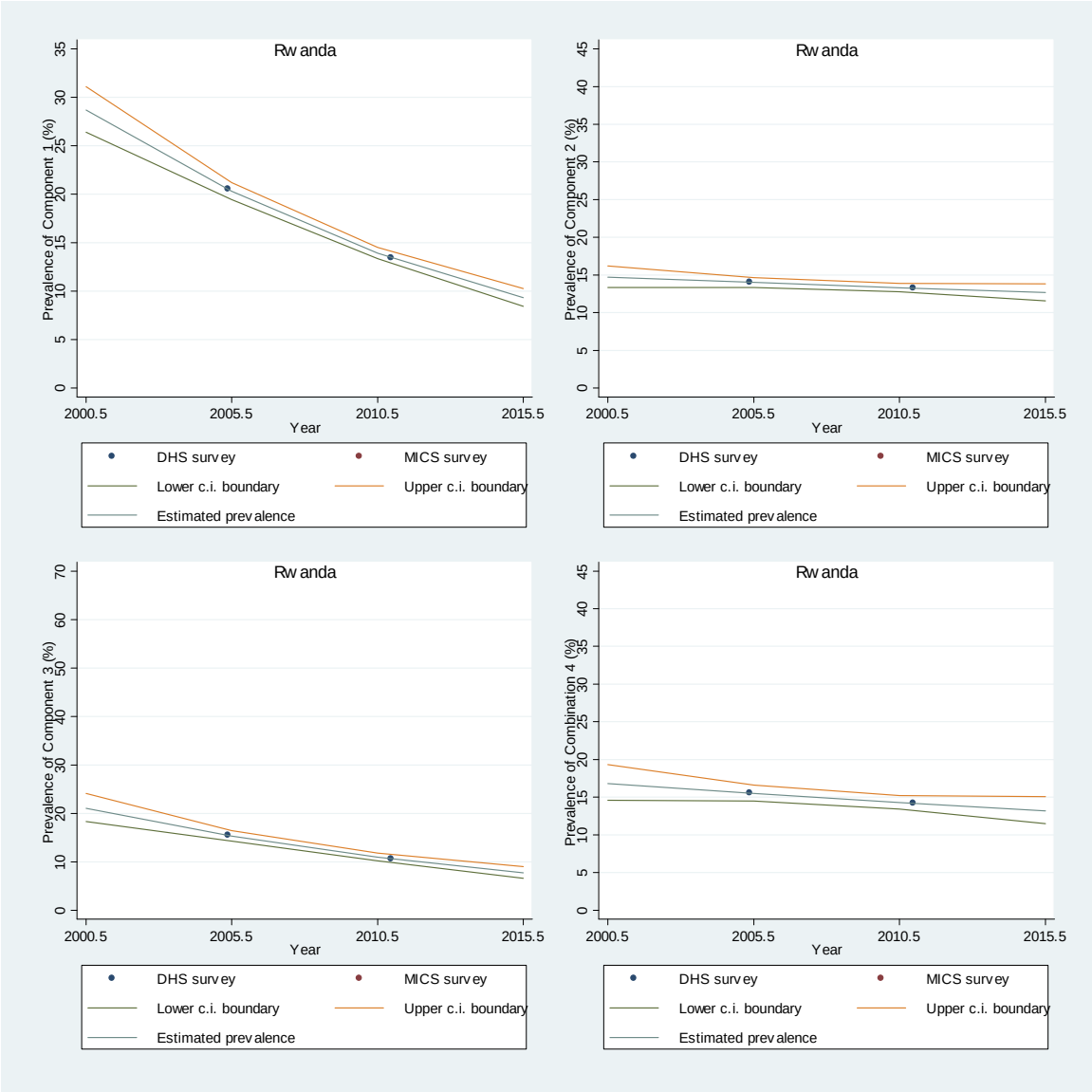


Table RW. Fitted percentages and estimated populations of children age 0-17 in Rwanda with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	28.7	14.7	21.0	39.6	12.2	3.7	8.9	16.8
2000	Population	1,218	625	893	1,682	516	157	380	714
2005	Percentage	20.3	14.0	15.3	40.7	9.0	4.4	8.2	15.5
2005	Population	917	631	691	1,835	406	199	371	700
2010	Percentage	13.9	13.3	10.9	41.8	6.6	5.2	7.5	14.3
2010	Population	695	665	547	2,087	330	261	377	714
2015	Percentage	9.3	12.7	7.7	42.9	4.8	6.2	6.9	13.2
2015	Population	515	700	426	2,373	267	343	383	729

Figure ST. Observed and fitted percentages of children age 0-17 in Sao Tome and Principe with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

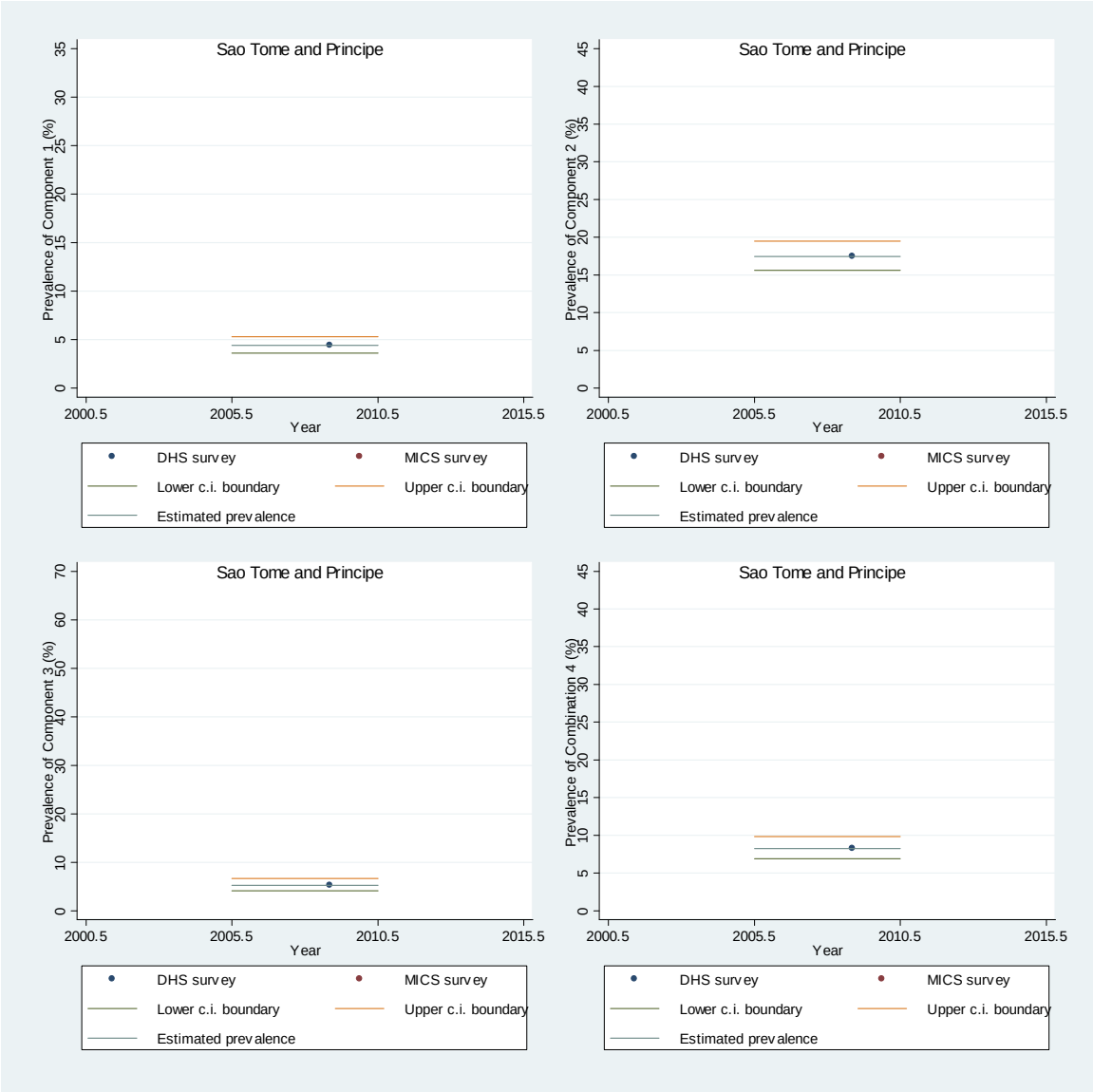


Table ST. Fitted percentages and estimated populations of children age 0-17 in Sao Tome and Principe with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	4.4	17.5	5.2	39.9	1.6	5.7	3.3	8.3
2005	Population	3	14	4	31	1	4	3	6
2010	Percentage	4.4	17.5	5.2	39.9	1.6	5.7	3.3	8.3
2010	Population	4	15	4	34	1	5	3	7

Figure SN. Observed and fitted percentages of children age 0-17 in Senegal with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

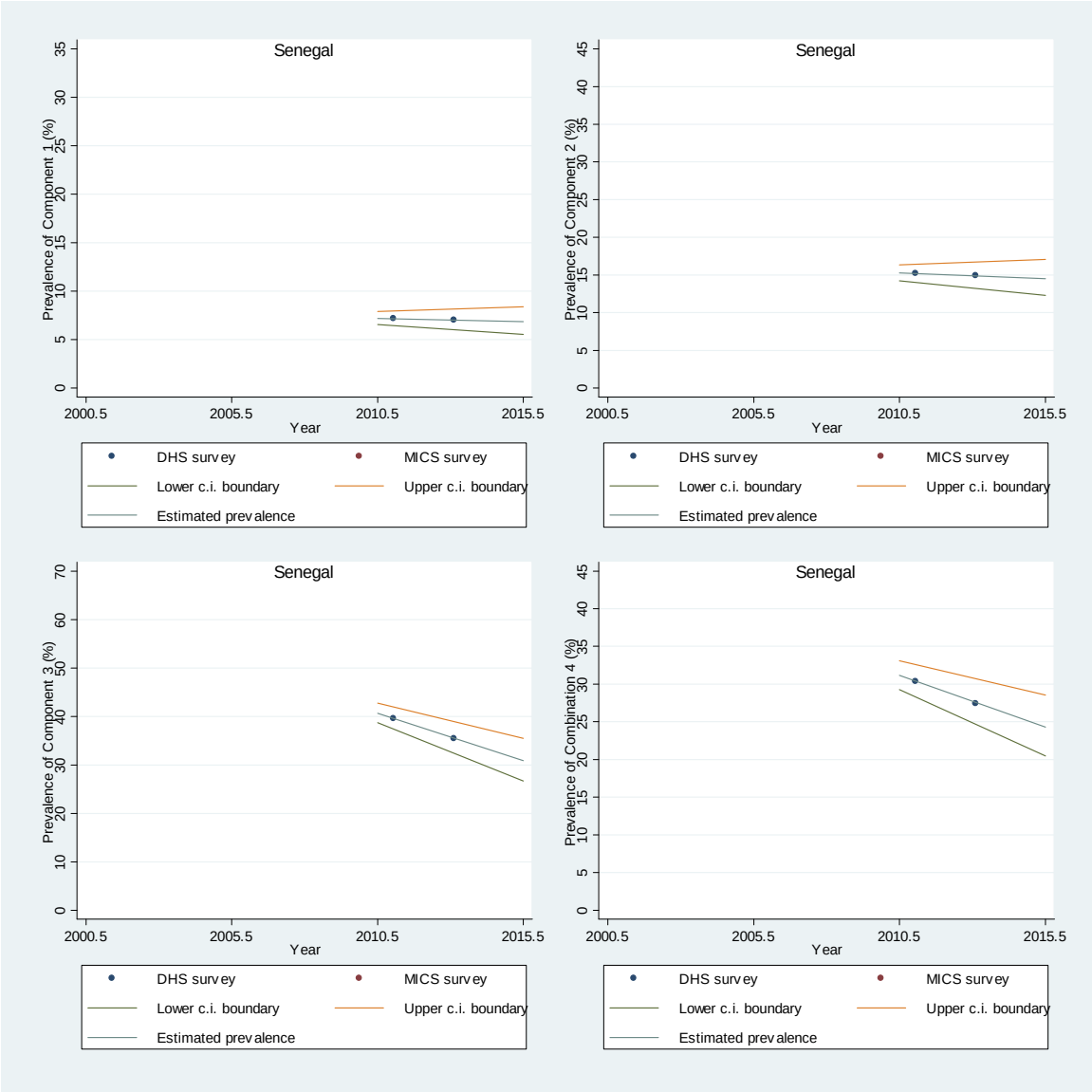


Table SN. Fitted percentages and estimated populations of children age 0-17 in Senegal with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	7.2	15.3	40.7	44.8	3.2	6.3	27.6	31.2
2010	Population	470	996	2,656	2,924	212	410	1,804	2,034
2015	Percentage	6.8	14.5	30.9	44.1	3.0	5.8	20.0	24.3
2015	Population	519	1,103	2,347	3,346	228	444	1,519	1,844

Figure SL. Observed and fitted percentages of children age 0-17 in Sierra Leone with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

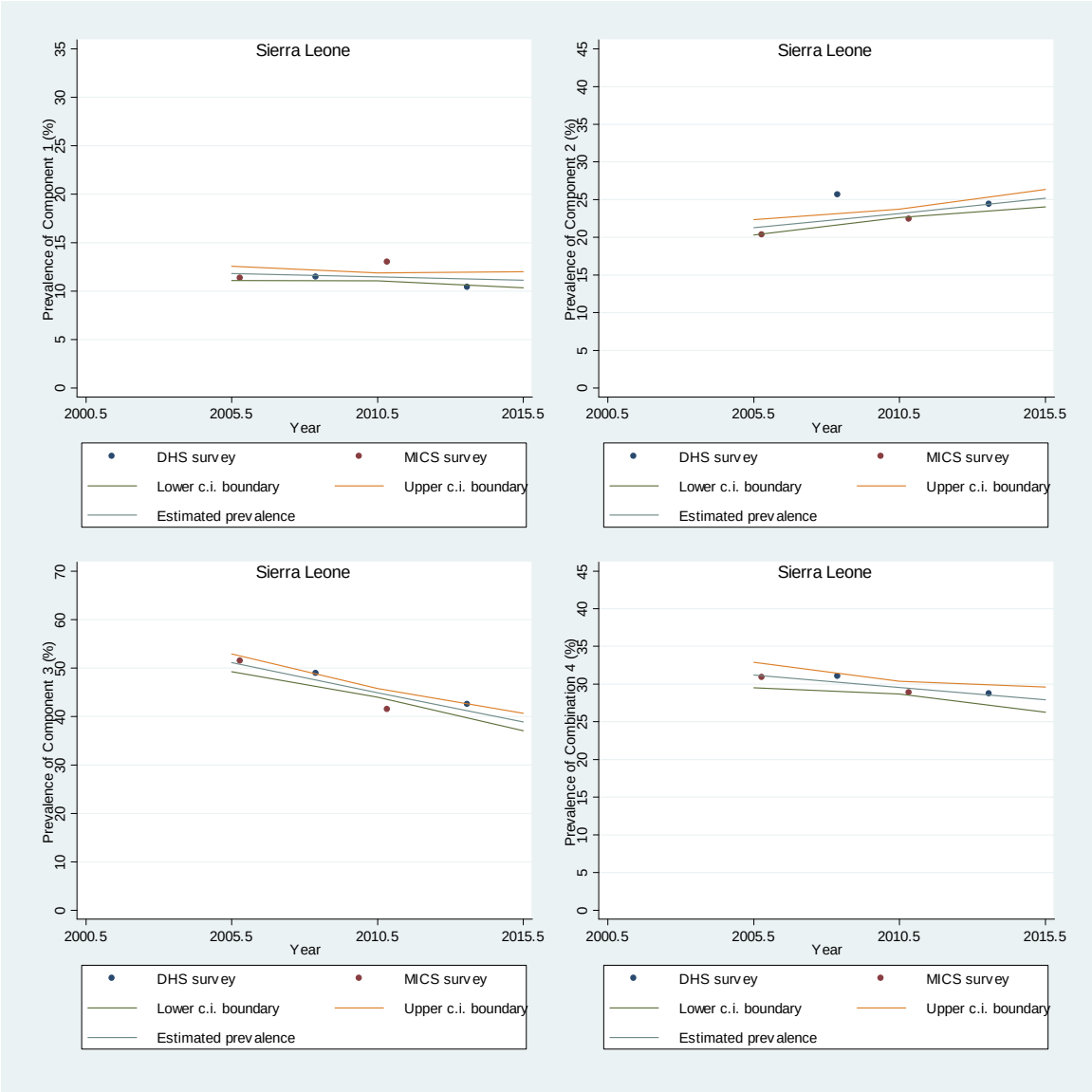


Table SL. Fitted percentages and estimated populations of children age 0-17 in Sierra Leone with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	11.8	21.3	51.1	39.9	4.6	6.9	28.8	31.2
2005	Population	303	546	1,310	1,025	118	177	740	800
2010	Percentage	11.5	23.2	44.9	40.7	4.2	7.7	25.9	29.5
2010	Population	332	670	1,297	1,175	122	224	749	854
2015	Percentage	11.1	25.2	38.8	41.4	3.9	8.7	23.2	27.9
2015	Population	353	797	1,229	1,311	123	276	735	884

Figure SO. Observed and fitted percentages of children age 0-17 in Somalia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

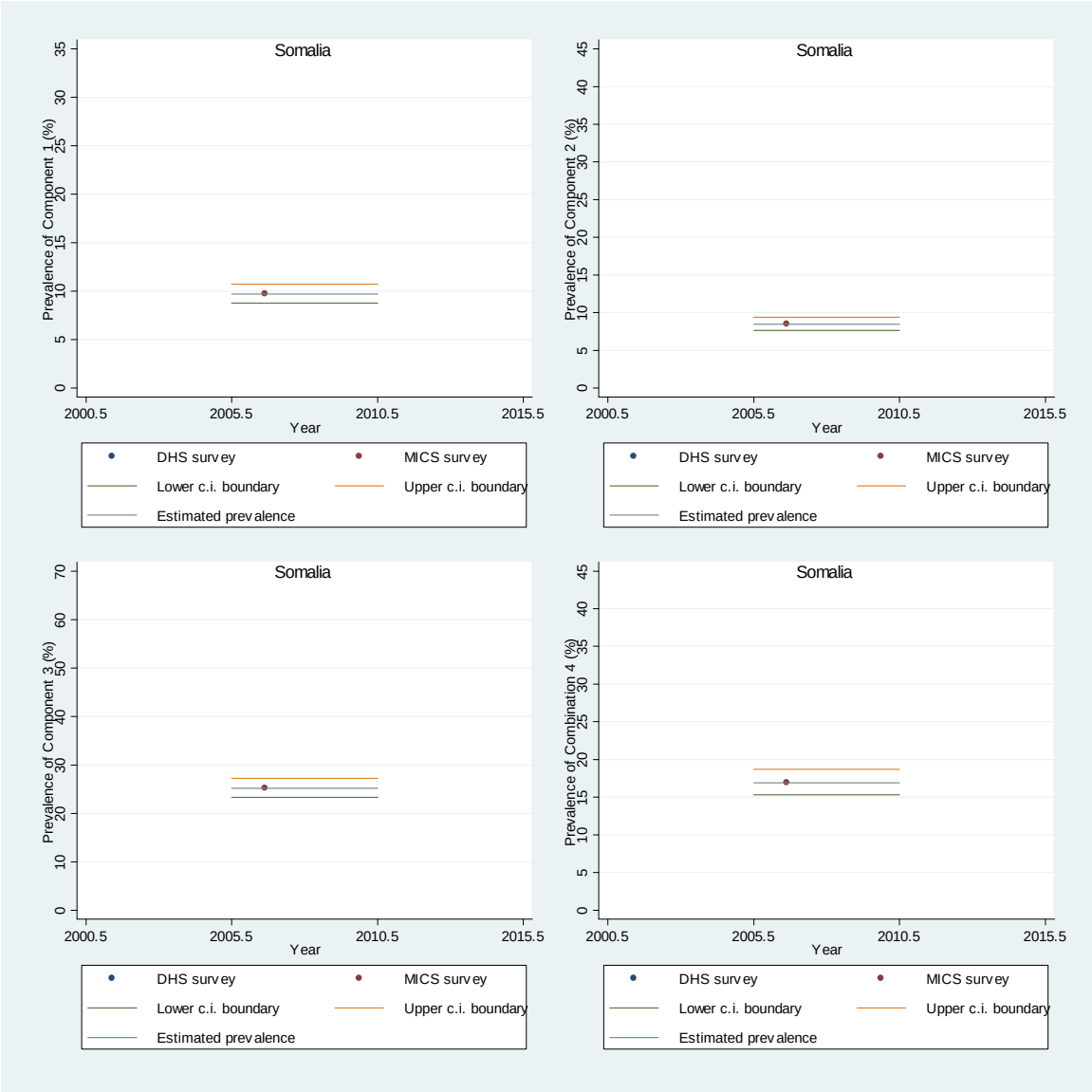


Table SO. Fitted percentages and estimated populations of children age 0-17 in Somalia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	9.7	8.5	25.2	40.4	3.5	2.8	14.3	16.9
2005	Population	444	388	1,153	1,849	159	127	654	774
2010	Percentage	9.7	8.5	25.2	40.4	3.5	2.8	14.3	16.9
2010	Population	504	440	1,310	2,101	181	144	744	880

Figure SS. Observed and fitted percentages of children age 0-17 in South Sudan with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

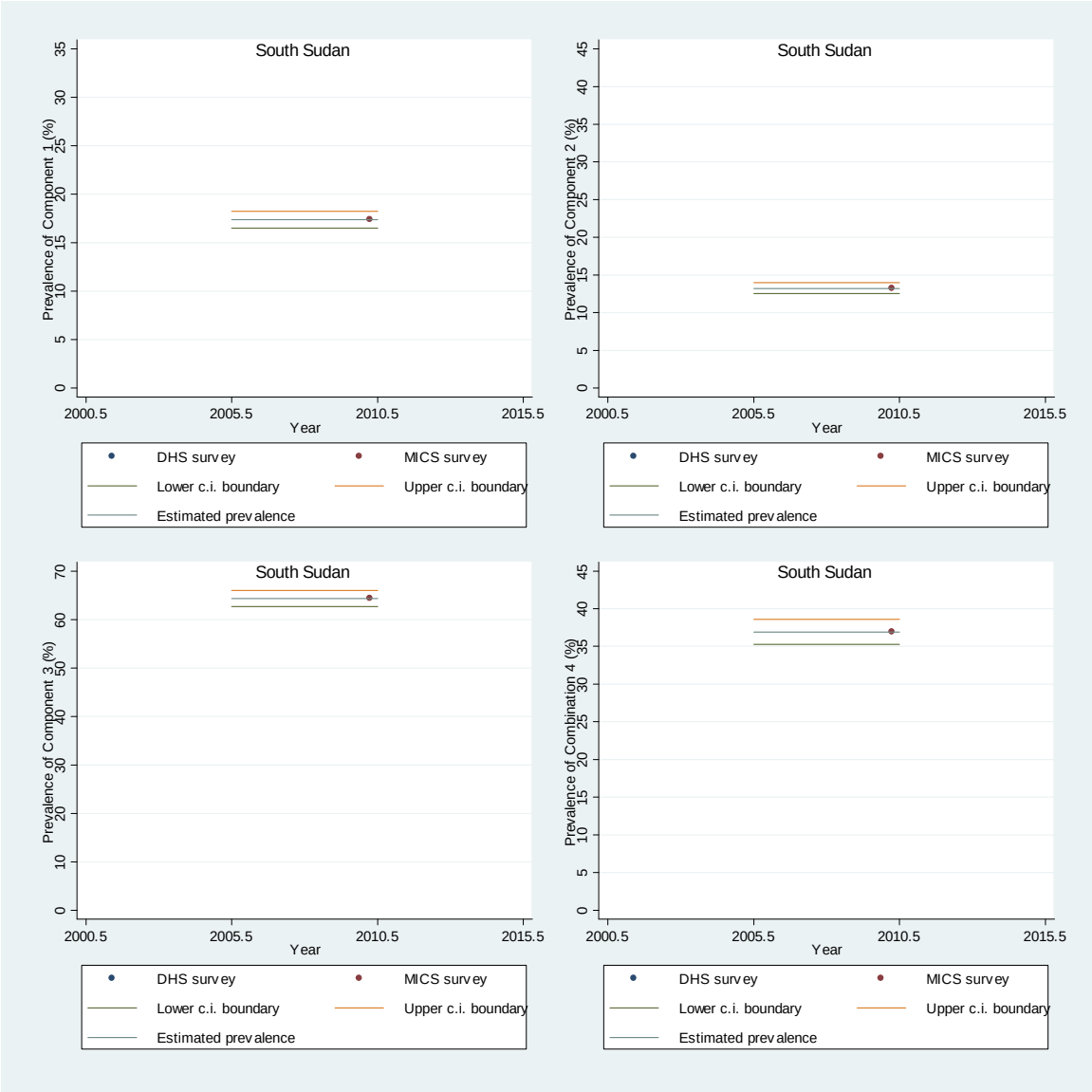


Table SS. Fitted percentages and estimated populations of children age 0-17 in South Sudan with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	17.4	13.2	64.4	41.5	7.5	4.7	35.2	36.9
2005	Population	715	545	2,652	1,709	309	192	1,452	1,521
2010	Percentage	17.4	13.2	64.4	41.5	7.5	4.7	35.2	36.9
2010	Population	874	666	3,241	2,088	378	234	1,774	1,859

Figure SD. Observed and fitted percentages of children age 0-17 in Sudan with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

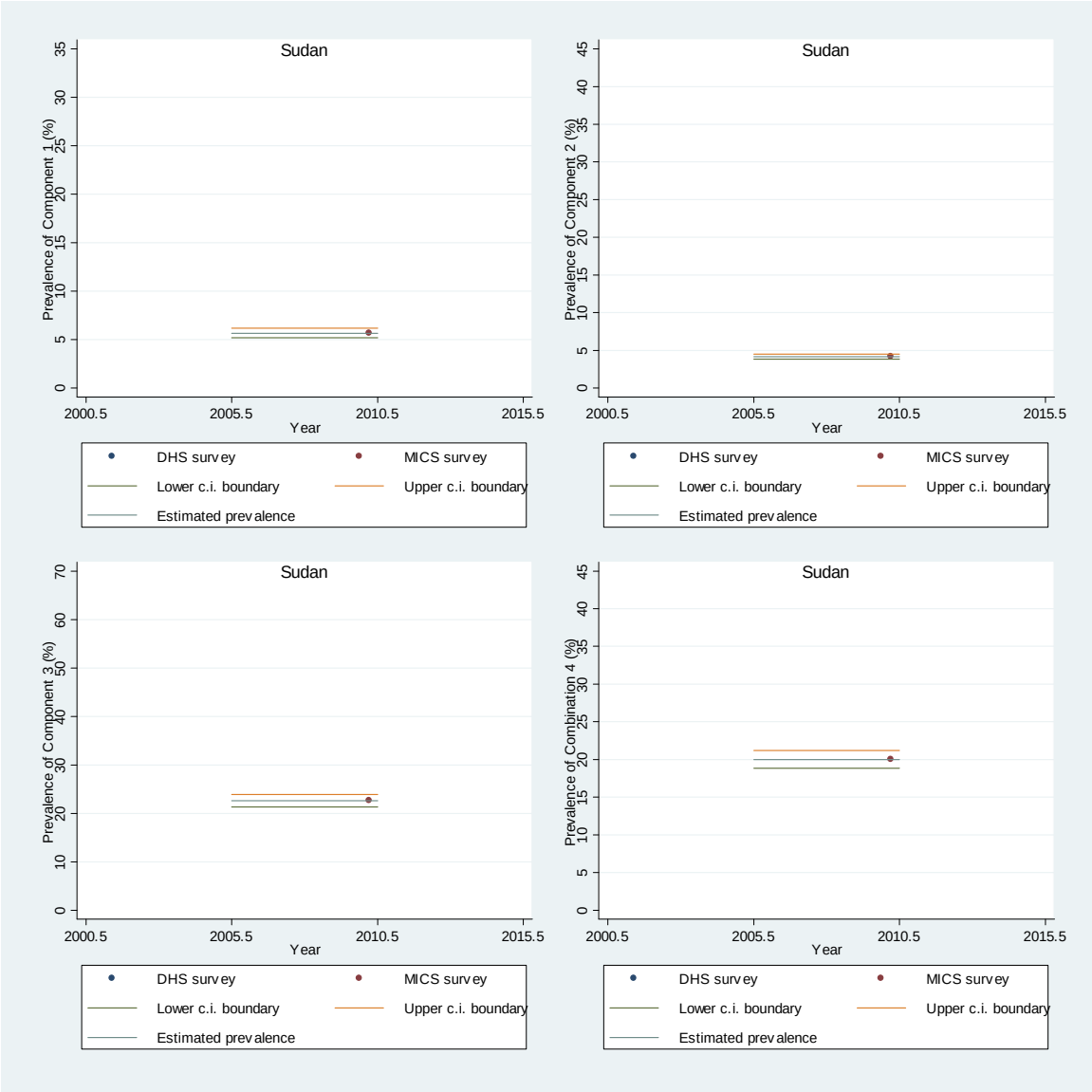


Table SD. Fitted percentages and estimated populations of children age 0-17 in Sudan with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	5.7	4.1	22.6	44.4	2.8	2.2	17.8	20.0
2005	Population	898	659	3,586	7,054	450	353	2,821	3,175
2010	Percentage	5.7	4.1	22.6	44.4	2.8	2.2	17.8	20.0
2010	Population	993	728	3,964	7,798	498	390	3,119	3,510

Figure SZ. Observed and fitted percentages of children age 0-17 in Swaziland with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

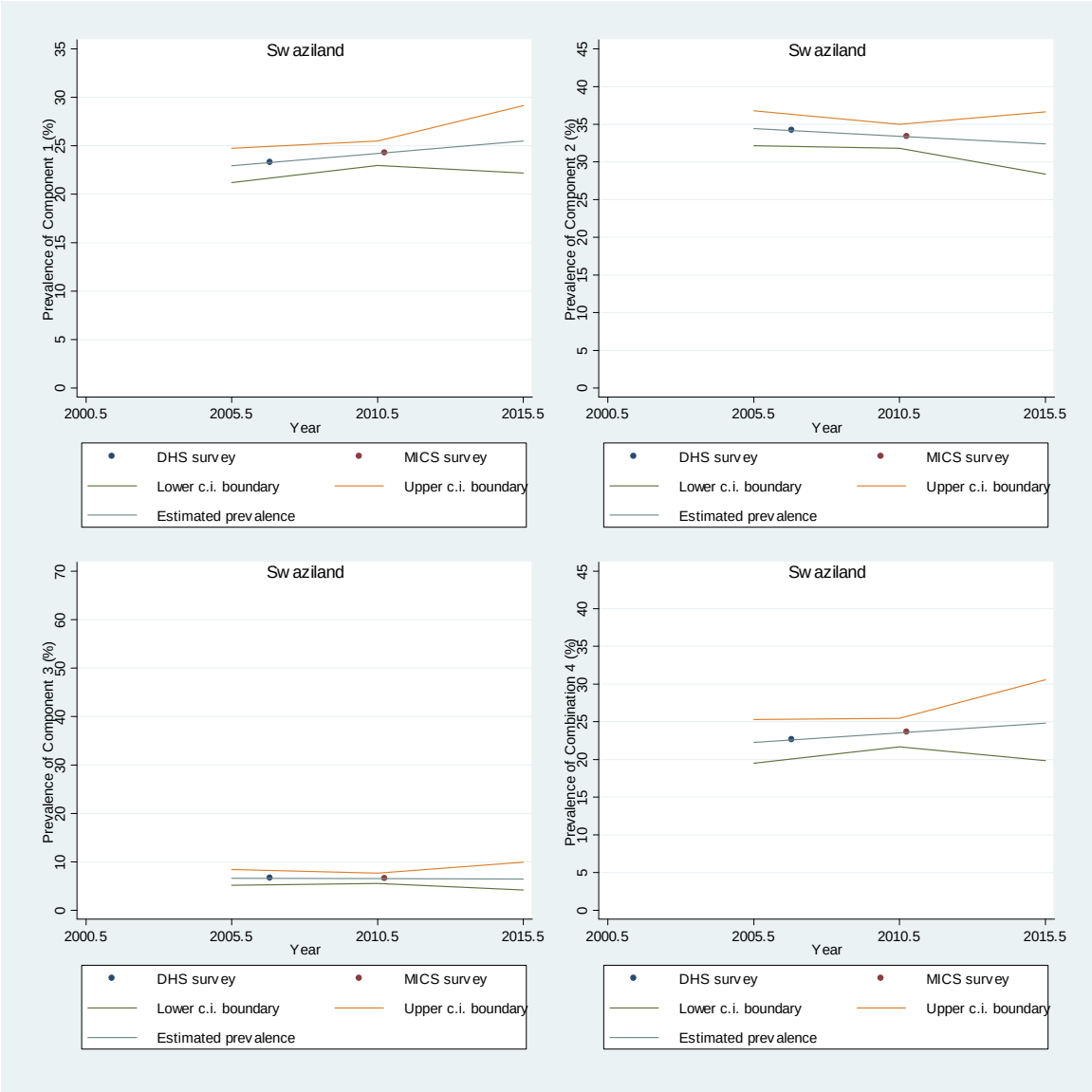


Table SZ. Fitted percentages and estimated populations of children age 0-17 in Swaziland with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	22.9	34.4	6.6	44.5	11.3	16.1	4.4	22.3
2005	Population	127	190	36	246	62	89	25	123
2010	Percentage	24.2	33.4	6.5	45.7	12.0	16.8	5.4	23.5
2010	Population	134	186	36	254	67	93	30	131
2015	Percentage	25.5	32.4	6.5	46.9	12.8	17.6	6.6	24.8
2015	Population	145	184	37	267	73	100	38	141

Figure TZ. Observed and fitted percentages of children age 0-17 in Tanzania with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

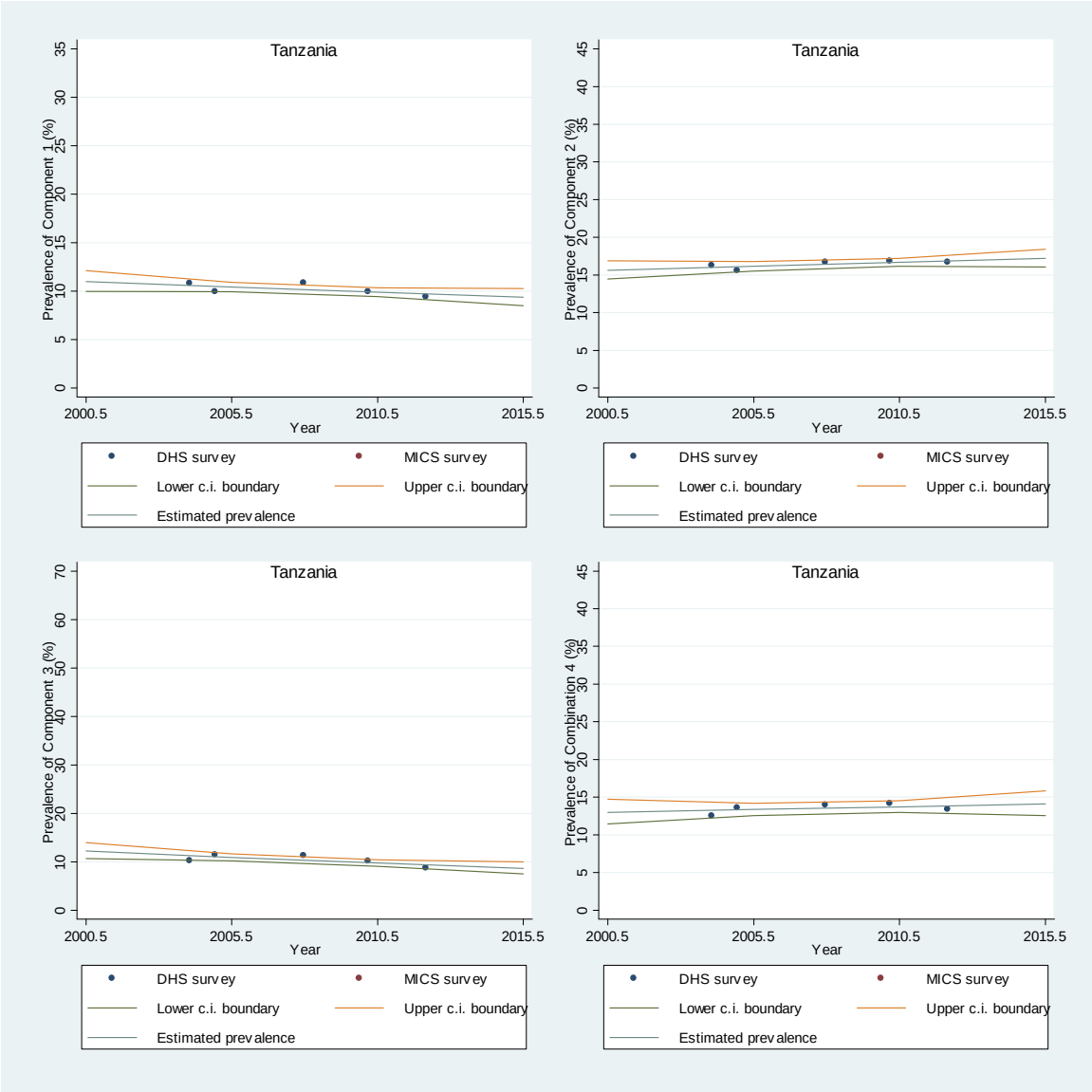


Table TZ. Fitted percentages and estimated populations of children age 0-17 in Tanzania with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	11.0	15.6	12.2	40.9	3.9	5.1	8.1	13.0
2000	Population	1928	2741	2139	7178	676	893	1414	2282
2005	Percentage	10.4	16.1	10.9	41.6	4.0	5.5	7.7	13.4
2005	Population	2078	3218	2171	8297	806	1100	1543	2665
2010	Percentage	9.9	16.7	9.7	42.3	4.2	6.0	7.4	13.7
2010	Population	2280	3848	2241	9767	980	1381	1714	3170
2015	Percentage	9.4	17.2	8.6	43.0	4.5	6.5	7.1	14.1
2015	Population	2502	4600	2310	11495	1190	1732	1904	3770

Figure TH. Observed and fitted percentages of children age 0-17 in Thailand with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

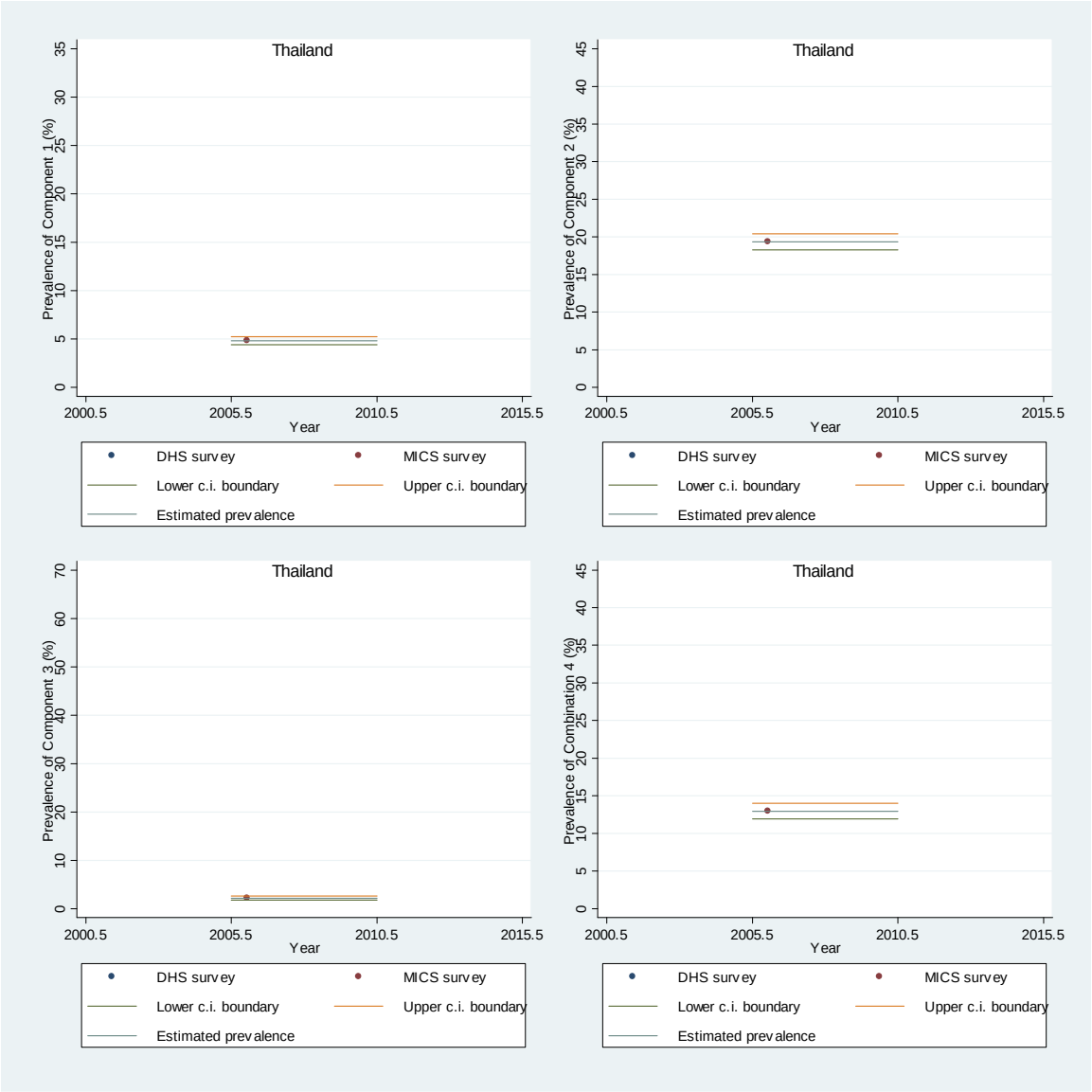


Table TH. Fitted percentages and estimated populations of children age 0-17 in Thailand with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	4.8	19.3	2.2	43.9	2.3	10.9	1.4	12.9
2005	Population	852	3,433	386	7,789	409	1,937	257	2,295
2010	Percentage	4.8	19.3	2.2	43.9	2.3	10.9	1.4	12.9
2010	Population	751	3,025	340	6,862	360	1,706	227	2,022

Figure TL. Observed and fitted percentages of children age 0-17 in Timor-Leste with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

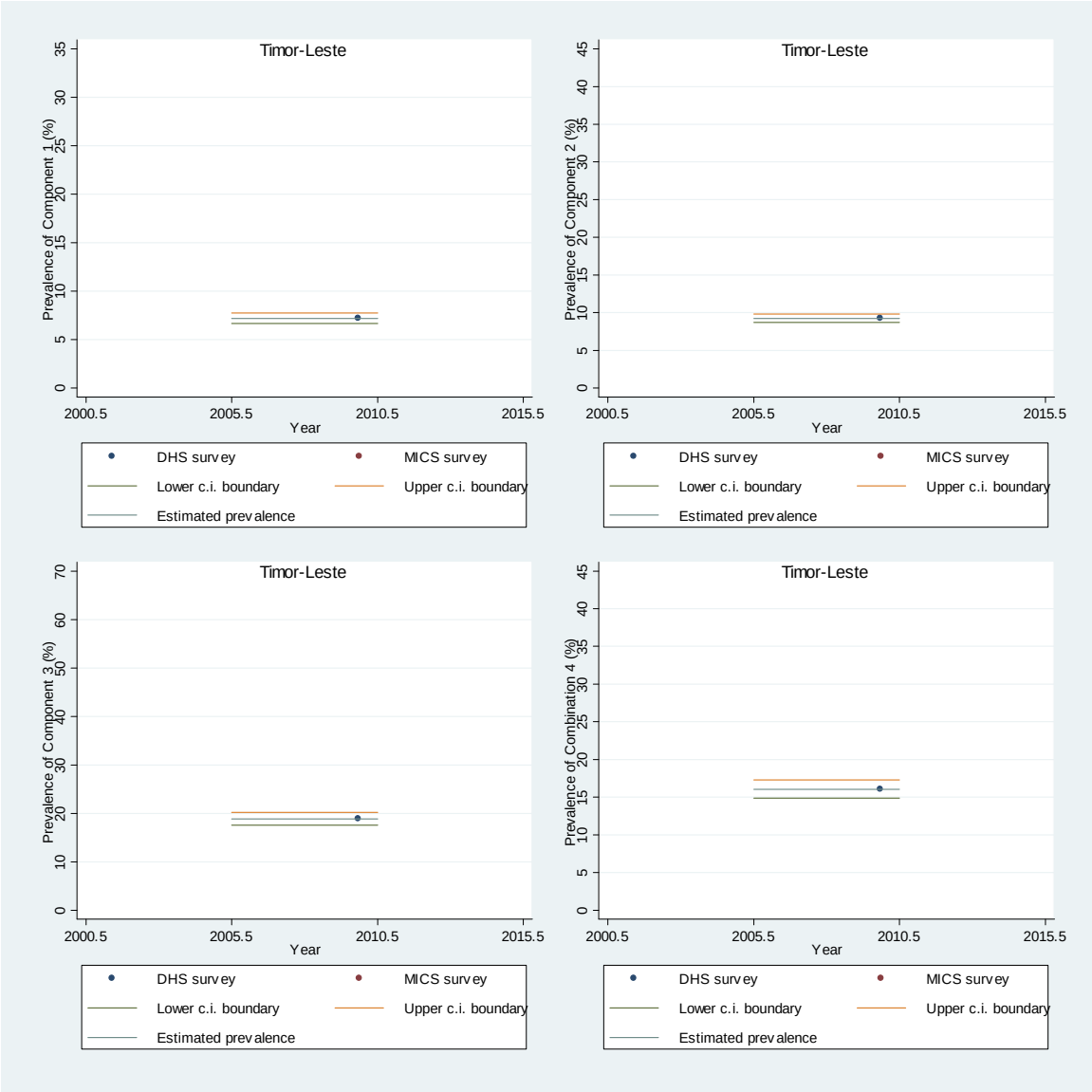


Table TL. Fitted percentages and estimated populations of children age 0-17 in Timor-Leste with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	7.2	9.2	18.9	40.9	3.5	3.1	13	16
2005	Population	39	50	103	223	19	17	71	87
2010	Percentage	7.2	9.2	18.9	40.9	3.5	3.1	13	16
2010	Population	37	47	96	208	18	16	66	82

Figure TG. Observed and fitted percentages of children age 0-17 in Togo with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

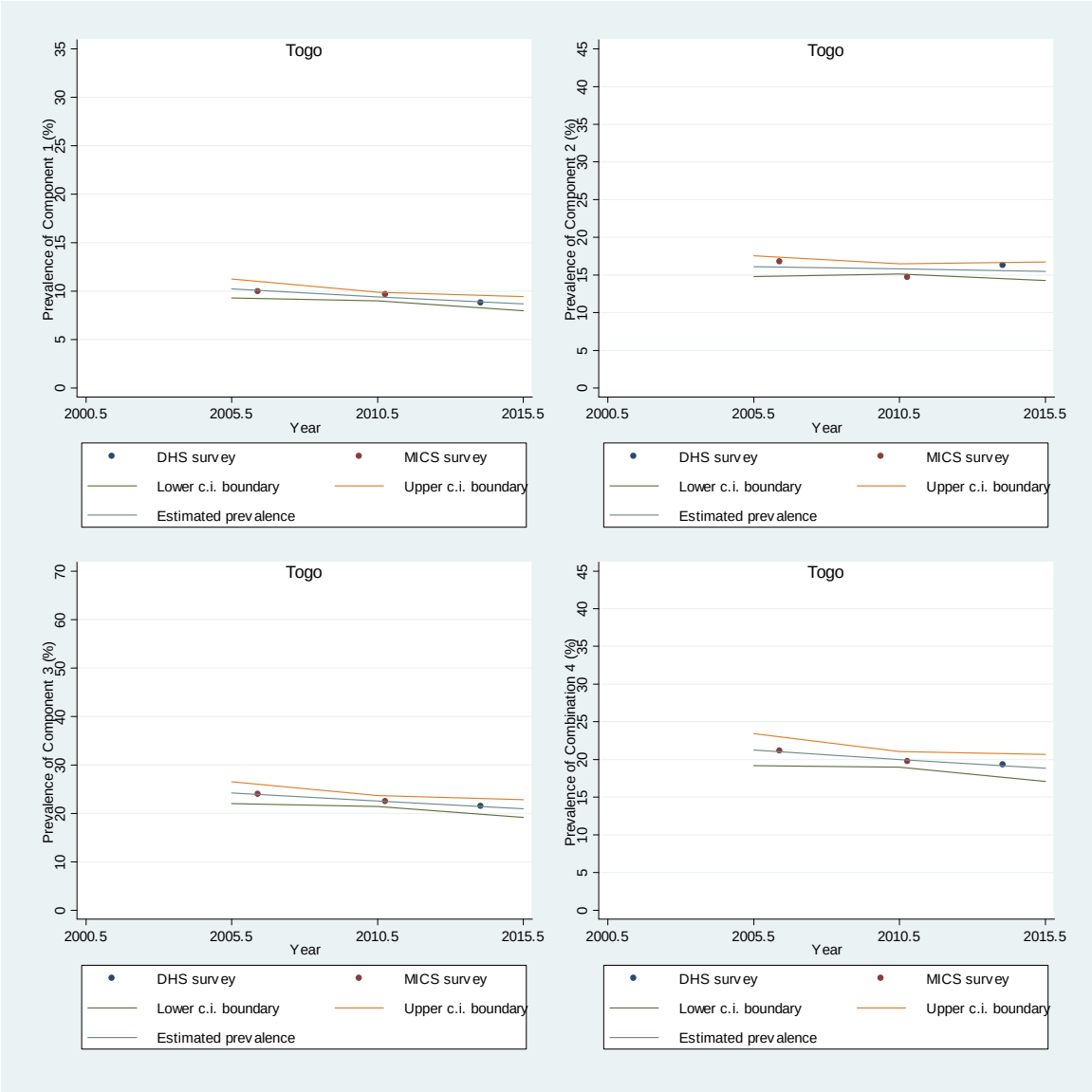


Table TG. Fitted percentages and estimated populations of children age 0-17 in Togo with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	10.2	16.1	24.2	43.3	3.9	5.1	17.0	21.2
2005	Population	286	451	676	1,212	110	142	476	594
2010	Percentage	9.4	15.8	22.5	44.4	3.7	5.0	15.6	20.0
2010	Population	297	498	710	1,401	118	158	492	631
2015	Percentage	8.7	15.5	20.9	45.4	3.5	5.0	14.3	18.8
2015	Population	308	550	744	1,615	125	176	508	668

Figure TN. Observed and fitted percentages of children age 0-17 in Tunisia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

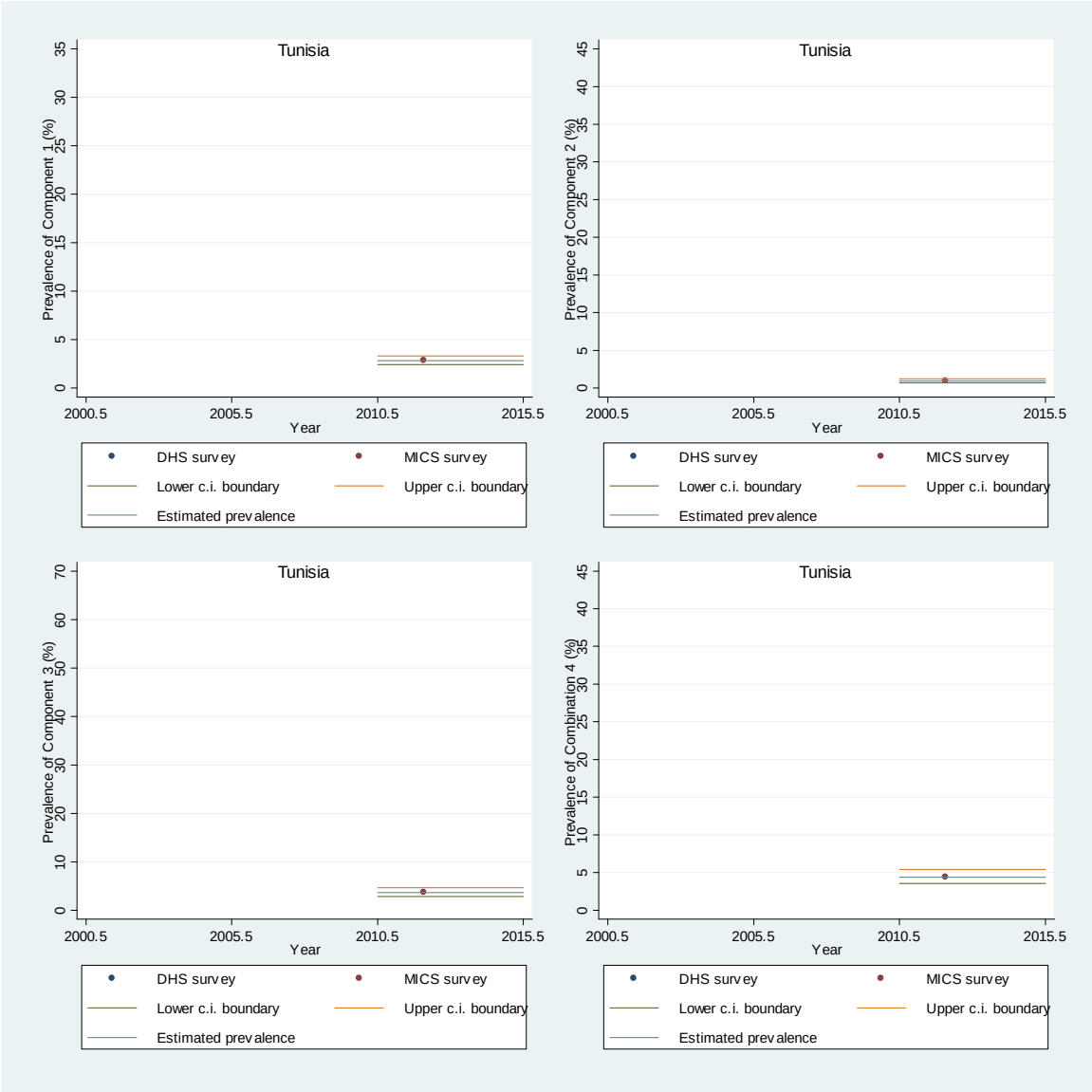


Table TN. Fitted percentages and estimated populations of children age 0-17 in Tunisia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2010	Percentage	2.8	0.9	3.6	41.8	1.4	0.3	3.1	4.4
2010	Population	86	27	110	1,269	42	9	95	133
2015	Percentage	2.8	0.9	3.6	41.8	1.4	0.3	3.1	4.4
2015	Population	88	28	113	1,303	43	9	98	136

Figure UG. Observed and fitted percentages of children age 0-17 in Uganda with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

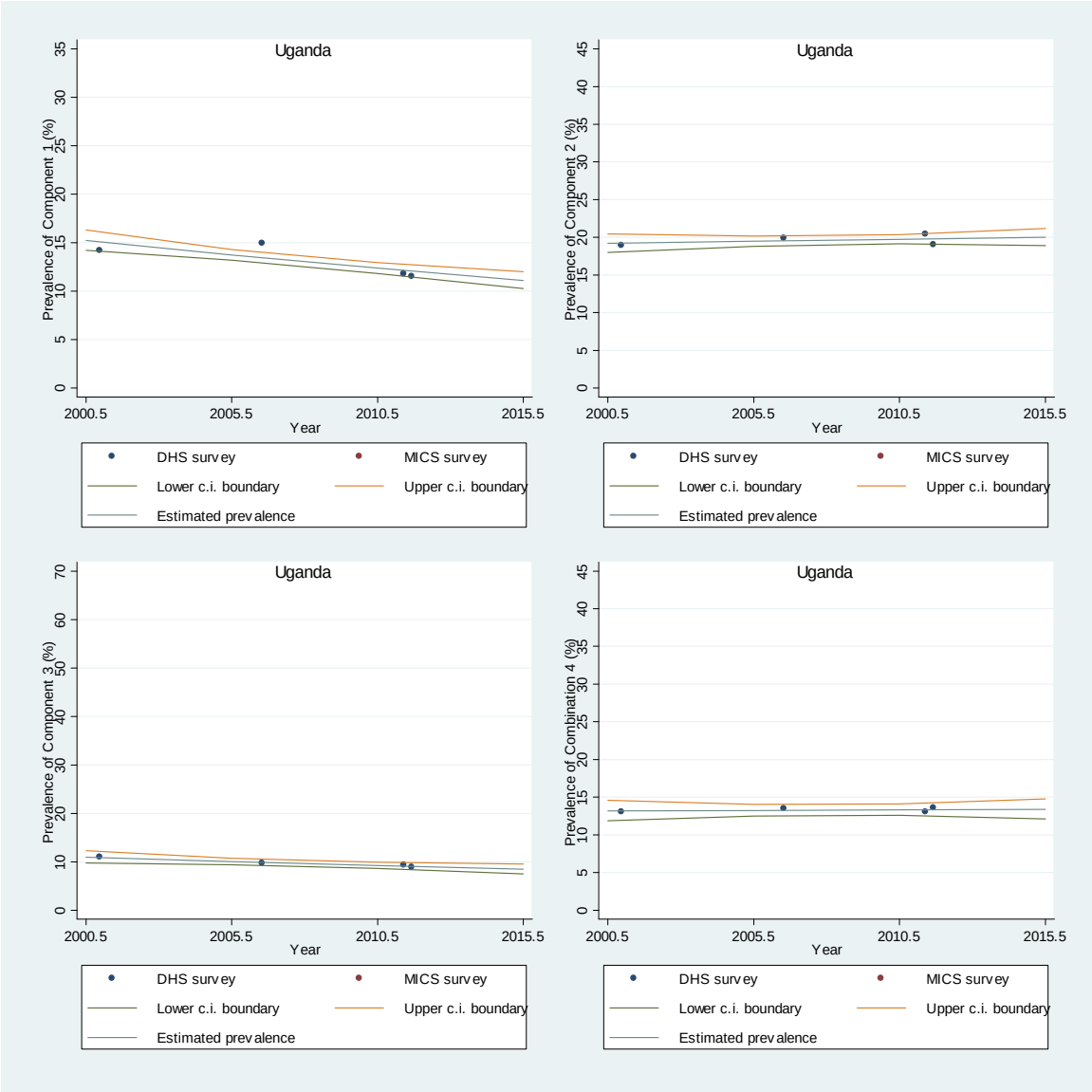


Table UG. Fitted percentages and estimated populations of children age 0-17 in Uganda with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2000	Percentage	15.2	19.2	10.9	39.7	5.3	6.2	7.2	13.2
2000	Population	2,031	2,557	1,458	5,287	700	827	955	1,755
2005	Percentage	13.7	19.5	10.0	40.5	5.4	6.6	6.7	13.2
2005	Population	2,167	3,070	1,584	6,392	848	1,041	1,050	2,089
2010	Percentage	12.4	19.7	9.2	41.4	5.5	7.0	6.2	13.3
2010	Population	2,288	3,657	1,706	7,664	1,018	1,299	1,144	2,465
2015	Percentage	11.1	20.0	8.4	42.3	5.6	7.5	5.7	13.4
2015	Population	2,384	4,302	1,814	9,073	1,208	1,601	1,232	2,874

Figure UA. Observed and fitted percentages of children age 0-17 in Ukraine with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

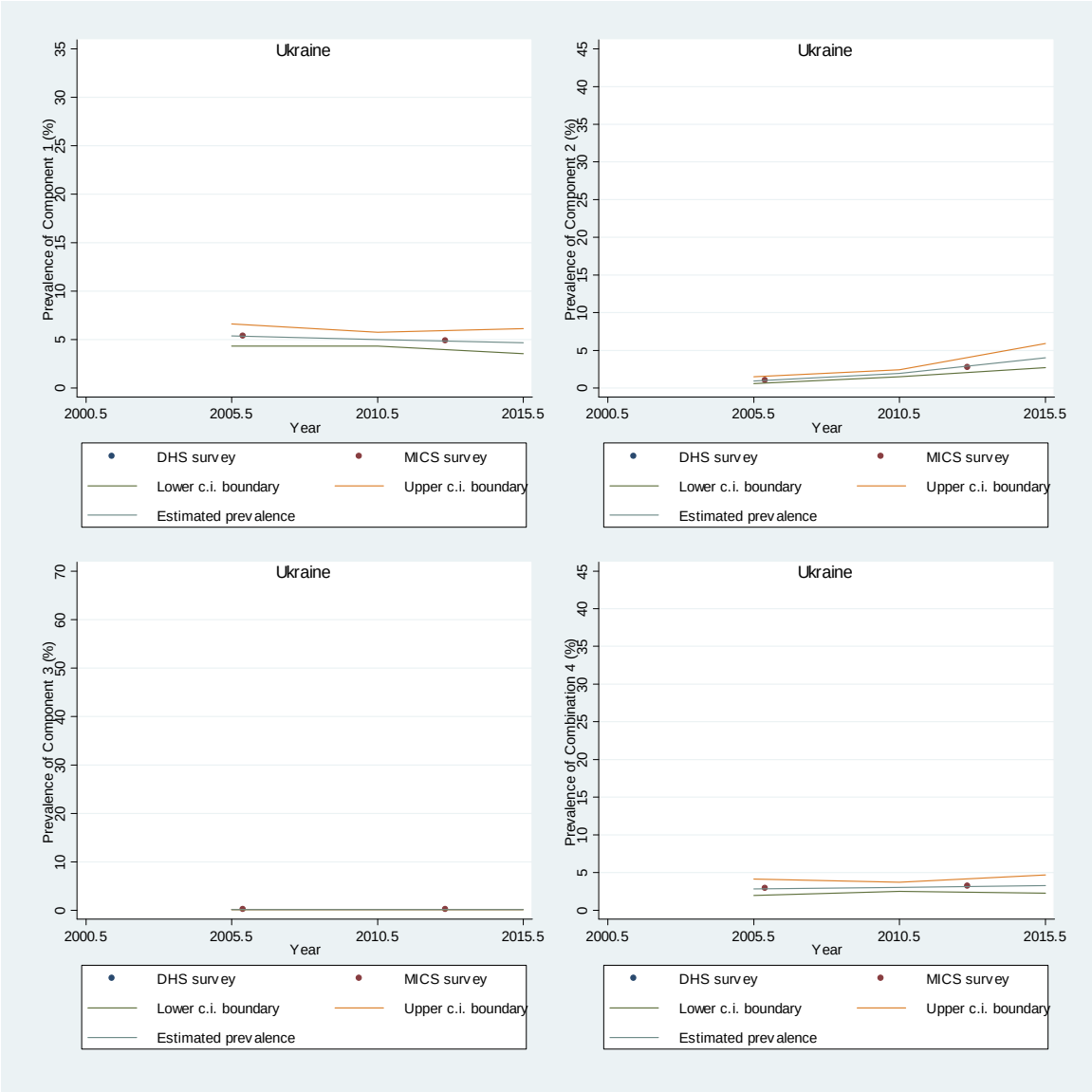


Table UA. Fitted percentages and estimated populations of children age 0-17 in Ukraine with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	5.4	0.9	0.1	45.1	2.8	0.1	0.1	2.8
2005	Population	471	80	13	3,963	244	10	9	250
2010	Percentage	5.0	1.9	0.1	40.8	2.4	0.6	0.1	3.0
2010	Population	395	152	9	3,221	189	47	8	240
2015	Percentage	4.7	4.0	0.1	36.7	2.1	3.0	0.1	3.3
2015	Population	369	317	7	2,896	162	235	8	258

Figure UZ. Observed and fitted percentages of children age 0-17 in Uzbekistan with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

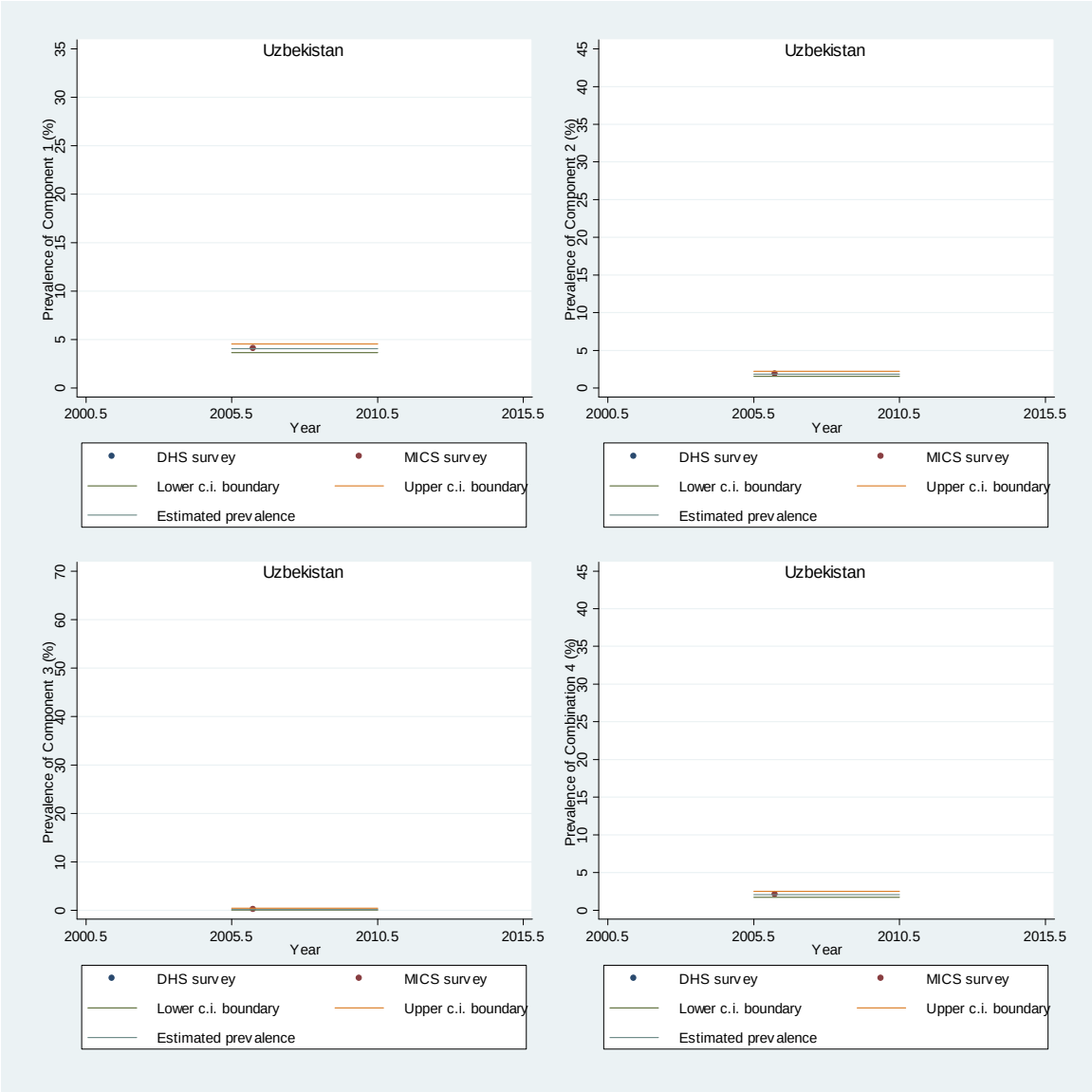


Table UZ. Fitted percentages and estimated populations of children age 0-17 in Uzbekistan with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	4.1	1.9	0.1	44.0	1.8	0.7	0.1	2.1
2005	Population	417	190	10	4,497	184	70	10	212
2010	Percentage	4.1	1.9	0.1	44.0	1.8	0.7	0.1	2.1
2010	Population	402	183	10	4,329	177	67	10	204

Figure VN. Observed and fitted percentages of children age 0-17 in Viet Nam with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

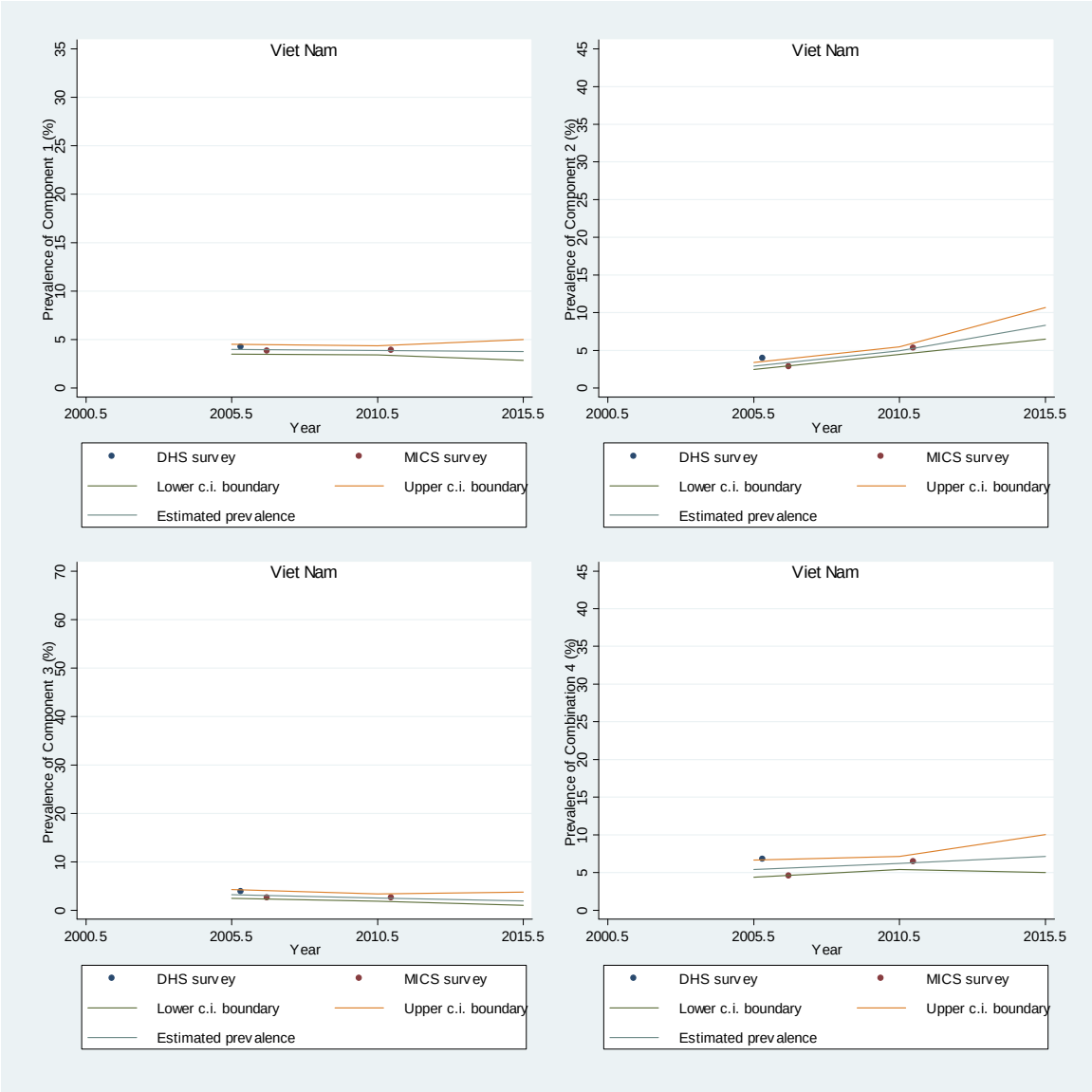


Table VN. Fitted percentages and estimated populations of children age 0-17 in Viet Nam with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	4.0	2.9	3.2	41.4	2.0	0.9	3.0	5.4
2005	Population	1,125	816	914	11,705	566	261	853	1,533
2010	Percentage	3.9	4.9	2.5	42.8	2.2	2.3	2.3	6.2
2010	Population	1,012	1,291	653	11,182	585	595	597	1,624
2015	Percentage	3.8	8.3	1.9	44.2	2.5	5.5	1.7	7.1
2015	Population	965	2,130	494	11,305	641	1,405	442	1,820

Figure YE. Observed and fitted percentages of children age 0-17 in Yemen with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

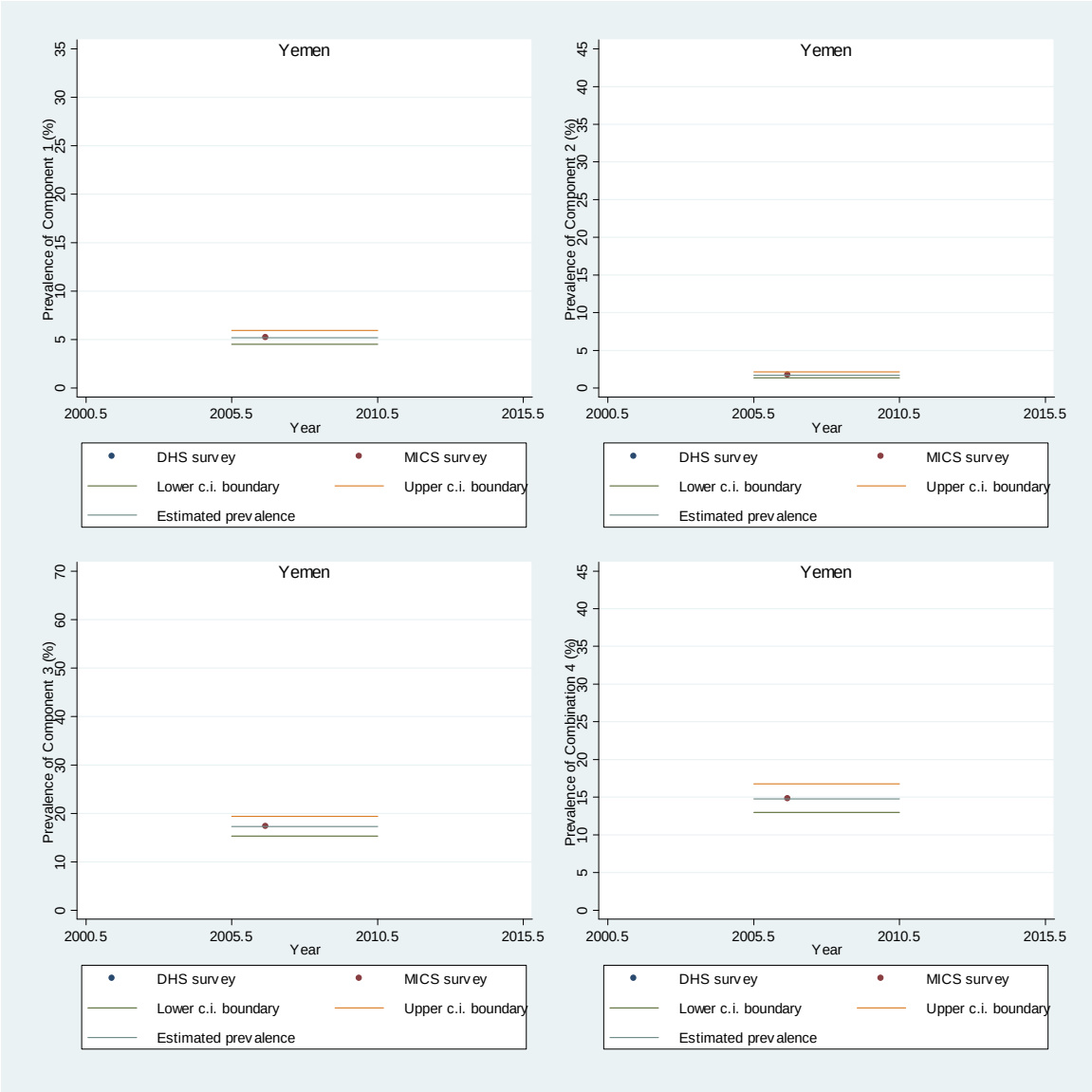


Table YE. Fitted percentages and estimated populations of children age 0-17 in Yemen with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	5.2	1.7	17.2	41.8	2.4	0.9	12.9	14.8
2005	Population	568	187	1,888	4,575	266	99	1,408	1,616
2010	Percentage	5.2	1.7	17.2	41.8	2.4	0.9	12.9	14.8
2010	Population	613	202	2,037	4,937	287	106	1,520	1,744

Figure ZM. Observed and fitted percentages of children age 0-17 in Zambia with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

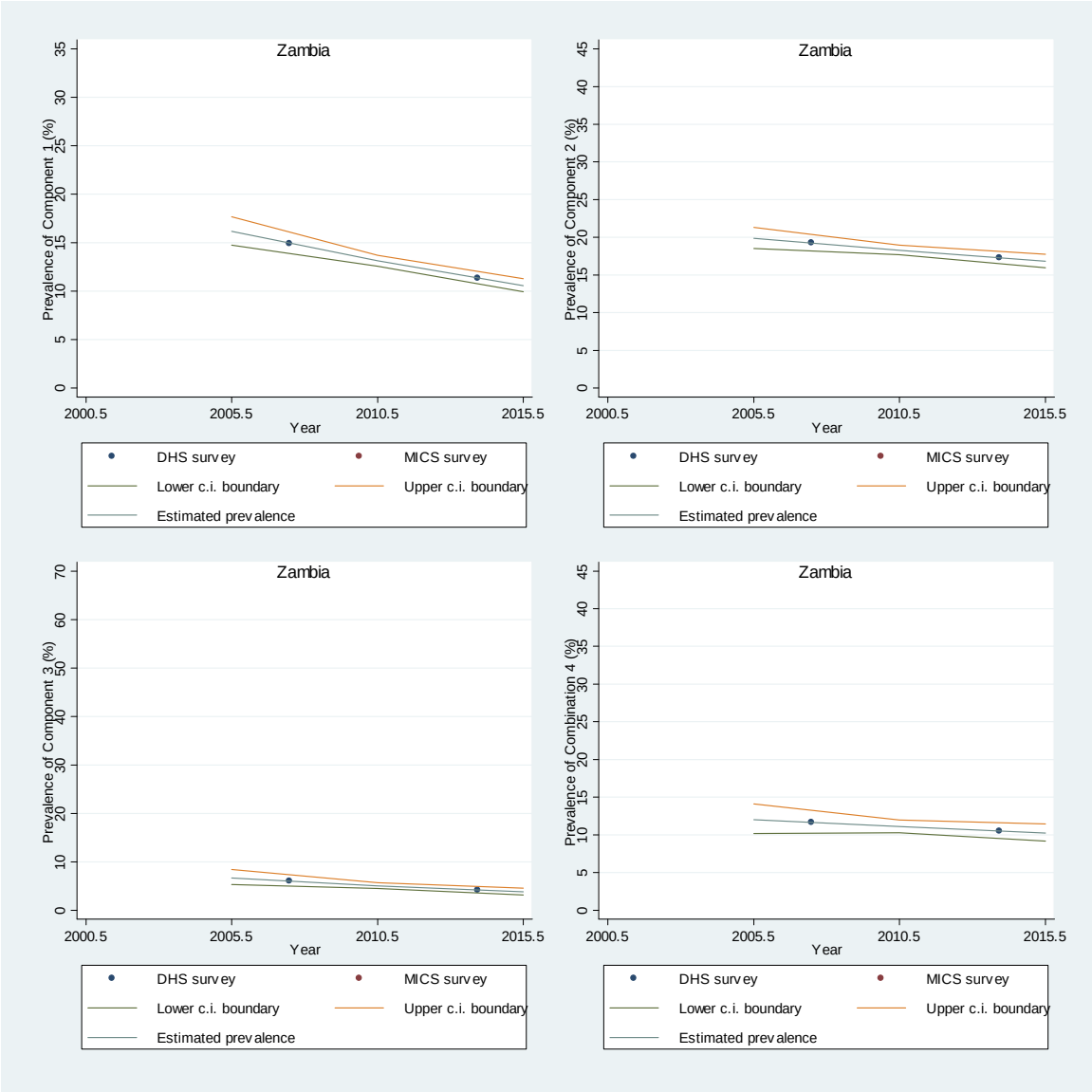


Table ZM. Fitted percentages and estimated populations of children age 0-17 in Zambia with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	16.2	19.9	6.7	42.7	5.0	7.2	5.0	12.0
2005	Population	1,043	1,284	431	2,756	322	465	322	775
2010	Percentage	13.1	18.3	5.0	42.7	4.8	6.4	3.9	11.1
2010	Population	974	1,359	374	3,170	360	476	293	823
2015	Percentage	10.6	16.8	3.8	42.7	4.7	5.7	3.1	10.2
2015	Population	902	1,435	322	3,643	402	486	266	873

Figure ZW. Observed and fitted percentages of children age 0-17 in Zimbabwe with vulnerability components 1-3 and combination 4, estimated from all available DHS and/or MICS surveys

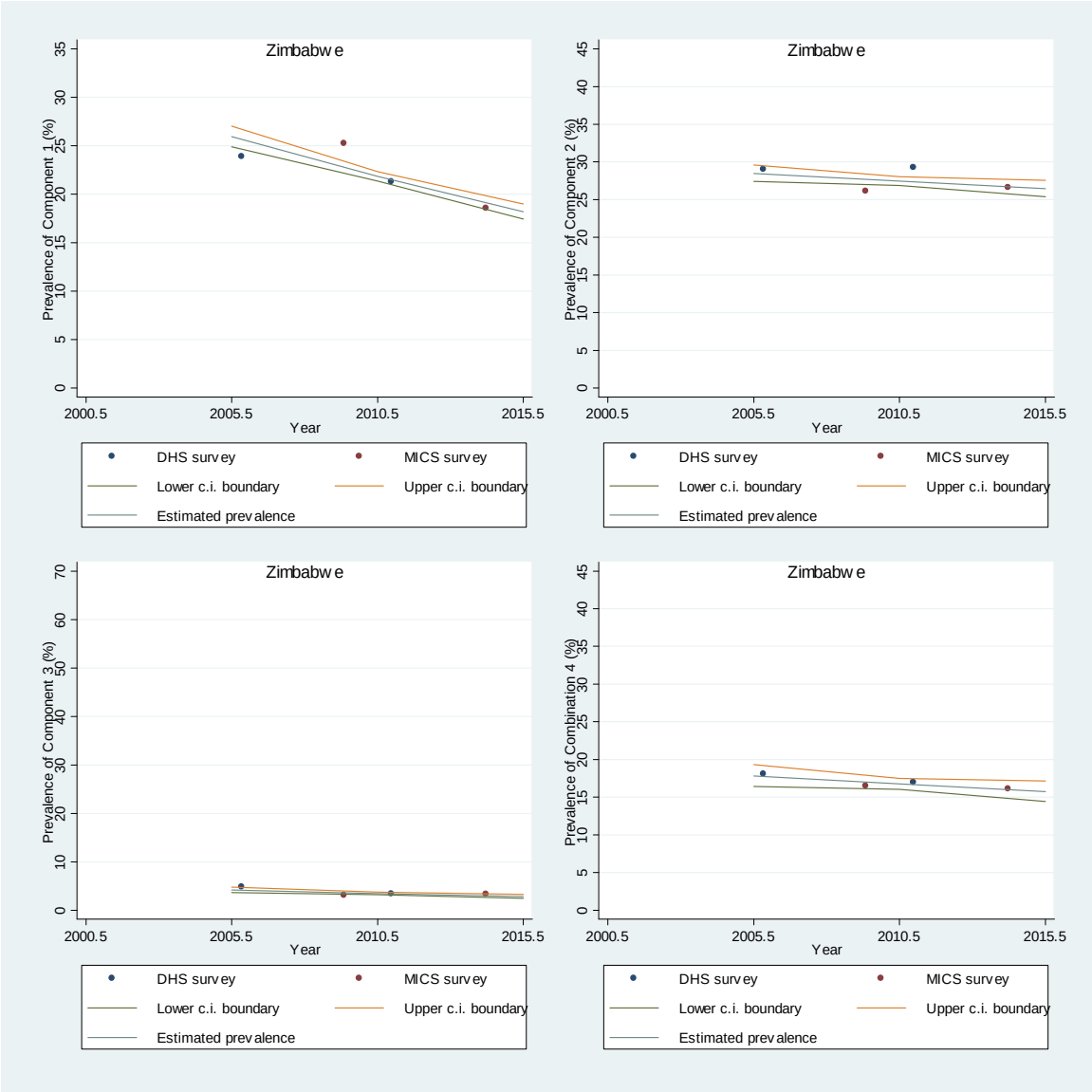


Table ZW. Fitted percentages and estimated populations of children age 0-17 in Zimbabwe with the four specified components and the four specified combinations of vulnerability, estimated from available DHS and/or MICS surveys. Population estimates are in thousands.

		Component				Combination			
Reference year		**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
2005	Percentage	26.0	28.5	4.2	44.7	11.6	12.4	3.0	17.8
2005	Population	1,675	1,838	268	2,885	746	803	192	1,151
2010	Percentage	21.8	27.4	3.4	44.7	10.1	12.1	2.4	16.8
2010	Population	1,487	1,869	235	3,046	686	824	167	1,142
2015	Percentage	18.2	26.4	2.9	44.7	8.8	11.8	2.0	15.7
2015	Population	1,366	1,984	214	3,357	658	882	151	1,181

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