The consequences of unintended pregnancy on child health

Sarah E. K. Bradley
University of California, Berkeley and MEASURE DHS, ICF International
SBradley@demog.berkeley.edu

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PRELIMINARY DATA – PLEASE DO NOT CITE

Introduction

An estimated 86 million unintended pregnancies occur each year worldwide, resulting in 41 million induced abortions, 33 million unintended births, and 11 million miscarriages (Singh, Sedgh and Hussain 2010). The fact that these unintended pregnancies have grave consequences for the lives of mothers is well-documented: an estimated 287,000 maternal deaths occur every year (WHO et al., 2012), mostly in low- and middle-income countries, many resulting from unintended pregnancies that were unsafely aborted (WHO 2007).

Less well documented, however, is the often-claimed relationship between unintendedness and poor health outcomes for children. Many fact sheets, websites, and family planning advocacy materials unequivocally make the claim that, for example, "unintended pregnancy is associated with an increased risk of problems for the mom and baby" (CDC 2012; see similar claims at Healthy People 2020, 2012; Guttmacher 2012; etc.). A review of studies on the subject, however, finds the consequences of unintended pregnancy for children to be far less clear, particularly in low- and middle-income countries. A quite thorough review of this literature was conducted in 2008 by Gipson and colleagues, who summarized their findings with this statement:

> The existing evidence on the impact of unintended pregnancy on child and parental health outcomes is mixed and is limited… That so few studies are available from developing country settings is particularly striking, considering that the financial, social, and physical costs of unintended pregnancy are likely to be greater in resource-poor settings. The scarcity of studies on this topic is surprising, given that the prevention of unintended pregnancy has been a major rationale for the funding and provision of family planning, both in the United States and internationally. (Gipson et al., 2008: 29)

The aim of this paper is to address this gap in the research, attempting to answer the question: *do children who were unintended suffer worse health outcomes compared to children who were wanted*? Focusing on low- and middle-income countries, I use data from 48 Demographic and Health Surveys (DHS) conducted in sub-Saharan Africa, Asia, Latin America and the Caribbean, Eastern Europe, and the Middle East/North Africa. In the paragraphs that follow, I 1) outline the theoretical framework for an association between unintended pregnancy and child health, 2) review the existing literature examining this association in resource-poor settings, 3) present multiple analyses addressing the research question, and 4) discuss the implications of these findings for policies and programs.

Rationale for the impact of unintended pregnancy on child health

A priori, there are several reasons we might expect children who were unintended to be less healthy than their wanted peers. First, women who conceive an unintended pregnancy were, by definition, not intending to become pregnant, and might not recognize the pregnancy immediately. Such mothers might be less likely to ensure good nutrition (i.e., folic acid and iron supplementation) and may continue behaviors such as alcohol and tobacco use, unaware of the detrimental effects these practices may have on their fetus. Women who are unaware they are pregnant might delay seeking antenatal care, and so not receive timely tetanus toxoid injections, and, in malarious areas, treatment to prevent possible transmission of malaria to their fetus. Even if a woman suspects or knows she is pregnant, if the pregnancy is unwanted she may not seek antenatal care or follow good health practices out of fear that her pregnancy will be recognized by others, or even out of hopes that she will spontaneously abort.

As the pregnancy progresses, we can imagine that women carrying unintended pregnancies may be less likely to seek professional delivery assistance or deliver in a health facility, compared to women carrying wanted pregnancies. As the child ages, we can also imagine that women may be less likely to appropriately feed children who are unintended, leading to poorer nutrition, and less likely to seek appropriate healthcare, perhaps resulting in lower vaccination rates and lower levels of treatment for diarrhea and fever. Taking this argument to its logical conclusion, we might expect to see higher levels of infant and child mortality among children who were unintended compared to children who were wanted.

Additionally, there are potential biologic, economic, and social mechanisms at work. Unintended children are most likely to be conceived by women who are at the beginning or end of their reproductive lifespans. Both young and old maternal ages are biologically associated with poorer maternal and child health outcomes, which are interrelated, especially if the mother becomes unable to care for her child through pregnancy-related mortality or severe morbidity. Additionally, older maternal age is associated with higher parity. A child of higher birth order, particularly if pregnancies are closely spaced, is at higher risk biologically, and also potentially economically, if scarce resources are being spread across a larger and larger group of siblings. The thinner spread of resources for higher-birth-order children could affect children directly, i.e., through decreased availability of food, or indirectly, through the decreased amount of time and energy parents have to spend on each child, including time to take the children for health care. Socially, women at either

end of the parity spectrum – at parity 0, or at very high parities – are often (based on DHS data) less likely to seek antenatal care or delivery assistance for social and cultural reasons too varied and complex to fully address here.

On the other hand, we might expect no association, particularly after the child is successfully brought to term. We could argue that there is a strong biologic and social bond between mother and child, and that, any child, once brought to term, will be loved by its mother and family. By this argument, any child, even if unintended at conception, will eventually treated the as a wanted child. Though there is some evidence to the contrary – the treatment of unwanted girl children in India and China come to mind – we may expect that in the majority of countries, unintended children would not bear unequal health costs compared to their wanted counterparts, especially after they have been born.

Literature review

A great number of studies have sought to examine the relationship between unintended pregnancy and health outcomes. Because of the thorough nature of the review by Gipson and colleagues, this review focuses on the few papers from low- and middle-income countries, which are more closely related to the research question at hand.

Prenatal care and delivery

Many studies have examined the relationship between unintendedness and the earliest possible (from the fetal perspective) health outcome: receipt of antenatal care. It is in this area that the strongest evidence of the impact of unintended pregnancy on child health exists. Cleland and Marston (2003) found that, in the surveys analyzed (Bolivia 1998, Egypt 1995, Kenya 1998, Peru 1996, and Philippines 1998), after controlling for other factors associated with ANC use, women with unintended[1] pregnancies in Kenya, Peru, and the Philippines were less likely to receive ANC in the first six months of pregnancy than women with wanted pregnancies. Using the 1994 Ecuador DHS, Eggleston (2000) found that women with unwanted pregnancies delayed initiation of ANC care, were less likely to receive the World Health Organization (WHO) recommended 4+ ANC visits,

[1] In the majority of analyses summarized here, live births are referred to as "mistimed" (not wanted at that time), "unwanted" (not wanted at all), or "unintended" (either mistimed or unwanted). For convenience and length, I refer to either or both groups as "unintended" unless the analyses showed divergent trends for mistimed vs. unwanted children.

and were less likely to receive any ANC at all, compared to women with wanted pregnancies. Using prospective data from rural India, Singh and colleagues (2012a) found that women with unwanted pregnancies were less likely to follow the WHO recommendations of 4+ ANC visits and at least one visit in the first trimester, compared to women with wanted pregnancies. Magadi and colleagues (2000), analyzing the 1993 Kenya DHS, found that women with unintended pregnancies were more likely to delay their first ANC visit, and to have fewer visits overall, compared to women with wanted pregnancies. Surprisingly, using the same dataset (Kenya 1993 DHS), as well as the 1992 Namibia DHS, Gage (1998) found no effect of unintendedness on the odds of initiating ANC in the first trimester. One possible reason for this seeming discrepancy is that, as pointed out by Kost et al. (1998), women with unintended pregnancies may not recognize the pregnancy as early as early as women who are trying to become pregnant, and so may delay seeking ANC. Thus Gage's findings may be more indicative of this late recognition than of a health consequence of unintended pregnancy.

The evidence of an effect of unintendedness on delivery and delivery outcomes is not quite as strong as for prenatal care. In Marston and Cleland (2003), the relationship between unintendedness and delivery by a trained professional is significant in only two out of the five countries (Egypt and Peru), and in Egypt, unintended pregnancies are more likely to be delivered by a trained professional than wanted births, i.e., the relationship is in the unexpected direction. Using the India 2005-06 DHS, Singh and colleagues (2012a) found lower odds of mistimed pregnancies being delivered by a trained professional than wanted pregnancies, but did not find an association for unwanted births. Gage (1998) found that mistimed births were less likely than wanted births to be delivered in a health facility in Kenya, but found no significant effect for unwanted births, or for unintended births in Namibia. A second analysis by Eggleston of the 1994 Ecuador DHS documented increased odds of low birth weight (as reported by mother) for unwanted vs. wanted children, but found no significant effect for mistimed children (Eggleston et al. 2001).

Child health: breastfeeding, disease incidence, vaccination, nutritional status

Several studies have examined the impact of unintendedness on various health indicators for children after the post-natal period, and results are varied. In an analysis of 18 DHS surveys, Hromi-Fiedler and Perez-Escamilla (2005) found significantly decreased odds of prolonged breastfeeding (breastfeeding for more than 18 months) for unintended vs. wanted children in only

three settings: Benin 1996, Guatemala 1995, and Kazakhstan 1995, though an overall significant association was detected in their pooled analysis. For slightly older children (up to age five), Jensen and Ahlburg (1999) analyzed 12 early-1990s DHS surveys and found a consistent association between higher incidence of acute respiratory infection and diarrhea and unintendedness. In countries where vaccination levels are relatively low, they also found that unintended children received fewer vaccinations than wanted children. Marston and Cleland (2003) studied vaccinations slightly differently: rather than the number of vaccines received, they examined the odds of receiving all basic recommended vaccinations (the WHO standard) by age one year. Marston and Cleland found that unwanted children had lower odds of receiving these vaccines in Kenya and Peru, but not in the other three countries studied (no information was given in the paper about the overall prevalence of vaccinations in these countries). Using the 2005-06 India DHS, Singh et al. (2012a) found that unintended children had lower odds of receiving all basic vaccinations, as defined in the Marston and Cleland study. In rural India, Singh and other colleagues (2012b) also documented decreased odds of receiving all basic vaccinations among unwanted vs. intended children. Marston and Cleland (2003) also examined child nutritional status for children up to age five, and found that unwanted children were more likely to be stunted in Peru, and *less* likely to be stunted in Egypt. In the Bolivia 1998 DHS, Shapiro-Mendoza and colleagues found increased odds of stunting among both unwanted and mistimed children (2005), while Singh and colleagues (2012b) found that unwanted, but not mistimed, children had increased odds of stunting compared to wanted children.

Summary of existing literature

Though many seem to consider the idea that unintended pregnancies result in poor health outcomes for children as a universal "fact," this review has demonstrated that results, at least in low- and middle-income countries, are far from consistent. The relationship between unintendedness and child health outcomes is most stable for events early in pregnancy, though this relationship may be mediated by differential recognition of pregnancy between women who are anticipating becoming pregnant and those who are not. After the postnatal period, the relationship between unintendedness and child health outcomes is much less profound, which may indicate that a) children who were unwanted at conception become "less" unwanted over time, or b) that any differential parental behaviors due to unintendedness have a decreasing effect on child health as the child grows older. These possibilities are explored in the analytic section of this paper by a) examining the percent of children who are considered unintended at each age (to determine

whether mothers report older children to be less unintended), and b) including a covariate of child age in regression models.

Evidence for an "unintendedness effect" on child health seems strongest in South America and South Asia, though this may simply reflect the paucity of studies on this subject in other geographic areas, particularly in sub-Saharan Africa. Gipson et al. (2008) clearly document the need for more studies to examine the relationship between unintendedness in a variety of low- and middle-income settings. An additional gap in the literature is recency: the only analyses I could find that use data collected this decade are the studies from India and Bangladesh. The next section of this paper aims to fill these gaps by analyzing recent DHS surveys from a wide range of low- and middle-income countries.

Data and Methods

This analysis makes use of all Demographic and Health Surveys (DHS) conducted since 2005. For countries that conducted more than one survey since 2005, I use the most recent survey. I therefore analyze 48 surveys predominantly from sub-Saharan Africa (26 surveys), but also covering countries in Asia, Latin America and the Caribbean, and Eastern Europe, and the Middle East/North Africa (Table 1).

Within each survey, the denominator for analysis is all live births to interviewed women that occurred in the five years prior to the survey, with some exceptions as noted below. I classify each birth according to three different measures of unintendedness. The first two are based on retrospective information, asking women who gave birth to children in the last 5 years to think back to the time they became pregnant, and recall their fertility intentions at the time they conceived: *"At the time you became pregnant with [NAME OF CHILD], did you want to become pregnant then, later, or not at all?"* Using this retrospective categorization of whether, at the time they became pregnant with each live birth, they had wanted to become pregnant then, later (a mistimed pregnancy), or not at all (an unwanted pregnancy), I categorize these births into two different variables for further examination:

1. Retrospective unintended: grouping children who were wanted later or not at all into one category, for a dichotomous characterization of intended vs. unintended.

2. Retrospective unwanted: grouping those who were wanted at that time or later together, for a dichotomous characterization of wanted vs. unwanted.

These two combinations allow for a determination of whether children whose conceptions were unplanned (mistimed or unwanted) are treated differently than those who were wanted at that time, or if conceptions that were completely unwanted are treated differently than those that were wanted, even if the timing was less than ideal. The comparison of these two measures can also be interpreted as a proxy for information on the strength of desire to avoid pregnancy: it seems a fair characterization to assume that women who became pregnant with an unwanted child had a greater motivation to avoid pregnancy than those who conceived a mistimed child.

A common critique of this measure, discussed in Gipson et al. 2008, Marston and Cleland 2003, and elsewhere, is that this retrospective information is subject to ex post facto rationalization – that women may "rewrite history" to some extent regarding the wantedness of their children at conception. We can easily imagine a situation whereby a woman becomes pregnant unexpectedly, but grows to love the child so much that she cannot imagine she ever didn't want her, and so would later report that she always wanted the child, even at the time she was conceived. We may expect a greater deal of rationalization for children who have died, or who were born further in the past – i.e., children who have died, or children who are now living and have been for some time, are less likely to be called unwanted than children who were born recently. Such rationalization would certainly cloud our ability to measure the association between pregnancy intention at conception and later-life child health outcomes. An additional concern, emphasized by Marston and Cleland (2003), is that birth order and pregnancy intentions are inextricably linked: that unintendedness increases with additional children to such a degree that the relationship is inevitably confounded. If we determine that Marston and Cleland are correct, we could assume that birth order and pregnancy intentions are practically the same thing: that if women and couples do have an ideal family size, it's likely that any birth order higher than that number would be unwanted. This alternative classification of children as unwanted vs. wanted could potentially also solve the problem of ex post facto rationalization because it does not rely on women's retrospective recall of their intentions at the time they became pregnant. I therefore use a third indicator for estimating unwanted fertility following Lightbourne (1985), essentially assuming that all children at birth orders in excess of ideal family size are unwanted.

3. Lightbourne unwanted: using information on women's desired family size from the question, "*If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?*" I compare the numeric response with the number of living children the woman had when the index child was conceived. If the child's birth order is higher than the woman's desired family size, the birth is classified as unwanted (and birth orders <= desired family size are classified as wanted). For the small proportions of women who give non-numeric responses, i.e., "up to God" when asked about their desired family size, all births are classified as wanted.

I use each of these classifications of unintendedness to examine whether unintended children have poorer health consequences, using the following outcome measures:

1. ANC: whether the mother received any antenatal care at any time during the most recent pregnancy.[2]
2. Facility delivery: whether the child was delivered in a health facility.
3. Complete basic vaccination: whether the child received the WHO standard for all basic immunizations (BCG, measles, 3 doses DPT, 3 doses polio) among living children ages 12 months or older.
4. Stunting: height-for-age z-score is <-2 standard deviations below the WHO international reference standard), among living children with valid height measurements,

I first examine the associations between the measures of unintendedness and child age[3] and birth order, to examine the validity of concerns about ex post facto rationalization and confounding with birth order. I then examine the associations between the measures of unintendedness and each health outcome using crosstabulations, applying Pearson's chi-squared test for statistically significant associations where appropriate. Finally, I examine whether any associations seen are attributable to other factors using multivariable regression analysis. For each health outcome, I run 3 models, using each measure of unintendedness as a covariate and also controlling for:

[2] I use the simple measure of any vs. no ANC rather than the WHO recommended 4+ visits to try and isolate maternal health-seeking behavior (i.e., a choice on the part of the mother to go for ANC or not) from potential late recognition of a pregnancy (more likely to occur with unintended pregnancies), which may not allow for 4 visits before delivery.

3 For children who have died, age is calculated from the survey date minus the child's birth date, giving the age the child would be had the child survived.

- Child age (i.e., time since conception), as a linear term in months and a squared term. The linear term adjusts for any ex-post-facto rationalization that may increase over time, while the squared term allows for non-linearity. Such non-linearity would occur if, for example, women also report very young children to be unwanted at higher rates than slightly older children. Higher reporting of unintendedness of current pregnancies vs. live births has been documented previously (Bradley, Croft, and Rutstein 2011).
- Sex of child, which for prenatal outcomes acts to adjust to some extent for any sex selective abortion, and for postnatal outcomes controls for differential treatment of boys and girls, for example in feeding practices.
- Urban/rural residence and wealth quintile, which act as proxies for access to health services. Urban/rural residence is included as a binary term, and the standard DHS wealth quintiles have been collapsed into a binary categorization of the wealthiest 60% of the population vs. the poorest 40%.[4]
- Maternal education, grouped into no education, primary education, and secondary and higher education levels.
- Maternal age, as a linear term in years, and age squared, to account for the U-shaped relationship between maternal age and unintendedness, as mothers who are either young or old are more likely to have unintended pregnancies than women in the middle of their reproductive years.

This is the complete model used for all health outcome models that include the Lightbourne unwantedness measure. In models that instead include the retrospective unintended or retrospective unwanted measure, I run a second set of models, including

- Birth order of the index child, as a linear term.

(Because birth order is part of the definition of the Lightbourne unwanted measure, it is not included in those models.) For the retrospective measures, I compare models with and without birth order, to see whether birth order does indeed confound the relationship between unintendedness and child health outcomes. All statistical analyses account for the DHS's multistage

[4] This recategorization preserves degrees of freedom, and, more importantly, allows me to use the same model for all countries. When I used wealth quintile as a categorical variable with four dummy terms, I could not estimate effects by quintile for several surveys that had no variation in outcomes within one wealth quintile, making wealth quintile a perfect predictor. Collapsing the quintiles avoids this estimation problem. I compared regression results using the five quintiles where possible to regression results using the two wealth categories, and found no substantial differences.

clustered sample designs using Stata's *svy* suite of commands for survey data with robust sampling errors. The data are weighted using women's sampling weights, with births taking on the sampling weights of their mothers.

Digesting results of these analyses for 48 surveys, three measures of unintendedness, and four outcome variables is not easy. I therefore have summarized the results of both bivariate and multivariate analyses in multiple ways. First, I group surveys by geographic region and compute unweighted averages (each survey = 1 observation) across the geographic regions.[5] For each region and for all surveys combined, I calculate the percentage of surveys that shows the expected relationship, for example, that ANC rates are lower for unwanted/unintended children compared to wanted/intended children. I also calculate the percentage of surveys in which the result is both in the expected direction and statistically significant. For bivariate tables, statistical significance is measured by the chi-squared p-value, and for regression tables, statistical significance is measured by the p-value of the coefficient on the unintendedness measure, both at the $p<0.05$ level. Finally, for all surveys, I calculate the Z-statistic and one-tailed p-value for the probability that the observed results demonstrate a stronger relationship between the unintendedness measure and the health outcome than we would expect under the null hypothesis of no relationship. For example, in Table 2, we see that Lightbourne unwanted children receive less ANC than wanted children in 41 out of 48 surveys, or 85 percent of the time. I use a binomial approximation to the normal distribution (please see methodological appendix for details) to test whether, when n = 48, finding a relationship in the expected direction 85% of the time is statistically significantly different than than the null hypothesis of finding a relationship 50% of the time (i.e., no relationship). Similarly, I test whether finding a relationship in the expected direction that is statistically significant 42% of the time is greater than the 5% we would expect under the null hypothesis (where p = alpha = 0.05).

Results

Figure 1 gives an overall sense of levels of wanted and unwanted fertility, showing the total fertility rate (TFR) broken down by wanted and unwanted fertility rates, the latter of which is a TFR including only those children classified as wanted using the Lightbourne method. These rates show

5 An alternative would be to renormalize the sampling weights, multiplying them by the number of observations divided by the size of the population they are representing (estimated size of country population under age 5 at the time of survey). This approach would produce averages that are more representative of the region as a whole. Because there are relatively few surveys in some regions (i.e., Middle East/North Africa), however, this approach would not come close to representing the entire regional population and so I use a simple mathematical average.

that on average, women have an excess of 0.7 unwanted births in their lifetime. Unwanted fertility is highest in sub-Saharan Africa, particularly in East and Southern Africa where the gap between total and wanted fertility is 1.3 children, on average across countries. Unsurprisingly, in countries where abortion is legal and widely available (Eastern Europe/NIS, and some Asian countries), the gap between wanted and total fertility is much smaller.

<Figure 1 about here>

Table 1 shows the distribution of each variable of interest: the percentage of all births in the last 5 years that are mistimed, unwanted, unintended (mistimed + unwanted, hereafter referred to as unintended), or unwanted by the Lightbourne calculation (hereafter referred to as Lightbourne unwanted). The percentage of births that are unintended is highest in Latin America and the Caribbean, where on average half of all births are unintended. In East and Southern Africa, nearly 40 percent of births are unintended, and in all other regions, between one-quarter and one-fifth of births are unintended – with the exception of Eastern Europe/NIS where an average of 13 percent of births are unintended. These regional averages hide some outliers: in Burkina Faso and Nigeria, less than 10 percent of births are unintended, which is to be expected given their high fertility rates (6.0 and 7.0, respectively) and high wanted fertility rates (5.2 and 6.8). Swaziland has an exceptionally high level of unintendedness by this measure: 64 percent of births are unintended, the bulk of which are unwanted. Swaziland also has a lower than average total fertility rate of 3.9, and the lowest wanted fertility rate in the region, at 2.1.

<Table 1 about here>

The percentage of births that are Lightbourne unwanted is, in almost all countries, between the percentage of retrospective unwanted and retrospective mistimed births. Lightbourne unwantedness is highest in Latin America and the Caribbean, at 28 percent on average, and lowest in Eastern Europe/NIS at 9 percent. Though the percentages unintended or unwanted by the Lightbourne and retrospective measures may be similar in level, they represent different children, as I will show next.

<Figure 2 about here>

Figure 2 shows the distribution of unintended children by age of the child, or length of time between the child's birth and interview, summarized in regional averages. Data for each survey are shown in Appendix Table 1. If there is indeed a retrospective bias that increases with time, i.e., women are more likely to say that recent births are unwanted than births in the past (usually children who are many months or years old at the time of survey), we should see the percentage unwanted decrease as child age increases. As shown in Figure 2, we do see this expected relationship in most sub-Saharan African and South Asian countries, with some minor discrepancies. In several countries that do not follow this linear trend, e.g., Namibia, Sao Tome and Principe, Armenia, Azerbaijan, Ukraine, Colombia, and Guyana, the percentage unwanted is higher among children 6-12 months old than among those under 6, and after 12 months the percent decreases with age. Though not a perfect linear relationship, the pattern of decreasing levels of unintendedness with increasing child age is consistent enough to confirm the theory of retrospective bias that increases with child age/time between birth and survey.

<Figure 3 about here>

Lightbourne unwantedness, however, appears largely uncorrelated with child age (Figure 3). Though regional averages appear to show a linear pattern in South Asia and Latin America, examination of the individual countries in each region show no pattern (Appendix Table 2). For example, though the averages in South Asia show a consistent increase in unwantedness with age, only one survey in this region, Bangladesh, actually increases in a stepwise fashion with each age group. The non-significant chi-squared p-values (Appendix Table 2) also indicate that unwantedness is relatively evenly spread across the age groups. So it appears that Lightbourne unwantedness does not suffer the same retrospective bias as the previous unintendedness measure in terms of child age. Lightbourne unwantedness is, however, completely dependent on birth order by definition. Though retrospective unintendedness is not related to birth order by definition, we may expect that children at higher birth orders are also more likely to be unintended using the retrospective measure. Figure 4 examines this issue.

<Figure 4 about here>

Figure 4 shows that the percentage unintended by the retrospective measure increases with increasing birth order, with details by country shown in Appendix Table 3. The relationship is

surprisingly consistent across surveys, with a slight discrepancy in West and Central Africa: in all countries in this region except Niger, Sao Tome and Principe, and Senegal, a greater percentage of first births are unintended compared to second or third births. The overall relationship is also consistent when examining only unwanted, rather than unintended, births (results not shown). This finding confirms the claim (e.g., by Marston and Cleland 2003) that unintendedness is inextricably linked with birth order. With this knowledge, we move on to examining relationships between the measures of unintendedness and health outcomes.

Bivariate results

Table 2 summarizes results for the bivariate relationships between unintendedness and each of the four health outcomes analyzed. Detailed results for each survey, each measure of unintendedness, and each health outcome can be found in Appendix Tables 4 through 15.

Antenatal Care

<Table 2 about here>

The first panel of Table 2 (and Appendix Tables 4 through 6) examines whether mothers who are pregnant with unintended/ unwanted pregnancies (among those pregnancies that result in live births) are less likely to seek ANC. Based on the Lightbourne measure, the answer is clearly yes. In almost every country, receipt of ANC is less common for unwanted compared to wanted births, including 100 percent of countries outside of sub-Saharan Africa. Many of these relationships do not approach statistical significance at the $p<0.05$ level, however. Across all countries, the relationship between ANC and Lightbourne unwantedness is in the expected direction in 85 percent of surveys, and statistically significant in 42 percent of all surveys. The p-values in the last row of the panel show that if we compare these percentages to what we would find if there were no relationship (a relationship in the expected direction in 50 percent of surveys, and a statistically significant relationship in the expected direction in 5 percent of surveys), these results demonstrate significantly more consistent relationships than we would find by chance.

Using retrospective measures of unintendedness weakens the relationship between ANC and planning status of births in terms of the number of surveys demonstrating the expected relationship, but increases the number of surveys that fit the criteria of showing the expected relationship at a statistically significant level. Using the categorization of intended vs. unintended

reduces the percentage of surveys with higher levels of ANC among intended vs. unintended children to 60 percent, and the percentage with this anticipated result at the $p<0.05$ level to 48 percent. There appears to be a slightly stronger relationship between unwantedness and ANC: in 71 percent of surveys, unwanted births receive ANC at lower levels than wanted births. Overall, our answer to the question about whether unintended/unwanted births receive ANC is a qualified yes. In most countries, this relationship exists, but it is not statistically significant in several cases, especially in West and Central Africa. The association in the expected direction is most common in countries with high levels of ANC.

Facility Delivery

The relationships between measures of unintended/unwantedness and delivery in a health facility follow similar patterns to those for ANC, though percentages of births delivered in health facilities are generally lower than percentages of births that received ANC (Table 2, panel 2, with details in Appendix Tables 7 through 9). Using the Lightbourne measure, the relationship is nearly universal in East and Southern African, South Asian, and Latin American and Caribbean countries, and in most cases is also statistically significant. The relationship is in the expected direction for the majority of Eastern European, and East Asian/Pacific countries, but does not often approach statistical significance. As with receipt of ANC, the relationship between facility delivery and unintendedness is less strong with the retrospective measures of unintendedness, though the relationship appears slightly more common comparing wanted vs. unwanted births rather than intended vs. unintended births. Overall, we see that unwanted births are less likely to be delivered in health facilities than wanted births in the vast majority of cases, and similar to ANC the relationship is weakest for countries in West and Central Africa.

Complete Basic Vaccination

The third panel of table 2 (and Appendix Tables 10, 11, and 12) show the percentage of living children 12-59 months old who have received the WHO standard for all basic immunizations (BCG, measles, 3 doses DPT, 3 doses polio), either by mother's report or by vaccination card, by measures of unintendedness.[6] Overall levels of complete basic vaccination vary widely, from 22 percent in Nigeria to 97 percent in Albania. In general, the relationship between complete basic vaccination

[6] Note that vaccination information was not collected in Ukraine, and so this panel only include 47 surveys

and unintendedness appears to be stronger in regions with higher vaccination rates. Using the Lightbourne measure, in every country in the Middle East/North Africa, Asia, and Latin America and the Caribbean, unwanted children have lower rates of complete basic vaccination than wanted children, and slightly more than half of these relationships are statistically significant. By contrast, there is only one sub-Saharan African country – Lesotho – in which the relationship is in the expected direction and statistically significant. Differences in vaccination rates by wantedness status are largest in Asia: in India and Cambodia, the difference in complete basic vaccination rates between wanted and unwanted children is more than 10 percentage points.

Retrospective measures of unwantedness show stronger relationships with vaccination in sub-Saharan Africa than the Lightbourne measure, though the relationship rarely reaches statistical significance. Overall, regardless of the measure, there are lower levels of vaccination among unwanted/unintended children compared to wanted/intended children in 55-64 percent of countries, but the relationship is only statistically significant in about one-quarter of countries analyzed. The relationship is particularly strong in Asian countries, which may be indicative of differences in the ways vaccines are distributed (i.e., campaigns that visit each household vs. requiring mothers to bring their infants to a clinic). In general, though, there is not outstanding evidence for a consistent relationship across countries, though for every measure of unintendedness, we find statistically significant relationships for a statistically significant number of countries.

Stunting

The final panel in Table 2 (and Appendix Tables 13 through 15) examines whether unintended/unwanted children are more likely to be stunted (height-for-age z-score less than -2 standard deviations below the WHO international reference standard) than their intended/wanted peers. Tables are limited to surveys that collected children's height and weight information, and in surveys where biomarkers were collected in a subset of households, results are restricted to the subset of children with valid weight and height measurements. Using the Lightbourne measure, the relationship is not consistent across all countries, but is entirely consistent (and statistically significant) across every survey from Latin America and the Caribbean. Differences in levels of stunting are large in this region: in Peru, for example, one third of unwanted children are stunted, compared with 22 percent of wanted children. The relationship is also consistent for countries in Eastern Europe and South Asia, but some results are not statistically significant. There does not

appear to be any relationship between wantedness and stunting in the surveys from West and Central Africa, nor from the Middle East/North Africa. Results using the retrospective measure of unintendedness are generally weaker, but using the retrospective categorization of wanted vs. unwanted, shows a very different pattern for the two East Asian countries of Cambodia and Timor-Leste. Using this categorization highlights strong differences in levels of stunting between wanted and unwanted children: in Cambodia, for example, 38 percent of wanted children are stunted, compared with nearly half of unwanted children. The relationship between unwantedness and stunting tends to be stronger in countries with higher levels of stunting. Overall, we see a fairly strong, consistent relationship between stunting and unintendedness in the Asian and Latin American and Caribbean countries studied, but little to no relationship in sub-Saharan Africa.

Multivariate results

Table 3 summarizes logistic regression results for each of the four health outcomes observed. Table 3 contains only regional summaries; adjusted odds ratios for each survey are included in Appendix Tables 15 through 18. For brevity, only the adjusted odds ratios (AORs) for the main covariate of interest – the measure of unintendedness – are shown, though models control for all the covariates described above. In each panel, Model 1 includes the Lightbourne measure plus all covariates except birth order, which is incorporated in the measure. Model 2 includes the retrospective unintendedness measure plus the same covariates as Model 1, and Model 3 adds birth order to this list. Similarly, Model 4 includes retrospective unwantedness and all other covariates except birth order; Model 5 adds birth order to Model 4.

After controlling for child age and other potential confounding variables, panel 1 of Table 3 demonstrates that we still find relationships between the Lightbourne unwantedness and ANC in significantly more cases than we would expect if there were not a true relationship. The same finding holds true for the relationship between ANC and the retrospective measures, though the association is stronger for retrospective unwantedness than retrospective unintendedness. We see by comparing Model 2 with Model 3, and Model 4 with Model 5, that the relationship between unintendedness and ANC does weaken when birth order is included in the model, but there is still a strong relationship even when birth order is included. As in the bivariate analyses, the relationship is strongest for countries in East and Southern Africa, the Middle East/North Africa, Eastern Europe, and Latin America and the Caribbean. The situation is particularly poor for retrospective unwanted children in East and Southern Africa: even after controlling for birth order, children in Burundi,

Kenya, Lesotho, Rwanda, and Uganda have between one-quarter and one-half the odds of receiving ANC compared to wanted children (AORs from 0.26 to 0.53, all statistically significant at $p<0.05$, see Appendix Table 16). There is little to no relationship for countries in West and Central Africa.

The results of regression analyses for delivery in a health facility (Table 3, panel 2) are broadly consistent with results for ANC, though birth order clearly confounds the relationship between retrospective unwantedness/unintendedness and facility delivery. For example, in Model 4 (which excludes birth order), retrospective unwanted children have lower odds of being delivered in a health facility compared to wanted children in 65 percent of surveys, and this result is statistically significant in 30 percent of surveys – a substantial proportion. When birth order is added to the otherwise identical Model 5, the relationship is only found in 33 percent of surveys and is only significant in 7 percent – no different than we would expect to find by chance. This finding confirms that, at least for facility delivery, birth order and unintendedness are strongly interrelated.

Panel 3 of Table 3 demonstrates a strikingly consistent relationship between vaccination and Lightbourne unwantedness for countries outside of sub-Saharan Africa: the odds of receipt of complete basic vaccination are lower for unwanted compared to wanted children in every country. Though these relationships are only statistically significant in 15 percent of surveys, when compared to the 5 percent we would expect to see by chance, the relationship is still substantial. As expected based on the bivariate results, the relationship is weaker for the retrospective vs. Lightbourne measures, and stronger for retrospective unwanted compared to retrospective unintended children. This relationship is also mediated by birth order – as seen in Models 3 and 5, including birth order substantially reduces the number of surveys in which the relationship is significant.

Perhaps the most consistent relationship included in this analysis is that between unintendedness and stunting, particularly in Latin America and the Caribbean. Using the Lightbourne measure, unwanted Latin American and Caribbean children have significantly higher odds of stunting in every survey, and the magnitude of the effect is large: unwanted children have between 32 and 70 percent higher odds of being stunted than wanted children (AORs 1.32 to 1.70, , all statistically significant at $p<0.05$, see Appendix Table 19). Relationships are similar, though not as significant, using the retrospective measures. The relationship is also striking in the Asian countries analyzed, and, to a lesser extent, the Eastern and Southern African countries. Birth order does confound the

relationships to some extent, decreasing the magnitude of the effect and reversing the relationship entirely in Guyana. Even after controlling for birth order, however, the number of surveys with statistically significant relationships in the expected direction remains higher than we would expect under the null hypothesis in every model.

Conclusions

Previous literature has found a paucity of rigorous studies examining the consequences of unintendedness on child health, particularly in resource-poor settings. This paper aims to fill that gap with a broad analysis of 48 countries and multiple health outcomes, paying special attention to previous critiques of retrospective measures of unintendedness and the inability to separate consequences of unintendedness from those of birth order.

This analysis has demonstrated that, although relationship between the child health outcomes examined and planning status of births is far from consistent, there is still a detectable effect of unintendedness in the majority of countries for most health indicators even after controlling for all potential confounding variables. The relationships are most consistent in Latin American and Caribbean settings where levels of unintendedness are highest, which fits with Marston and Cleland's (2003) findings, though their Latin American results were limited to Bolivia and Peru. They suggest that one potential reason for both the high levels of unintendedness and the strong negative relationship between unintendedness and health outcomes might be high levels of contraceptive failure in this region. Findings from this analysis do not contradict this hypothesis, though it is interesting to compare results from Latin America with those from Eastern Europe, where contraceptive failure is also high, but is generally backed up by abortion. As might be anticipated in a region where unwanted pregnancies can legally be aborted, the effects of unintendedness on health outcomes is lower in Eastern Europe and the Newly Independent States, but is far from non-existent. This analysis also highlighted the poorer health outcomes experienced by unintended children in many Asian and East and Southern African countries, but show little effect of unintendedness in West and Central African countries, which is perhaps unsurprising given the context of low levels of unintendedness in this region, despite high levels of fertility.

There are clear limitations to the data used in this analysis. The measures of unintendedness used in this analysis are far from perfect, as has been noted repeatedly in the literature. If these measures are systematically biased, however, it seems most likely that the bias is generally towards

women saying that fewer children were unwanted at conception than actually were unwanted – which would likely result in an underestimation of the effect of unintendedness. In the outcomes analyzed, I can think only of one example where the bias might go in the opposite direction: in the analysis of stunting, we could hypothesize that a child who was wanted when they were conceived grows up to be ill and malnourished, leading a mother to claim that this child was unwanted all along. However, we could not expect that sort of bias to be associated with decreased odds of ANC and facility delivery. The fact that we still find statistically significant associations using these flawed measures of unintendedness suggests that the true relationship between unintendedness and health outcomes is even larger. An additional limitation is that this analysis only includes live births, and cannot account for the intention status of pregnancies that were aborted or resulted in a miscarriage or stillbirth. Again, I cannot imagine that if these non-live-birth-outcomes were included in analysis, that the relationship between unintendedness and health outcomes would be weaker – if anything, they would likely be stronger for the only prenatal health outcome, receipt of ANC. Overall, any biases seem to be in the direction of weakening any detectable relationship between unintendedness and health outcomes, and thus I believe the true relationships we would find with perfect data would be stronger than those presented here.

Marston and Cleland's (2003) analysis posed an interesting question about whether unintendedness can ever fully be disentangled from birth order. The analyses here have shown that unintendedness and birth order are clearly linked, but fail to demonstrate, as seems to be suggested by Marston and Cleland's conclusions, that there is no additional effect of unintendedness after controlling for birth order. What these data most clearly show is that birth order and unintendedness are collinear – that unintendedness increases with birth order. This fact is not surprising, especially if, as Lightbourne (1985) and others have hypothesized, women have an ideal family size and any children beyond that size are unintended. It is also not surprising that health outcomes are worse for higher-order births: we can easily imagine that spreading parental time and other resources across more children would leave fewer resources, health and otherwise, for the higher-order children. What is not clear is the degree to which poorer health outcomes among unintended children are due to the increased likelihood of unintended children being higher-order, versus the degree to which the poorer health outcomes are due simply to unintendedness, independent of birth order. I would argue that from a family planning policy or program perspective, these degrees are largely irrelevant. If higher-birth-order children are more likely to be unintended, and unintended children have worse health outcomes, does it truly matter

whether the causal factor is the unintendedness or the birth order if the group of children is largely the same? If women could control their fertility to have only births that were truly wanted, they would by definition have fewer higher-order births. Results from this analysis indicate that the wanted children have substantially better health outcomes than unwanted children. Increasing the proportion of children with better health outcomes is clearly in the best interest of families and family planning programs alike, regardless of the mechanism by which this change is made.

When I began this analysis, I anticipated that my findings would largely replicate those of Marston and Cleland, and I would conclude that there is no substantive health effect of unintendedness. I am surprised to conclude that my hypothesis was incorrect. Though the effect of unintendedness seems small (especially after controlling for birth order), it is surprisingly pervasive. Though there is not a consistent relationship in every country for every health outcome, the evidence presented here is strong enough to conclude that in general, unintended children do suffer poorer health outcomes compared to their intended peers. Family planning programs are therefore justified in the goal of increasing child health by decreasing unintended pregnancies. However, this analysis has clearly demonstrated that unintended children are not universally disadvantaged. The relationship between unintendedness and receipt of vaccinations is less strong than for other health outcomes, which perhaps may reflect the way that vaccines are distributed – often through campaigns that reach every child, rather than relying on families bringing children into a clinic, which leaves more room for differential treatment.

Unintended pregnancies will never disappear entirely. While this analysis shows that children whose conceptions were unplanned have poorer health outcomes, on average, than wanted children, this is far from proscriptive. Mothers, families, programs, and governments can make it easier for all children to have the best health possible, regardless of birth order or planning status. At the same time, reducing the number of unintended births can only help improve the health and wellbeing of all children.

References

Bradley, Sarah E.K., Trevor N. Croft, and Shea O. Rutstein. 2011. The Impact of Contraceptive Failure on Unintended Births and Induced Abortions: Estimates and Strategies for Reduction. DHS Analytical Studies No. 22. Calverton, Maryland, USA: ICF Macro.

Centers for Disease Control (CDC). 2012. "Reproductive Health: Unintended Pregnancy Prevention." Accessed November 1, 2012: http://www.cdc.gov/reproductivehealth/unintendedpregnancy/

Chalasani, Satvika, John B. Casterline, and Michael A. Koenig. 2007. "Consequences of unwanted childbearing: A study of child outcomes in Bangladesh." Paper presented at the Annual Meeting of the Population Association of America, New York, 29–31 March.

Eggleston, Elizabeth. 2000. "Unintended pregnancy and women's use of prenatal care in Ecuador." Social Science & Medicine 51(2): 1,011 – 1018.

Eggleston, Elizabeth, Amy Ong Tsui, and Milton Kotelchuck. 2001. "Unintended pregnancy and low birthweight in Ecuador. American Journal of Public Health 91(5): 808–810.

Frenzen, Paul D. and Dennis P. Hogan. 1982. "The impact of class, education, and health care on infant mortality in a developing society: The case of rural Thailand." Demography 19(3): 391-408.

Gage, Anastasia J. 1998. "Premarital childbearing, unwanted fertility and maternity care in Kenya and Namibia." Population Studies 52(1): 21-34.

Gipson, Jessica D., Michael A. Koenig, and Michelle Hindin. 2008. "The effects of unintended pregnancy on health outcomes: a review of the literature." Studies in Family Planning 39(1):18-38.

Guttmacher Institute. 2012. "Fact Sheet: Facts on Unintended Pregnancy in the United States." Accessed October 10, 2012. http://www.guttmacher.org/pubs/FB-Unintended-Pregnancy-US.html

Healthy People 2020. 2012. "Overview: Family Planning." Accessed November 1 2012. http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=13

Hromi-Fiedler, Amber J. and Rafael Perez-Escamilla. 2006. "Unintended pregnancies are associated with less likelihood of prolonged breastfeeding: An analysis of 18 Demographic and Health Surveys." Public Health Nutrition 9(3): 306-312.

Jensen, Eric R. and Dennis A. Ahlburg. 1999. A Multicountry Analysis of the Impact of Unwantedness and Number of Children on Child Health and Preventive and Curative Care. Washington, DC: POLICY Project, Futures Group International.

Lightbourne, Robert E. 1985. "Individual preferences and fertility behaviour." In John Cleland and John Hobcraft (eds). Reproductive Change in Developing Countries: Insights from the World Fertility Survey. Oxford: Oxford University Press.

Magadi, Monica Akinyi, Nyovani Janet Madise, and Roberto Nascimento Rodrigues. 2000. "Frequency and timing of antenatal care in Kenya: Explaining the variations between women of different communities. Social Science & Medicine 51(4): 551–561.

Marston, Cicely and John Cleland. 2003. "Do unintended pregnancies carried to term lead to adverse outcomes for mother and child? An assessment in five developing countries." Population Studies 57(1): 77-93.

Shapiro-Mendoza, Carrie, Beatrice J Selwyn, David P Smith, and Maureen Sanderson. 2005. "Parental pregnancy intention and early childhood stunting: findings from Bolivia." International Journal of Epidemiology. 34(2):387-96.

Singh, Abhishek, Satvika Chalasani, Michael A. Koenig, and Bidhubhusan Mahapatra. 2012a. "The consequences of unintended births for maternal and child health in India." Population Studies 66(3): 223-239.

Singh, Abhishek, Ashish Singh, and Bidhubhusan Mahapatra. 2012b. "The Consequences of Unintended Pregnancy for Maternal and Child Health in Rural India: Evidence from Prospective Data." Maternal and Child Health Journal (online).

Singh, Susheela, Gilda Sedgh, and Rubina Hussain. 2010. "Unintended pregnancy: worldwide levels, trends, and outcomes." Studies in family planning. 41(4):241-50.

World Health Organization (WHO). 2007. "Unsafe Abortion: Global and Regional Estimates of the Incidence of Unsafe Abortion and Associated Mortality in 2003." Fifth edition. Geneva: World Health Organization.

WHO, UNICEF, UNFPA and The World Bank. 2012. "Trends in Maternal Mortality: 1990-2010. Estimates developed by WHO, UNICEF, UNFPA and the World Bank."

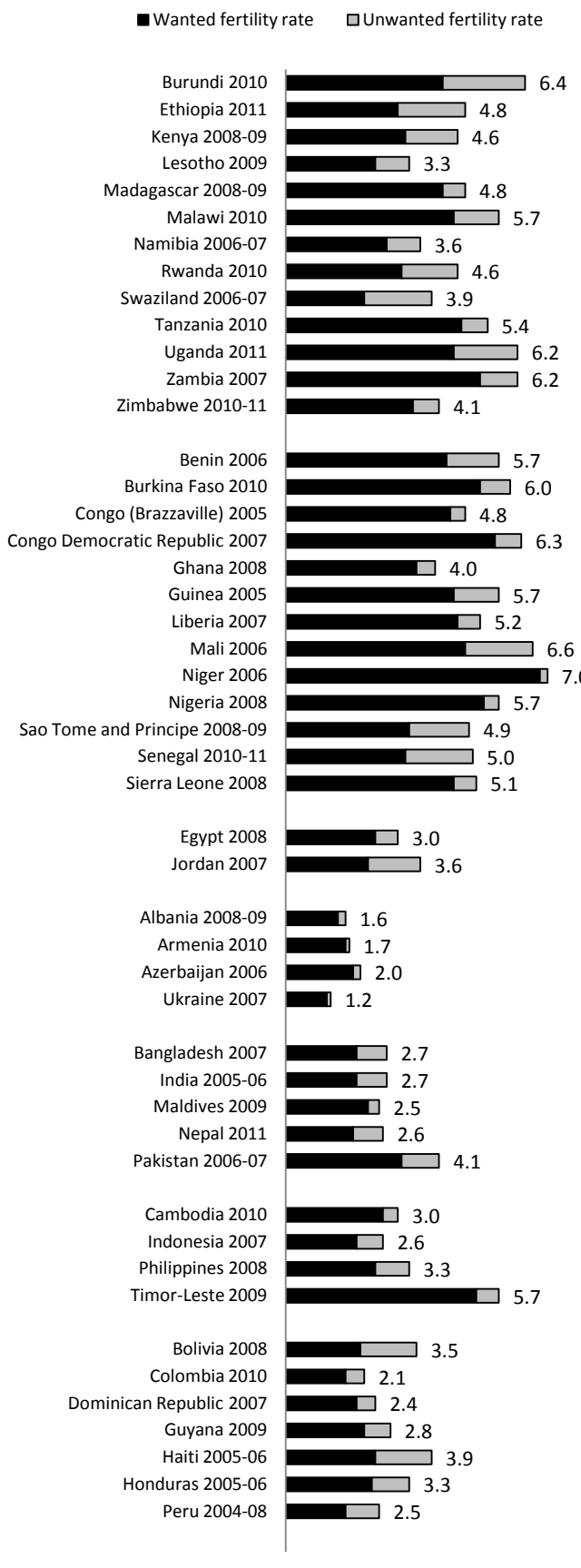
Geneva: World Health Organization.

Table 1: Percentage of all births in the last 5 years that are mistimed, unwanted, unintended (retrospective measures), or unwanted by the Lightborne method. Most recent DHS surveys in each country.

	Among all births in 5 years prior to survey				
	Percent mistimed	Percent unwanted	unintended (mistimed + unwanted)	Lightborne % unwanted	Number of births in the 5 years prior to survey
East and Southern Africa					
Burundi 2010	24.2	4.9	29.1	22.3	7,981
Ethiopia 2011	19.2	8.7	27.9	16.9	11,872
Kenya 2008-09	25.0	17.3	42.3	20.9	5,852
Lesotho 2009	30.0	22.7	52.6	21.9	3,732
Madagascar 2008-09	6.9	4.7	11.6	10.2	12,686
Malawi 2010	18.3	25.1	43.4	14.3	19,697
Namibia 2006-07	26.2	27.0	53.2	20.0	5,003
Rwanda 2010	24.6	12.2	36.7	23.7	9,137
Swaziland 2006-07	26.5	37.6	64.1	38.6	2,829
Tanzania 2010	21.3	3.6	24.9	9.5	8,176
Uganda 2011	31.4	11.5	42.9	19.1	8,076
Zambia 2007	24.5	15.7	40.2	10.4	6,435
Zimbabwe 2010-11	24.2	6.8	31.0	10.9	5,596
Regional average	23.3	15.2	38.5	18.4	
West and Central Africa					
Benin 2006	13.0	3.4	16.5	12.0	15,929
Burkina Faso 2010	6.2	1.5	7.8	6.3	15,375
Congo (Brazzaville) 2005	28.2	4.7	32.9	5.0	4,948
Congo Democratic Republic 2007	19.5	9.1	28.6	8.0	8,999
Ghana 2008	22.4	14.5	36.8	12.1	2,909
Guinea 2005	9.9	3.6	13.5	8.1	6,370
Liberia 2007	24.0	4.5	28.5	9.4	5,594
Mali 2006	12.1	3.2	15.3	6.4	14,420
Niger 2006	9.0	0.5	9.5	1.7	9,954
Nigeria 2008	6.1	4.2	10.3	5.1	28,100
Sao Tome and Principe 2008-09	29.1	19.6	48.7	26.5	1,834
Senegal 2010-11	20.1	4.1	24.2	10.2	11,479
Sierra Leone 2008	15.5	10.3	25.8	8.2	5,811
Regional average	16.5	6.4	23.0	9.2	
Middle East/North Africa					
Egypt 2008	4.8	9.1	13.8	17.6	10,590
Jordan 2007	14.7	11.4	26.1	19.8	9,864
Regional average	9.8	10.3	20.0	18.7	
Eastern Europe/NIS					
Albania 2008-09	8.9	4.0	12.9	15.3	1,576
Armenia 2010	6.5	1.3	7.8	4.8	1,448
Azerbaijan 2006	9.2	7.8	17.0	9.7	2,289
Ukraine 2007	7.4	6.2	13.7	5.9	1,177
Regional average	8.0	4.8	12.9	8.9	

	Among all births in 5 years prior to survey				
	Percent mistimed	Percent unwanted	unintended (mistimed + unwanted)	Lightborne % unwanted	Number of births in the 5 years prior to survey
South Asia					
Bangladesh 2007	14.2	13.9	28.2	28.0	6,058
India 2005-06	9.4	11.0	20.4	27.0	56,438
Maldives 2009	9.5	17.2	26.7	10.4	3,736
Nepal 2011	11.3	13.3	24.6	28.1	5,391
Pakistan 2006-07	12.6	11.1	23.7	20.1	9,121
Regional average	11.4	13.3	24.7	22.7	
East Asia/Pacific					
Cambodia 2010	6.3	9.0	15.3	11.7	8,200
Indonesia 2007	12.2	7.5	19.7	13.9	16,504
Philippines 2008	19.9	16.6	36.5	25.7	6,359
Timor-Leste 2009	11.8	2.2	14.0	8.0	9,828
Regional average	12.6	8.8	21.4	14.8	
Latin America and Caribbean					
Bolivia 2008	24.8	35.8	60.7	39.8	8,726
Colombia 2010	28.0	23.6	51.6	24.7	15,858
Dominican Republic 2007	29.6	14.3	44.0	20.0	10,543
Guyana 2009	21.1	17.3	38.4	22.7	1,886
Haiti 2005-06	19.2	26.6	45.8	32.6	5,727
Honduras 2005-06	25.1	24.4	49.6	25.5	10,167
Peru 2004-08	30.2	26.2	56.5	32.6	14,976
Regional average	25.4	24.0	49.5	28.3	

Figure 1: Wanted, Unwanted, and Total fertility rates



Number outside last bar indicates the TFR. Source: STATcompiler (www.statcompiler.com), accessed 11/10/12, and DHS final reports. Fertility rates calculated for period 3 years prior to survey.

Figure 2: Percentage of all births in the last 5 years that are unintended (retrospective measure) by child age at time of survey: regional averages

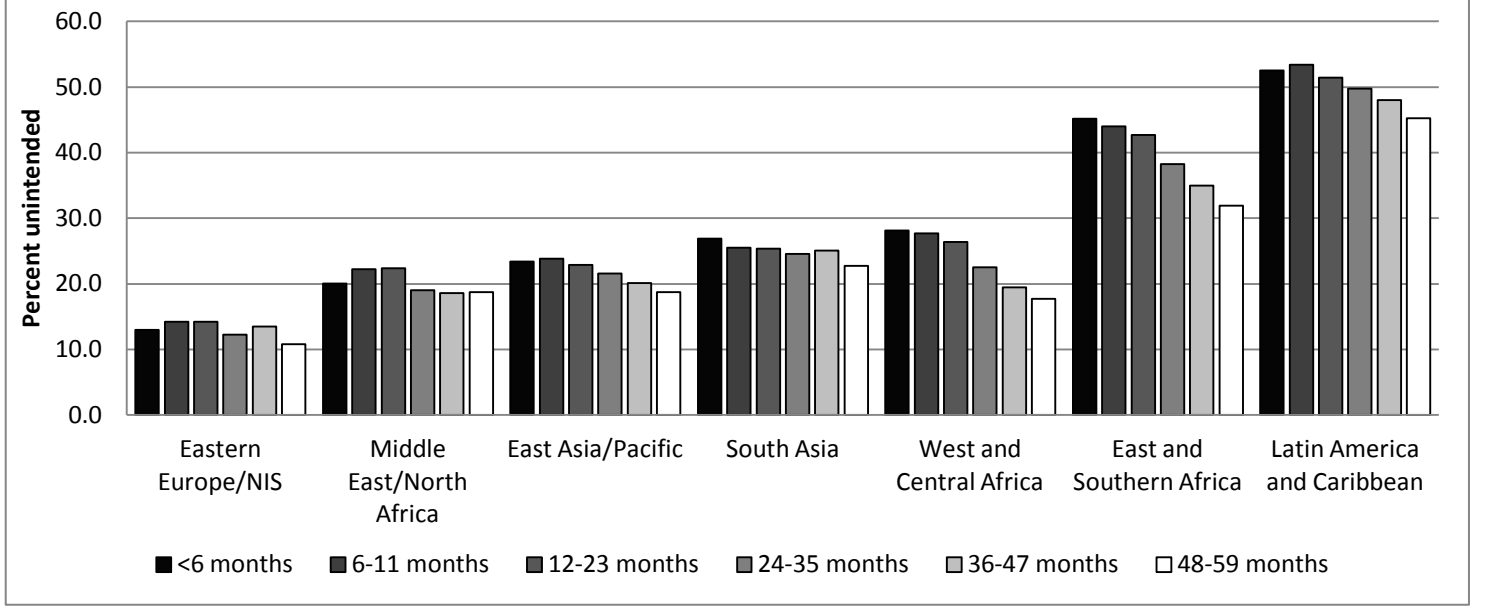


Figure 3: Percentage of all births in the last 5 years that are unwanted (Lightborne measure) by child age at time of survey: regional averages

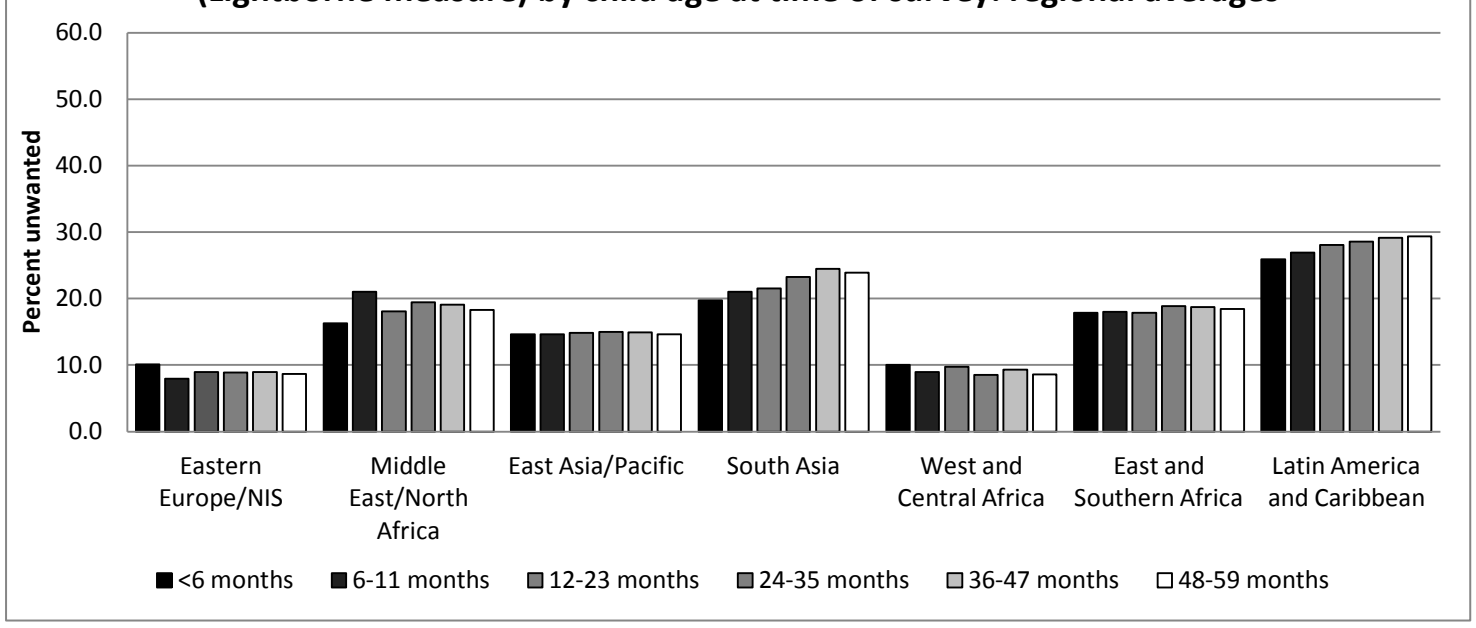


Figure 4: Percentage of all births in the last 5 years that are unintended (retrospective measure) by child's birth order: regional averages

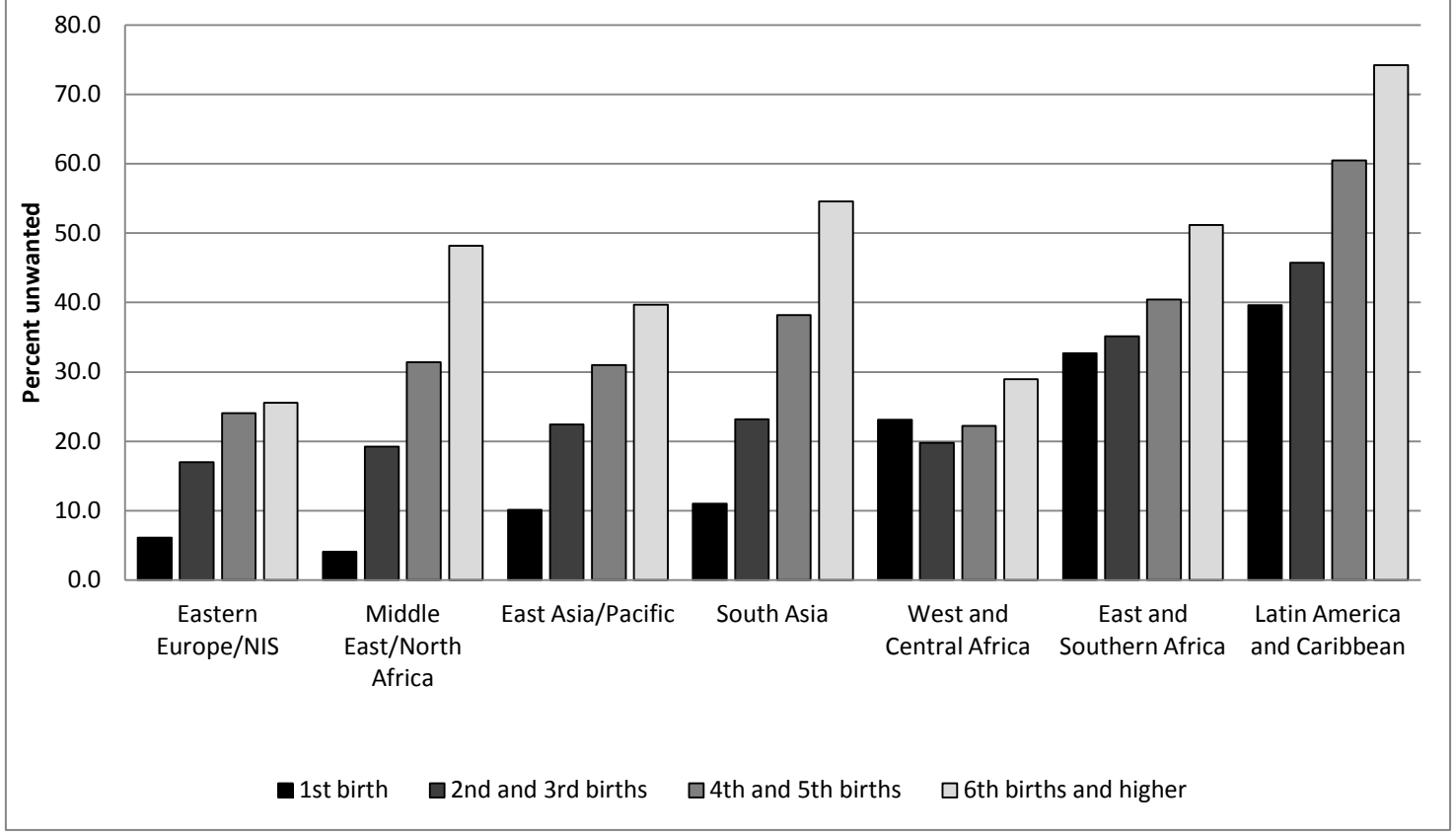


Table 2: Summaries of child health outcomes (ANC, facility delivery, complete basic vaccination, and stunting) by Lightborne unwantedness, retrospective unintendedness, and retrospective unwantedness measures

Percentage of births in the last five years during which ANC was sought by planning status of the birth														
		Lightborne				Retrospective unintended				Retrospective unwanted				
	Number of surveys	wanted	unwanted	Expected direction (unwanted lower)	Expected direction and statistically significant	intended	unintended	Expected direction (unintended lower)	Expected direction and statistically significant	wanted	unwanted	Expected direction (unwanted lower)	Expected direction and statistically significant	Total
East and Southern Africa	13	92.2	90.6	84.6	30.8	92.6	90.9	84.6	53.8	92.3	89.7	92.3	61.5	91.8
West and Central Africa	13	84.7	84.2	61.5	0.0	84.0	88.3	15.4	7.7	84.5	87.3	38.5	0.0	84.6
Middle East/North Africa	2	87.1	82.1	100.0	100.0	87.3	80.8	100.0	100.0	87.0	79.3	100.0	100.0	86.2
Eastern Europe/NIS	4	93.7	89.1	100.0	50.0	93.6	90.7	50.0	50.0	93.7	86.8	50.0	50.0	93.1
South Asia	5	80.3	69.7	100.0	80.0	78.1	74.9	60.0	60.0	78.6	68.8	80.0	60.0	77.2
East Asia/Pacific	4	92.9	88.4	100.0	50.0	92.7	90.7	75.0	75.0	92.8	88.3	75.0	75.0	92.3
Latin America and Caribbean	7	95.1	90.8	100.0	85.7	95.2	92.6	85.7	71.4	95.0	90.7	85.7	71.4	93.8
Total	48	89.3	86.1	85.4	41.7	89.0	88.3	60.4	47.9	89.1	86.2	70.8	47.9	88.5
Counts of surveys with expected relationships (totals)				41	20			29	23			34	23	
Z-scores				4.76	11.32			1.30	13.31			2.74	13.31	
P-values				<0.001	<0.001			0.097	<0.001			0.003	<0.001	

Percentage of births in the last five years that were delivered in a health facility by planning status of the birth														
		Lightborne				Retrospective unintended				Retrospective unwanted				
	Number of surveys	wanted	unwanted	Expected direction (unwanted lower)	Expected direction and statistically significant	intended	unintended	Expected direction (unintended lower)	Expected direction and statistically significant	wanted	unwanted	Expected direction (unwanted lower)	Expected direction and statistically significant	Total
East and Southern Africa	13	57.4	50.1	92.3	84.6	57.2	54.4	69.2	46.2	56.5	53.4	69.2	46.2	55.9
West and Central Africa	13	53.6	53.6	53.8	7.7	52.4	58.8	7.7	0.0	53.2	61.8	15.4	0.0	53.5
Middle East/North Africa	2	86.1	81.0	100.0	50.0	86.0	80.3	100.0	100.0	85.8	79.4	100.0	100.0	85.2
Eastern Europe/NIS	4	93.5	90.3	75.0	25.0	93.5	91.3	75.0	0.0	93.5	89.4	75.0	25.0	93.2
South Asia	5	46.5	35.2	100.0	100.0	44.6	40.3	100.0	60.0	44.9	34.8	100.0	100.0	43.6
East Asia/Pacific	4	43.1	36.2	75.0	50.0	42.2	40.9	75.0	50.0	42.2	37.1	100.0	50.0	41.7
Latin America and Caribbean	7	72.6	63.1	100.0	85.7	72.2	67.5	57.1	57.1	72.2	62.7	100.0	71.4	69.6
Total	48	60.5	54.9	81.3	56.3	59.7	59.1	56.3	35.4	59.8	57.8	66.7	43.8	59.1
Counts of surveys with expected relationships (totals)				39	27			27	17			32	21	
Z-scores				4.19	15.96			0.72	9.34			2.17	11.99	
P-values				<0.001	<0.001			0.236	<0.001			0.015	<0.001	

Percentage of living children ages 12-59 months old who received all basic immunizations recommended by the WHO by planning status of the birth

		Lightborne				Retrospective unintended				Retrospective unwanted				
	Number of surveys	wanted	unwanted	Expected direction (unwanted lower)	Expected direction and statistically significant	intended	unintended	Expected direction (unintended lower)	Expected direction and statistically significant	wanted	unwanted	Expected direction (unwanted lower)	Expected direction and statistically significant	Total
East and Southern Africa	13	63.6	63.2	46.2	7.7	63.8	63.3	53.8	23.1	63.7	63.1	61.5	15.4	63.5
West and Central Africa	13	46.4	47.3	30.8	0.0	46.0	49.3	7.7	0.0	46.5	50.1	38.5	0.0	46.6
Middle East/North Africa	2	88.0	85.0	100.0	50.0	88.2	84.8	100.0	50.0	87.9	83.9	50.0	50.0	87.4
Eastern Europe/NIS	3	79.3	77.9	66.7	33.3	79.3	79.0	33.3	0.0	79.3	80.3	33.3	0.0	79.1
South Asia	5	73.8	68.5	100.0	60.0	73.3	69.4	100.0	40.0	73.2	66.9	100.0	60.0	72.4
East Asia/Pacific	4	65.7	60.0	100.0	50.0	65.5	61.1	100.0	25.0	65.2	61.0	75.0	25.0	64.8
Latin America and Caribbean	7	65.0	61.5	100.0	50.0	65.6	62.2	100.0	25.0	65.0	60.3	75.0	25.0	64.0
Tercile <31.3	16	38.3	36.9	50.0	12.5	37.8	39.0	31.3	12.5	38.1	39.9	37.5	6.3	38.0
Tercile 31.3-62.5	15	64.2	63.2	53.3	20.0	65.0	62.6	73.3	26.7	64.5	61.1	86.7	26.7	64.0
Tercile >62.5	16	84.7	82.1	87.5	43.8	84.4	83.4	62.5	25.0	84.4	82.9	62.5	37.5	84.0
Total	47	62.4	60.7	63.8	25.5	62.3	61.6	55.3	21.3	62.3	61.3	61.7	23.4	62.0
Counts of surveys with expected relationships (totals)				30	12			26	10			29	11	
Z-scores				1.75	6.12			0.58	4.79			1.46	5.45	
P-values				0.040	<0.001			0.281	<0.001			0.072	<0.001	

Percentage of measured, living children who are stunted (height-for-age z-score < -2 standard deviations below the WHO international reference standard), by planning status of the birth

		Lightborne				Retrospective unintended				Retrospective unwanted				
	Number of surveys	wanted	unwanted	Expected direction (unwanted higher)	Expected direction and statistically significant	intended	unintended	Expected direction (unintended higher)	Expected direction and statistically significant	wanted	unwanted	Expected direction (unwanted higher)	Expected direction and statistically significant	Total
East and Southern Africa	13	39.9	41.9	76.9	15.4	39.8	41.0	61.5	30.8	40.1	41.3	69.2	0.0	40.3
West and Central Africa	11	35.2	34.3	27.3	0.0	35.5	33.3	27.3	0.0	35.3	31.7	27.3	0.0	35.2
Middle East/North Africa	2	21.6	21.9	50.0	0.0	21.6	21.9	50.0	0.0	21.7	21.0	50.0	0.0	21.7
Eastern Europe/NIS	3	20.4	28.4	100.0	33.3	21.2	20.8	33.3	0.0	21.0	27.7	66.7	33.3	21.2
South Asia	4	35.5	42.8	100.0	75.0	36.5	39.8	100.0	25.0	36.2	43.8	100.0	75.0	37.3
East Asia/Pacific	2	48.2	49.3	50.0	0.0	48.0	50.8	50.0	50.0	47.8	56.9	100.0	100.0	48.4
Latin America and Caribbean	5	17.1	25.4	100.0	100.0	16.6	22.3	100.0	80.0	17.4	25.6	100.0	80.0	19.6
Tercile <64.3	14	20.3	25.6	78.6	42.9	20.2	22.8	64.3	35.7	20.5	26.1	85.7	42.9	21.6
Tercile 64.3-42.9	13	33.3	35.4	69.2	15.4	33.0	34.5	69.2	30.8	33.4	34.8	61.5	15.4	33.8
Tercile >42.9	14	45.6	47.7	57.1	28.6	46.3	45.8	42.9	14.3	46.1	46.5	50.0	21.4	46.3
Total	40	33.1	36.2	68.3	29.3	33.2	34.4	58.5	26.8	33.3	35.8	65.9	26.8	33.9
Counts of surveys with expected relationships (totals)				27	12			23	11			26	11	
Z-scores				2.16	6.68			0.92	5.97			1.85	5.97	
P-values				0.015	<0.001			0.179	<0.001			0.032	<0.001	

Table 3: Summaries of logistic regression results for child health outcomes (ANC, facility delivery, complete basic vaccination, and stunting) by Lightborne unwantedness, retrospective unintendedness, and retrospective unwantedness measures

Logistic regression models results for odds of receipt of ANC among births in the last 5 years by planning status of births

		Lightbourne		Retrospective unintendedness				Retrospective unwantedness			
		Model 1		Model 2		Model 3		Model 4		Model 5	
Region	Number of surveys	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05
East and Southern Africa	13	84.6	15.4	84.6	61.5	84.6	61.5	92.3	46.2	92.3	46.2
West and Central Africa	13	53.8	0.0	38.5	15.4	23.1	15.4	61.5	15.4	53.8	7.7
Middle East/North Africa	2	100.0	50.0	100.0	100.0	100.0	50.0	100.0	100.0	100.0	50.0
Eastern Europe/NIS	2	100.0	0.0	100.0	50.0	100.0	50.0	100.0	50.0	100.0	50.0
South Asia	5	80.0	60.0	60.0	40.0	40.0	0.0	80.0	40.0	40.0	20.0
East Asia/Pacific	4	75.0	50.0	75.0	75.0	75.0	25.0	75.0	75.0	75.0	0.0
Latin America and Caribbean	7	100.0	71.4	71.4	57.1	57.1	42.9	85.7	57.1	85.7	42.9
Total	46	78.3	28.3	67.4	47.8	58.7	34.8	80.4	43.5	73.9	28.3
Number of surveys with expected relationships		36	13	31	22	27	16	37	20	34	13
Z-scores		3.69	6.90	2.21	12.99	1.03	8.93	3.98	11.64	3.10	6.90
P-values		0.000	<0.001	0.135	<0.001	0.152	<0.001	<0.001	<0.001	0.001	<0.001

Logistic regression models results for odds of delivery in a health facility among births in the last 5 years by planning status of births

		Lightbourne		Retrospective unintendedness				Retrospective unwantedness			
		Model 1		Model 2		Model 3		Model 4		Model 5	
Region	Number of surveys	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05
East and Southern Africa	13	61.5	23.1	84.6	53.8	69.2	23.1	69.2	23.1	30.8	7.7
West and Central Africa	13	53.8	7.7	53.8	23.1	46.2	7.7	46.2	7.7	30.8	0.0
Middle East/North Africa	2	50.0	0.0	100.0	0.0	100.0	0.0	100.0	50.0	100.0	0.0
Eastern Europe/NIS	2	100.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	0.0
South Asia	5	60.0	20.0	80.0	60.0	40.0	0.0	80.0	20.0	0.0	0.0
East Asia/Pacific	4	100.0	50.0	25.0	0.0	0.0	0.0	50.0	25.0	25.0	0.0
Latin America and Caribbean	7	100.0	100.0	100.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0
Total	46	65.2	28.3	69.6	41.3	52.2	15.2	65.2	30.4	32.6	6.5
Number of surveys with expected relationships		30	13	32	19	24	7	30	14	15	3
Z-scores		1.92	6.90	2.51	10.96	0.15	2.84	1.92	7.58	-2.51	0.14
P-values		0.027	<0.001	0.006	<0.001	0.440	0.002	0.027	<0.001	na	0.444

Logistic regression models results for odds of complete basic vaccination among children 12-59 months old by planning status of births

		Lightbourne		Retrospective unintendedness				Retrospective unwantedness			
		Model 1		Model 2		Model 3		Model 4		Model 5	
Region	Number of surveys	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05
East and Southern Africa	13	53.8	7.7	53.8	15.4	46.2	7.7	61.5	7.7	69.2	7.7
West and Central Africa	13	61.5	0.0	30.8	0.0	23.1	0.0	69.2	0.0	53.8	0.0
Middle East/North Africa	2	100.0	0.0	100.0	50.0	100.0	50.0	50.0	50.0	50.0	50.0
Eastern Europe/NIS	2	100.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0
South Asia	5	100.0	20.0	100.0	40.0	100.0	0.0	100.0	20.0	40.0	0.0
East Asia/Pacific	4	100.0	50.0	100.0	25.0	50.0	25.0	50.0	25.0	25.0	25.0
Latin America and Caribbean	7	100.0	42.9	85.7	42.9	71.4	28.6	85.7	71.4	85.7	42.9
Total	46	76.1	15.2	63.0	19.6	52.2	10.9	69.6	19.6	58.7	13.0
Number of surveys with expected relationships		35	7	29	9	24	5	32	9	27	6
Z-scores		3.39	2.84	1.62	4.19	0.15	1.49	2.51	4.19	1.03	2.16
P-values		0.000	0.002	0.052	<0.001	0.440	0.068	0.006	<0.001	0.152	0.015

Logistic regression models results for odds of stunting among weighed and measured living children by planning status of births

		Lightbourne		Retrospective unintendedness				Retrospective unwantedness			
		Model 1		Model 2		Model 3		Model 4		Model 5	
Region	Number of surveys	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05
East and Southern Africa	12	66.7	8.3	75.0	33.3	75.0	33.3	83.3	16.7	75.0	16.7
West and Central Africa	11	45.5	9.1	54.5	9.1	45.5	0.0	45.5	0.0	36.4	0.0
Middle East/North Africa	2	50.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eastern Europe/NIS	2	100.0	0.0	50.0	0.0	50.0	0.0	50.0	50.0	50.0	50.0
South Asia	4	100.0	50.0	75.0	50.0	75.0	0.0	75.0	75.0	75.0	25.0
East Asia/Pacific	2	50.0	0.0	100.0	0.0	100.0	0.0	100.0	100.0	100.0	50.0
Latin America and Caribbean	6	100.0	100.0	100.0	83.3	83.3	50.0	100.0	83.3	83.3	33.3
Total	39	69	26	72	31	64	18	69	33	62	18
Number of surveys with expected relationships		27	10	28	12	25	7	27	13	24	7
Z-scores		2.24	5.55	2.56	7.02	1.60	3.34	2.24	7.75	1.28	3.34
P-values		0.013	<0.001	0.005	<0.001	0.055	0.000	0.013	<0.001	0.100	0.000

Models 1, 2, and 4 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, and maternal age^2.

Models 3 and 5 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, maternal age^2, and child's birth order.

Armenia and Ukraine have been excluded from all regression analyses.

Only surveys that collected height and weight of children are included in analysis of stunting.

Appendix Table 1: Percentage of all births in the last 5 years that are unintended (mistimed or unwanted), by age of the child at time of survey. Most recent DHS surveys in each country.

		Age of child (or time since birth, for children who have died)								
Region	Survey	<6 months	6-11 months	12-23 months	24-35 months	36-47 months	48-59 months	Total	Number of births	Pearson chi-squared p-value
East and Southern Africa	Burundi 2010	37.3	37.3	34.7	27.8	23.2	21.6	29.1	7,742	0.000
East and Southern Africa	Ethiopia 2011	34.4	34.8	32.1	28.6	24.1	21.0	27.9	11,654	0.000
East and Southern Africa	Kenya 2008-09	47.5	49.3	43.8	45.5	39.4	33.4	42.3	6,079	0.000
East and Southern Africa	Lesotho 2009	58.4	59.9	55.0	51.5	49.5	46.2	52.6	3,995	0.000
East and Southern Africa	Madagascar 2008-09	18.2	13.5	13.3	11.1	9.0	8.9	11.6	12,448	0.000
East and Southern Africa	Malawi 2010	47.2	47.8	49.3	43.7	40.2	35.7	43.4	19,967	0.000
East and Southern Africa	Namibia 2006-07	55.3	56.3	55.4	53.4	51.0	49.3	53.2	5,149	0.142
East and Southern Africa	Rwanda 2010	45.4	41.6	43.2	37.8	33.4	27.8	36.7	9,002	0.000
East and Southern Africa	Swaziland 2006-07	71.9	70.3	68.3	60.9	62.7	56.5	64.1	2,812	0.000
East and Southern Africa	Tanzania 2010	32.2	29.9	29.6	24.2	20.5	18.4	24.9	8,023	0.000
East and Southern Africa	Uganda 2011	51.8	52.8	46.8	39.9	37.0	37.9	42.9	7,878	0.000
East and Southern Africa	Zambia 2007	50.5	47.9	46.3	42.2	33.7	27.3	40.2	6,401	0.000
East and Southern Africa	Zimbabwe 2010	36.9	31.0	36.9	30.9	31.3	30.5	32.8	5,234	0.045
West and Central Africa	Benin 2006	24.5	22.7	19.4	15.7	12.9	9.7	16.5	16,075	0.000
West and Central Africa	Burkina Faso 2010	10.1	10.4	9.5	7.1	6.9	5.0	7.8	15,044	0.000
West and Central Africa	Congo (Brazzaville) 200	40.8	36.1	39.3	31.7	27.8	25.1	32.9	4,835	0.000
West and Central Africa	Congo Democratic Repu	36.9	35.1	33.7	25.3	24.6	22.7	28.6	8,992	0.000
West and Central Africa	Ghana 2008	42.2	46.0	41.6	36.7	31.1	29.8	36.8	2,992	0.000
West and Central Africa	Guinea 2005	18.0	19.2	15.3	13.8	11.0	7.7	13.5	6,336	0.000
West and Central Africa	Liberia 2007	33.7	34.9	31.4	27.5	25.2	23.8	28.5	5,799	0.000
West and Central Africa	Mali 2006	21.8	18.7	18.0	15.7	11.5	10.7	15.3	14,238	0.000
West and Central Africa	Niger 2006	12.9	12.8	10.4	9.6	7.3	7.2	9.5	9,193	0.000
West and Central Africa	Nigeria 2008	12.6	12.5	11.6	10.4	9.0	7.9	10.3	28,647	0.000
West and Central Africa	Sao Tome and Principe	46.8	54.0	53.4	50.7	45.3	43.5	48.7	1,931	0.263
West and Central Africa	Senegal 2010-11	33.1	28.6	30.1	23.0	18.4	18.0	24.2	12,326	0.000
West and Central Africa	Sierra Leone 2008	32.6	28.7	29.5	25.9	21.8	18.9	25.8	5,631	0.000
Middle East/North Africa	Egypt 2008	14.0	13.8	13.4	14.1	14.2	13.4	13.8	10,872	0.970
Middle East/North Africa	Jordan 2007	26.1	30.6	31.3	23.9	22.9	24.1	26.1	10,426	0.000
Eastern Europe/NIS	Albania 2008-09	14.4	13.7	14.1	14.5	13.7	9.2	12.9	1,616	0.404
Eastern Europe/NIS	Armenia 2010	5.0	6.9	9.6	7.8	6.7	8.9	7.8	1,473	0.776
Eastern Europe/NIS	Azerbaijan 2006	20.3	21.7	17.4	14.7	15.7	15.8	17.0	2,297	0.382
Eastern Europe/NIS	Ukraine 2007	12.2	14.5	15.7	11.9	17.8	9.3	13.7	1,221	0.170
South Asia	Bangladesh 2007	32.0	28.7	30.3	24.8	30.6	25.1	28.2	6,150	0.005
South Asia	India 2005-06	23.4	20.4	20.9	20.4	19.8	19.0	20.4	51,555	0.000
South Asia	Maldives 2009	22.9	22.9	24.8	29.5	29.0	29.0	26.7	3,817	0.077
South Asia	Nepal 2011	30.4	27.7	24.9	24.3	23.1	21.6	24.6	5,306	0.036
South Asia	Pakistan 2006-07	25.9	27.7	25.9	23.8	22.8	18.9	23.7	9,177	0.000
East Asia/Pacific	Cambodia 2010	15.0	18.9	13.9	16.6	15.0	13.9	15.3	8,232	0.062
East Asia/Pacific	Indonesia 2007	19.4	21.4	21.2	18.6	19.7	18.7	19.7	18,645	0.341
East Asia/Pacific	Philippines 2008	43.1	38.4	40.8	36.3	32.8	31.8	36.5	6,572	0.000
East Asia/Pacific	Timor-Leste 2009	16.1	16.5	15.5	14.9	12.9	10.6	14.0	9,806	0.000
Latin America and Caribbea	Bolivia 2008	63.7	61.5	62.1	60.9	59.0	58.6	60.7	8,605	0.217
Latin America and Caribbea	Colombia 2010	52.0	53.8	51.9	51.5	51.7	50.2	51.6	17,756	0.568
Latin America and Caribbea	Dominican Republic 20(	47.3	49.1	49.0	44.1	42.5	36.9	44.0	11,149	0.000
Latin America and Caribbea	Guyana 2009	41.1	42.4	39.2	37.7	37.7	34.8	38.4	2,178	0.692
Latin America and Caribbea	Haiti 2005-06	54.9	54.3	48.9	47.0	40.9	36.1	45.8	6,015	0.000
Latin America and Caribbea	Honduras 2005-06	50.9	50.7	49.9	47.7	50.8	48.8	49.6	10,800	0.463
Latin America and Caribbea	Peru 2004-08	57.6	61.8	58.8	59.4	53.4	51.3	56.5	17,189	0.000
Regional Averages	Number of surveys in region									
East and Southern Africa	13	45.2	44.0	42.7	38.3	35.0	31.9	38.6	8,183	0.014
West and Central Africa	13	28.2	27.7	26.4	22.5	19.4	17.7	23.0	10,157	0.020
Middle East/North Africa	2	20.1	22.2	22.4	19.0	18.6	18.8	20.0	10,649	0.485
Eastern Europe/NIS	4	13.0	14.2	14.2	12.2	13.5	10.8	12.9	1,652	0.433
South Asia	5	26.9	25.5	25.4	24.6	25.1	22.7	24.7	15,201	0.024
East Asia/Pacific	4	23.4	23.8	22.9	21.6	20.1	18.8	21.4	10,814	0.101
Latin America and Caribbea	7	52.5	53.4	51.4	49.8	48.0	45.2	49.5	10,527	0.277
Total	48	34.2	33.9	32.9	29.9	27.9	25.6	30.1	9,568	0.117

Appendix Table 2. Percentage of all births in the last 5 years that are unwanted by the Lightbourne measure of unwantedness, by age of the child at time of survey. Most recent DHS surveys in each country.

		Age of child (or time since birth, for children who have died)								
Region	Survey	<6 months	6-11 months	12-23 months	24-35 months	36-47 months	48-59 months	Total	Number of births	Pearson chi-squared p-value
East and Southern Africa	Burundi 2010	18.1	23.2	20.6	23.6	22.5	24.5	22.3	7,742	0.023
East and Southern Africa	Ethiopia 2011	17.7	17.0	16.7	17.9	16.6	16.1	16.9	11,654	0.880
East and Southern Africa	Kenya 2008-09	20.5	23.1	18.7	22.7	20.7	20.7	20.9	6,079	0.463
East and Southern Africa	Lesotho 2009	17.5	19.9	22.2	21.6	23.0	24.8	21.9	3,999	0.148
East and Southern Africa	Madagascar 2008-09	10.0	12.0	9.8	11.0	9.2	9.7	10.2	12,448	0.203
East and Southern Africa	Malawi 2010	14.6	14.7	15.3	14.7	13.4	13.1	14.3	19,967	0.207
East and Southern Africa	Namibia 2006-07	25.3	18.3	19.5	20.7	19.7	18.2	20.0	5,168	0.086
East and Southern Africa	Rwanda 2010	22.3	22.1	22.3	23.3	24.7	25.5	23.7	9,002	0.114
East and Southern Africa	Swaziland 2006-07	38.1	34.6	35.7	40.8	43.3	37.5	38.6	2,812	0.111
East and Southern Africa	Tanzania 2010	9.1	9.3	8.8	10.4	9.9	9.1	9.5	8,023	0.804
East and Southern Africa	Uganda 2011	17.6	18.9	20.1	17.9	19.3	20.2	19.1	7,879	0.504
East and Southern Africa	Zambia 2007	11.6	10.0	11.8	10.1	10.2	8.9	10.4	6,401	0.270
East and Southern Africa	Zimbabwe 2010	9.6	11.3	10.5	10.8	11.0	11.7	10.9	5,247	0.871
West and Central Africa	Benin 2006	11.8	12.5	12.9	11.1	11.8	11.8	12.0	16,075	0.410
West and Central Africa	Burkina Faso 2010	6.5	5.5	7.3	5.8	6.3	6.1	6.3	15,045	0.203
West and Central Africa	Congo (Brazzaville) 2005	6.7	3.8	5.2	5.7	4.9	3.4	5.0	4,835	0.217
West and Central Africa	Congo Democratic Republic 2007	8.5	5.5	8.8	9.0	6.0	9.0	8.0	8,994	0.057
West and Central Africa	Ghana 2008	14.1	9.8	12.3	11.3	13.1	11.9	12.1	2,992	0.658
West and Central Africa	Guinea 2005	7.9	8.9	8.6	7.2	10.1	6.6	8.1	6,364	0.085
West and Central Africa	Liberia 2007	9.4	7.6	9.5	8.2	12.6	7.9	9.4	5,799	0.004
West and Central Africa	Mali 2006	5.8	6.9	7.3	5.7	6.7	6.1	6.4	14,238	0.243
West and Central Africa	Niger 2006	1.2	1.8	1.7	2.0	1.3	2.0	1.7	9,193	0.434
West and Central Africa	Nigeria 2008	5.8	5.3	4.9	5.0	5.3	4.9	5.1	28,653	0.456
West and Central Africa	Sao Tome and Principe 2008-09	34.4	28.9	29.0	21.6	26.4	22.9	26.5	1,931	0.208
West and Central Africa	Senegal 2010-11	10.7	9.1	10.8	10.7	9.0	10.8	10.2	12,337	0.353
West and Central Africa	Sierra Leone 2008	7.8	10.9	8.1	7.1	7.8	8.2	8.2	5,631	0.207
Middle East/North Africa	Egypt 2008	16.2	17.7	17.3	18.2	18.0	17.5	17.6	10,872	0.826
Middle East/North Africa	Jordan 2007	16.4	24.3	18.9	20.7	20.2	19.1	19.8	10,426	0.057
Eastern Europe/NIS	Albania 2008-09	16.4	13.4	13.7	15.5	16.4	15.6	15.3	1,616	0.958
Eastern Europe/NIS	Armenia 2010	10.0	3.4	5.6	4.7	3.1	3.7	4.8	1,473	0.326
Eastern Europe/NIS	Azerbaijan 2006	9.8	9.1	8.9	9.2	10.4	10.8	9.7	2,297	0.950
Eastern Europe/NIS	Ukraine 2007	4.2	6.0	7.7	6.1	5.8	4.6	5.9	1,221	0.748
South Asia	Bangladesh 2007	22.2	22.8	25.6	28.0	32.2	31.1	28.0	6,150	0.000
South Asia	India 2005-06	26.0	24.6	25.4	27.9	27.8	28.4	27.0	51,555	0.000
South Asia	Maldives 2009	8.4	10.7	9.6	10.3	11.5	11.6	10.4	3,817	0.639
South Asia	Nepal 2011	24.6	26.6	26.1	31.1	29.4	28.3	28.1	5,306	0.178
South Asia	Pakistan 2006-07	17.6	20.4	20.9	18.9	21.5	20.3	20.1	9,177	0.202
East Asia/Pacific	Cambodia 2010	9.1	11.0	10.6	13.3	11.9	12.6	11.7	8,232	0.124
East Asia/Pacific	Indonesia 2007	14.7	14.2	14.2	14.4	13.3	13.1	13.9	18,645	0.824
East Asia/Pacific	Philippines 2008	24.8	26.0	26.0	24.3	27.2	25.4	25.7	6,572	0.666
East Asia/Pacific	Timor-Leste 2009	9.9	7.2	8.7	8.1	7.2	7.5	8.0	9,806	0.156
Latin America and Caribbean	Bolivia 2008	39.5	40.3	39.3	37.8	40.4	41.6	39.8	8,605	0.526
Latin America and Caribbean	Colombia 2010	23.8	23.5	23.3	24.7	27.2	24.3	24.7	17,756	0.054
Latin America and Caribbean	Dominican Republic 2007	19.0	20.9	19.5	19.4	20.3	20.8	20.0	11,149	0.928
Latin America and Caribbean	Guyana 2009	19.0	19.4	26.2	20.7	26.0	22.6	22.7	2,178	0.323
Latin America and Caribbean	Haiti 2005-06	25.6	32.1	30.6	37.3	30.8	36.1	32.6	6,015	0.000
Latin America and Caribbean	Honduras 2005-06	25.3	21.7	25.3	25.4	26.9	26.4	25.5	10,800	0.102
Latin America and Caribbean	Peru 2004-08	29.0	30.7	32.1	34.7	32.4	34.0	32.6	17,189	0.022

Regional Averages	Number of surveys in region								
East and Southern Africa	13	17.8	18.0	17.8	18.9	18.7	18.5	18.4	8,186	0.360
West and Central Africa	13	10.0	9.0	9.7	8.5	9.3	8.6	9.2	10,161	0.272
Middle East/North Africa	2	16.3	21.0	18.1	19.5	19.1	18.3	18.7	10,649	0.442
Eastern Europe/NIS	4	10.1	8.0	9.0	8.9	8.9	8.7	8.9	1,652	0.746
South Asia	5	19.8	21.0	21.5	23.2	24.5	23.9	22.7	15,201	0.204
East Asia/Pacific	4	14.6	14.6	14.9	15.0	14.9	14.7	14.8	10,814	0.443
Latin America and Caribbean	7	25.9	26.9	28.0	28.6	29.1	29.4	28.3	10,527	0.279
Total	48	16.1	16.2	16.5	16.8	17.2	16.8	16.7	9,570	0.351

Appendix Table 3: Percentage of all births in the last 5 years that are unintended (mistimed or unwanted), by birth order. Most recent DHS surveys in each country.

Region	Survey	Birth order 1	2 to 3	4 to 5	6+	Total	Number of births	Pearson chi-squared p-value
East and Southern Africa	Burundi 2010	8.1	31.7	33.2	40.0	29.1	7,742	0.000
East and Southern Africa	Ethiopia 2011	22.4	26.3	28.9	32.9	27.9	11,654	0.000
East and Southern Africa	Kenya 2008-09	38.2	36.5	44.5	56.6	42.3	6,079	0.000
East and Southern Africa	Lesotho 2009	46.7	51.5	59.4	75.5	52.6	3,995	0.000
East and Southern Africa	Madagascar 2008-09	10.8	8.3	11.3	18.1	11.6	12,448	0.000
East and Southern Africa	Malawi 2010	30.4	38.1	48.0	61.9	43.4	19,967	0.000
East and Southern Africa	Namibia 2006-07	58.8	49.3	49.6	56.8	53.2	5,149	0.000
East and Southern Africa	Rwanda 2010	19.7	36.1	40.1	55.8	36.7	9,002	0.000
East and Southern Africa	Swaziland 2006-07	67.7	57.2	62.7	76.8	64.1	2,812	0.000
East and Southern Africa	Tanzania 2010	19.7	22.8	25.9	32.4	24.9	8,023	0.000
East and Southern Africa	Uganda 2011	35.6	34.8	43.4	55.8	42.9	7,878	0.000
East and Southern Africa	Zambia 2007	39.1	34.9	40.0	49.6	40.2	6,401	0.000
East and Southern Africa	Zimbabwe 2010	27.8	29.8	38.6	52.9	32.8	5,234	0.000
West and Central Africa	Benin 2006	17.4	14.2	16.0	20.0	16.5	16,075	0.000
West and Central Africa	Burkina Faso 2010	8.0	6.5	7.2	10.0	7.8	15,044	0.000
West and Central Africa	Congo (Brazzaville) 2005	40.0	30.7	28.2	32.5	32.9	4,835	0.000
West and Central Africa	Congo Democratic Republic 2007	29.7	24.9	28.4	32.4	28.6	8,992	0.001
West and Central Africa	Ghana 2008	41.8	29.5	39.1	43.8	36.8	2,992	0.000
West and Central Africa	Guinea 2005	16.8	7.4	11.5	20.0	13.5	6,336	0.000
West and Central Africa	Liberia 2007	30.3	25.4	25.1	35.0	28.5	5,799	0.000
West and Central Africa	Mali 2006	14.0	13.7	13.2	19.6	15.3	14,238	0.000
West and Central Africa	Niger 2006	4.6	10.4	10.2	10.6	9.5	9,193	0.000
West and Central Africa	Nigeria 2008	12.9	8.5	9.4	11.7	10.3	28,647	0.000
West and Central Africa	Sao Tome and Principe 2008-09	43.8	44.0	50.7	65.4	48.7	1,931	0.000
West and Central Africa	Senegal 2010-11	15.0	22.7	25.1	35.9	24.2	12,326	0.000
West and Central Africa	Sierra Leone 2008	26.1	19.0	25.0	39.8	25.8	5,631	0.000
Middle East/North Africa	Egypt 2008	1.4	11.9	32.6	50.7	13.8	10,872	0.000
Middle East/North Africa	Jordan 2007	6.8	26.6	30.2	45.6	26.1	10,426	0.000
Eastern Europe/NIS	Albania 2008-09	4.9	14.5	25.7	38.9	12.9	1,616	0.000
Eastern Europe/NIS	Armenia 2010	0.2	14.3	23.5	0.0	7.8	1,473	0.000
Eastern Europe/NIS	Azerbaijan 2006	7.4	24.5	24.5	24.7	17.0	2,297	0.000
Eastern Europe/NIS	Ukraine 2007	12.0	14.8	22.7	38.7	13.7	1,221	0.043
South Asia	Bangladesh 2007	14.3	28.6	42.9	57.4	28.2	6,150	0.000
South Asia	India 2005-06	9.0	19.2	29.5	45.8	20.4	51,555	0.000
South Asia	Maldives 2009	11.6	27.5	51.3	68.6	26.7	3,817	0.000
South Asia	Nepal 2011	15.2	21.5	38.4	57.7	24.6	5,306	0.000
South Asia	Pakistan 2006-07	4.9	19.2	28.8	43.2	23.7	9,177	0.000
East Asia/Pacific	Cambodia 2010	6.0	13.9	25.9	40.7	15.3	8,232	0.000
East Asia/Pacific	Indonesia 2007	5.9	21.9	36.9	49.2	19.7	18,645	0.000
East Asia/Pacific	Philippines 2008	21.7	37.3	46.1	54.0	36.5	6,572	0.000
East Asia/Pacific	Timor-Leste 2009	6.9	16.6	15.0	14.8	14.0	9,806	0.000
Latin America and Caribbean	Bolivia 2008	46.8	54.2	73.3	86.4	60.7	8,605	0.000
Latin America and Caribbean	Colombia 2010	47.0	49.9	66.9	77.7	51.6	17,756	0.000
Latin America and Caribbean	Dominican Republic 2007	33.9	45.1	54.5	71.4	44.0	11,149	0.000
Latin America and Caribbean	Guyana 2009	31.4	34.2	49.3	63.1	38.4	2,178	0.000
Latin America and Caribbean	Haiti 2005-06	34.7	36.9	50.8	68.8	45.8	6,015	0.000
Latin America and Caribbean	Honduras 2005-06	36.3	48.8	56.8	69.4	49.6	10,800	0.000
Latin America and Caribbean	Peru 2004-08	47.4	51.3	71.8	82.8	56.5	17,189	0.000

Regional Averages	Number of surveys in region						
East and Southern Africa	13	32.7	35.2	40.4	51.2	38.6	8,183	0.000
West and Central Africa	13	23.1	19.8	22.2	29.0	23.0	10,157	0.000
Middle East/North Africa	2	4.1	19.3	31.4	48.2	20.0	10,649	0.000
Eastern Europe/NIS	4	6.1	17.0	24.1	25.6	12.9	1,652	0.011
South Asia	5	11.0	23.2	38.2	54.5	24.7	15,201	0.000
East Asia/Pacific	4	10.1	22.4	31.0	39.7	21.4	10,814	0.000
Latin America and Caribbean	7	39.6	45.8	60.5	74.2	49.5	10,527	0.000
Total	48	23.6	28.1	35.7	45.7	30.1	9,568	0.001

Appendix Table 4: Percentage of births in the last five years during which ANC was sought by planning status of the birth, Lightborne unwantedness measure

		wanted	unwanted	Total	N	P-value	Expected direction (100= unwanted lower)	Result is statistically significant and unwanted lower = 100
East and Southern Africa	Burundi 2010	98.9	98.8	98.9	4,916	0.707	100	0
East and Southern Africa	Ethiopia 2011	43.5	39.9	42.9	7,764	0.111	100	0
East and Southern Africa	Kenya 2008-09	93.0	91.0	92.6	4,082	0.143	100	0
East and Southern Africa	Lesotho 2009	93.8	86.3	92.1	3,139	0.000	100	100
East and Southern Africa	Madagascar 2008-09	90.5	93.1	90.8	8,569	0.026	0	0
East and Southern Africa	Malawi 2010	98.4	97.6	98.3	13,776	0.035	100	100
East and Southern Africa	Namibia 2006-07	96.5	94.7	96.2	3,993	0.032	100	100
East and Southern Africa	Rwanda 2010	98.4	97.7	98.2	6,328	0.143	100	0
East and Southern Africa	Swaziland 2006-07	98.2	95.9	97.3	2,136	0.003	100	100
East and Southern Africa	Tanzania 2010	98.0	97.3	97.9	5,358	0.350	100	0
East and Southern Africa	Uganda 2011	96.0	94.7	95.7	4,909	0.116	100	0
East and Southern Africa	Zambia 2007	97.7	98.2	97.8	4,148	0.452	0	0
East and Southern Africa	Zimbabwe 2010	95.2	93.1	95.0	4,064	0.056	100	0
West and Central Africa	Benin 2006	88.2	91.2	88.6	10,602	0.006	0	0
West and Central Africa	Burkina Faso 2010	95.2	94.2	95.1	10,364	0.282	100	0
West and Central Africa	Congo (Brazzaville) 2005	88.6	84.0	88.3	3,540	0.141	100	0
West and Central Africa	Congo Democratic Republic 2007	86.8	89.2	87.0	5,483	0.415	0	0
West and Central Africa	Ghana 2008	96.2	96.5	96.3	2,147	0.837	0	0
West and Central Africa	Guinea 2005	83.5	83.5	83.5	4,449	0.992	0	0
West and Central Africa	Liberia 2007	95.8	92.9	95.5	3,996	0.114	100	0
West and Central Africa	Mali 2006	71.3	68.7	71.1	9,036	0.284	100	0
West and Central Africa	Niger 2006	46.9	51.3	47.0	5,884	0.490	0	0
West and Central Africa	Nigeria 2008	62.9	61.8	62.8	18,028	0.668	100	0
West and Central Africa	Sao Tome and Principe 2008-09	97.9	96.8	97.6	1,445	0.360	100	0
West and Central Africa	Senegal 2010-11	95.9	95.8	95.9	8,147	0.823	100	0
West and Central Africa	Sierra Leone 2008	91.7	88.8	91.4	3,980	0.143	100	0
Middle East/North Africa	Egypt 2008	75.2	66.2	73.6	10,872	0.000	100	100
Middle East/North Africa	Jordan 2007	99.0	98.0	98.8	6,725	0.042	100	100
Eastern Europe/NIS	Albania 2008-09	97.8	95.0	97.4	1,341	0.036	100	100
Eastern Europe/NIS	Armenia 2010	99.1	98.8	99.1	1,163	0.752	100	0
Eastern Europe/NIS	Azerbaijan 2006	79.2	64.7	77.4	1,698	0.000	100	100
Eastern Europe/NIS	Ukraine 2007	98.5	97.9	98.5	1,097	0.650	100	0
South Asia	Bangladesh 2007	65.0	48.8	60.3	4,926	0.000	100	100
South Asia	India 2005-06	81.9	66.1	77.2	36,850	0.000	100	100
South Asia	Maldives 2009	99.3	98.8	99.2	3,263	0.436	100	0
South Asia	Nepal 2011	89.7	73.7	84.8	4,079	0.000	100	100
South Asia	Pakistan 2006-07	65.8	61.1	64.7	5,724	0.012	100	100
East Asia/Pacific	Cambodia 2010	91.1	79.7	89.7	6,448	0.000	100	100
East Asia/Pacific	Indonesia 2007	95.8	94.8	95.7	15,334	0.167	100	0
East Asia/Pacific	Philippines 2008	97.1	93.3	96.1	4,712	0.000	100	100
East Asia/Pacific	Timor-Leste 2009	87.7	85.8	87.5	5,999	0.264	100	0
Latin America and Caribbean	Bolivia 2008	92.9	86.5	90.4	6,429	0.000	100	100
Latin America and Caribbean	Colombia 2010	98.0	94.0	97.0	14,521	0.000	100	100
Latin America and Caribbean	Dominican Republic 2007	98.0	97.0	97.8	8,499	0.093	100	0
Latin America and Caribbean	Guyana 2009	97.3	94.7	96.7	1,583	0.018	100	100
Latin America and Caribbean	Haiti 2005-06	88.7	80.4	86.0	4,237	0.000	100	100
Latin America and Caribbean	Honduras 2005-06	93.3	88.0	91.9	8,082	0.000	100	100
Latin America and Caribbean	Peru 2004-08	97.2	95.0	96.5	13,866	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	92.2	90.6	91.8	5,629	0.167	84.6	30.8
West and Central Africa		13	84.7	84.2	84.6	6,700	0.427	61.5	0.0
Middle East/North Africa		2	87.1	82.1	86.2	8,799	0.021	100.0	100.0
Eastern Europe/NIS		4	93.7	89.1	93.1	1,325	0.360	100.0	50.0
South Asia		5	80.3	69.7	77.2	10,968	0.090	100.0	80.0
East Asia/Pacific		4	92.9	88.4	92.3	8,123	0.108	100.0	50.0
Latin America and Caribbean		7	95.1	90.8	93.8	8,174	0.016	100.0	85.7
Tercile <89.3		16	75.3	69.8	73.9	8,698	0.211	75.0	43.8
Tercile 89.3-96.4		16	94.4	91.5	93.8	6,150	0.171	87.5	37.5
Tercile >96.367		16	98.2	97.0	97.9	5,635	0.255	93.8	43.8
Total		48	89.3	86.1	88.5	6,828	0.212	85.4	41.7

Appendix Table 5: Percentage of births in the last five years during which ANC was sought by planning status of the birth, retrospective measure (intended vs. unintended)

		intended	unintended	Total	N	P-value	Expected direction (100= unintended lower)	Result is statistically significant and unintended lower = 100
East and Southern Africa	Burundi 2010	99.3	98.1	98.9	4,916	0.000	100	100
East and Southern Africa	Ethiopia 2011	43.0	42.7	42.9	7,764	0.870	100	0
East and Southern Africa	Kenya 2008-09	93.6	91.4	92.6	4,082	0.037	100	100
East and Southern Africa	Lesotho 2009	96.3	88.8	92.1	3,139	0.000	100	100
East and Southern Africa	Madagascar 2008-09	91.1	89.0	90.8	8,569	0.056	100	0
East and Southern Africa	Malawi 2010	98.7	97.9	98.3	13,776	0.006	100	100
East and Southern Africa	Namibia 2006-07	96.0	96.2	96.2	3,991	0.808	0	0
East and Southern Africa	Rwanda 2010	98.8	97.3	98.2	6,328	0.000	100	100
East and Southern Africa	Swaziland 2006-07	98.3	96.8	97.3	2,136	0.059	100	0
East and Southern Africa	Tanzania 2010	97.6	98.7	97.9	5,358	0.074	0	0
East and Southern Africa	Uganda 2011	97.0	94.3	95.7	4,909	0.001	100	100
East and Southern Africa	Zambia 2007	97.8	97.7	97.8	4,148	0.781	100	0
East and Southern Africa	Zimbabwe 2010	96.1	92.8	95.0	4,060	0.000	100	100
West and Central Africa	Benin 2006	87.0	95.4	88.6	10,602	0.000	0	0
West and Central Africa	Burkina Faso 2010	95.0	96.5	95.1	10,364	0.069	0	0
West and Central Africa	Congo (Brazzaville) 2005	89.6	86.2	88.3	3,540	0.049	100	100
West and Central Africa	Congo Democratic Republic 2007	86.3	88.3	87.0	5,483	0.136	0	0
West and Central Africa	Ghana 2008	96.3	96.1	96.3	2,147	0.782	100	0
West and Central Africa	Guinea 2005	82.9	86.6	83.5	4,444	0.035	0	0
West and Central Africa	Liberia 2007	94.8	96.8	95.5	3,996	0.013	0	0
West and Central Africa	Mali 2006	70.2	75.5	71.1	9,036	0.008	0	0
West and Central Africa	Niger 2006	45.0	64.6	47.0	5,884	0.000	0	0
West and Central Africa	Nigeria 2008	61.4	73.3	62.8	18,028	0.000	0	0
West and Central Africa	Sao Tome and Principe 2008-09	97.4	97.8	97.6	1,445	0.716	0	0
West and Central Africa	Senegal 2010-11	95.8	96.3	95.9	8,147	0.352	0	0
West and Central Africa	Sierra Leone 2008	90.2	94.5	91.4	3,980	0.000	0	0
Middle East/North Africa	Egypt 2008	75.1	64.1	73.6	10,872	0.000	100	100
Middle East/North Africa	Jordan 2007	99.4	97.4	98.8	6,725	0.000	100	100
Eastern Europe/NIS	Albania 2008-09	97.7	94.9	97.4	1,341	0.038	100	100
Eastern Europe/NIS	Armenia 2010	99.0	99.7	99.1	1,163	0.202	0	0
Eastern Europe/NIS	Azerbaijan 2006	79.4	69.1	77.4	1,698	0.002	100	100
Eastern Europe/NIS	Ukraine 2007	98.4	99.0	98.5	1,097	0.436	0	0
South Asia	Bangladesh 2007	62.1	56.2	60.3	4,926	0.004	100	100
South Asia	India 2005-06	78.8	71.3	77.2	36,850	0.000	100	100
South Asia	Maldives 2009	99.2	99.2	99.2	3,263	0.976	0	0
South Asia	Nepal 2011	86.9	79.3	84.8	4,079	0.000	100	100
South Asia	Pakistan 2006-07	63.3	68.5	64.7	5,724	0.002	0	0
East Asia/Pacific	Cambodia 2010	91.2	81.9	89.7	6,448	0.000	100	100
East Asia/Pacific	Indonesia 2007	96.2	93.6	95.7	15,334	0.000	100	100
East Asia/Pacific	Philippines 2008	96.8	95.0	96.1	4,712	0.002	100	100
East Asia/Pacific	Timor-Leste 2009	86.6	92.3	87.5	5,999	0.000	0	0
Latin America and Caribbean	Bolivia 2008	94.6	87.7	90.4	6,429	0.000	100	100
Latin America and Caribbean	Colombia 2010	98.4	95.7	97.0	14,521	0.000	100	100
Latin America and Caribbean	Dominican Republic 2007	97.3	98.3	97.8	8,499	0.009	0	0
Latin America and Caribbean	Guyana 2009	96.7	96.6	96.7	1,583	0.936	100	0
Latin America and Caribbean	Haiti 2005-06	87.3	84.8	86.0	4,237	0.042	100	100
Latin America and Caribbean	Honduras 2005-06	94.7	89.3	91.9	8,082	0.000	100	100
Latin America and Caribbean	Peru 2004-08	97.6	95.7	96.5	13,866	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	92.6	90.9	91.8	5,629	0.207	84.6	53.8
West and Central Africa		13	84.0	88.3	84.6	6,700	0.166	15.4	7.7
Middle East/North Africa		2	87.3	80.8	86.2	8,799	0.000	100.0	100.0
Eastern Europe/NIS		4	93.6	90.7	93.1	1,325	0.170	50.0	50.0
South Asia		5	78.1	74.9	77.2	10,968	0.196	60.0	60.0
East Asia/Pacific		4	92.7	90.7	92.3	8,123	0.001	75.0	75.0
Latin America and Caribbean		7	95.2	92.6	93.8	8,174	0.141	85.7	71.4
Tercile <89.3		16	74.1	74.9	73.9	8,698	0.072	50.0	43.8
Tercile 89.3-96.4		16	94.7	92.5	93.8	6,149	0.133	68.8	56.3
Tercile >96.367		16	98.2	97.6	97.9	5,635	0.265	62.5	43.8
Total		48	89.0	88.3	88.5	6,828	0.156	60.4	47.9

Appendix Table 6: Percentage of births in the last five years during which ANC was sought by planning status of the birth, retrospective measure (wanted vs. unwanted)

		wanted	unwanted	Total	N	P-value	Expected direction (100= unwanted lower)	Result is statistically significant and unwanted lower = 100
East and Southern Africa	Burundi 2010	99.1	96.8	98.9	4,916	0.003	100	100
East and Southern Africa	Ethiopia 2011	43.2	40.2	42.9	7,764	0.250	100	0
East and Southern Africa	Kenya 2008-09	93.7	88.3	92.6	4,082	0.000	100	100
East and Southern Africa	Lesotho 2009	94.5	84.6	92.1	3,139	0.000	100	100
East and Southern Africa	Madagascar 2008-09	90.9	89.9	90.8	8,569	0.518	100	0
East and Southern Africa	Malawi 2010	98.7	97.3	98.3	13,776	0.000	100	100
East and Southern Africa	Namibia 2006-07	96.5	95.2	96.2	3,991	0.144	100	0
East and Southern Africa	Rwanda 2010	98.4	97.0	98.2	6,328	0.007	100	100
East and Southern Africa	Swaziland 2006-07	98.2	95.9	97.3	2,136	0.006	100	100
East and Southern Africa	Tanzania 2010	97.9	97.9	97.9	5,358	0.974	0	0
East and Southern Africa	Uganda 2011	96.3	92.0	95.7	4,909	0.000	100	100
East and Southern Africa	Zambia 2007	97.8	97.6	97.8	4,148	0.771	100	0
East and Southern Africa	Zimbabwe 2010	95.3	92.9	95.0	4,060	0.031	100	100
West and Central Africa	Benin 2006	88.4	94.0	88.6	10,602	0.002	0	0
West and Central Africa	Burkina Faso 2010	95.1	93.7	95.1	10,364	0.409	100	0
West and Central Africa	Congo (Brazzaville) 2005	88.5	86.0	88.3	3,540	0.326	100	0
West and Central Africa	Congo Democratic Republic 2007	86.9	87.6	87.0	5,483	0.709	0	0
West and Central Africa	Ghana 2008	96.4	95.8	96.3	2,147	0.588	100	0
West and Central Africa	Guinea 2005	83.5	82.0	83.5	4,444	0.656	100	0
West and Central Africa	Liberia 2007	95.6	93.3	95.5	3,996	0.150	100	0
West and Central Africa	Mali 2006	71.0	75.0	71.1	9,036	0.271	0	0
West and Central Africa	Niger 2006	46.9	65.5	47.0	5,884	0.017	0	0
West and Central Africa	Nigeria 2008	62.2	73.5	62.8	18,028	0.000	0	0
West and Central Africa	Sao Tome and Principe 2008-09	97.5	98.1	97.6	1,445	0.723	0	0
West and Central Africa	Senegal 2010-11	95.9	95.9	95.9	8,147	0.964	0	0
West and Central Africa	Sierra Leone 2008	91.1	94.1	91.4	3,980	0.039	0	0
Middle East/North Africa	Egypt 2008	74.7	62.4	73.6	10,872	0.000	100	100
Middle East/North Africa	Jordan 2007	99.2	96.2	98.8	6,725	0.000	100	100
Eastern Europe/NIS	Albania 2008-09	97.7	90.5	97.4	1,341	0.002	100	100
Eastern Europe/NIS	Armenia 2010	99.1	100.0	99.1	1,163	0.722	0	0
Eastern Europe/NIS	Azerbaijan 2006	79.6	57.8	77.4	1,698	0.000	100	100
Eastern Europe/NIS	Ukraine 2007	98.4	98.7	98.5	1,097	0.829	0	0
South Asia	Bangladesh 2007	62.6	47.6	60.3	4,926	0.000	100	100
South Asia	India 2005-06	79.3	61.8	77.2	36,850	0.000	100	100
South Asia	Maldives 2009	99.3	98.9	99.2	3,263	0.257	100	0
South Asia	Nepal 2011	87.4	70.6	84.8	4,079	0.000	100	100
South Asia	Pakistan 2006-07	64.6	65.0	64.7	5,724	0.886	0	0
East Asia/Pacific	Cambodia 2010	90.9	78.2	89.7	6,448	0.000	100	100
East Asia/Pacific	Indonesia 2007	96.1	90.9	95.7	15,334	0.000	100	100
East Asia/Pacific	Philippines 2008	96.6	93.9	96.1	4,712	0.000	100	100
East Asia/Pacific	Timor-Leste 2009	87.4	90.2	87.5	5,999	0.231	0	0
Latin America and Caribbean	Bolivia 2008	93.2	85.4	90.4	6,429	0.000	100	100
Latin America and Caribbean	Colombia 2010	98.2	93.3	97.0	14,521	0.000	100	100
Latin America and Caribbean	Dominican Republic 2007	97.7	98.3	97.8	8,499	0.264	0	0
Latin America and Caribbean	Guyana 2009	97.0	95.0	96.7	1,583	0.091	100	0
Latin America and Caribbean	Haiti 2005-06	87.9	81.7	86.0	4,237	0.000	100	100
Latin America and Caribbean	Honduras 2005-06	93.8	86.7	91.9	8,082	0.000	100	100
Latin America and Caribbean	Peru 2004-08	97.2	94.5	96.5	13,866	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	92.3	89.7	91.8	5,629	0.208	92.3	61.5
West and Central Africa		13	84.5	87.3	84.6	6,700	0.373	38.5	0.0
Middle East/North Africa		2	87.0	79.3	86.2	8,799	0.000	100.0	100.0
Eastern Europe/NIS		4	93.7	86.8	93.1	1,325	0.388	50.0	50.0
South Asia		5	78.6	68.8	77.2	10,968	0.229	80.0	60.0
East Asia/Pacific		4	92.8	88.3	92.3	8,123	0.058	75.0	75.0
Latin America and Caribbean		7	95.0	90.7	93.8	8,174	0.051	85.7	71.4
Tercile <89.3		16	74.6	71.3	73.9	8,698	0.209	56.3	37.5
Tercile 89.3-96.4		16	94.5	90.7	93.8	6,149	0.178	87.5	56.3
Tercile >96.367		16	98.2	96.6	97.9	5,635	0.291	68.8	50.0
Total		48	89.1	86.2	88.5	6,828	0.226	70.8	47.9

Appendix Table 7: Percentage of births in the last five years that were delivered in a health facility by planning status of the birth, Lightborne unwantedness measure

		wanted	unwanted	Total	N	P-value	Expected direction (100= unwanted lower)	Result is statistically significant and unwanted lower = 100
East and Southern Africa	Burundi 2010	61.4	52.5	59.5	7,742	0.000	100	100
East and Southern Africa	Ethiopia 2011	10.4	7.5	9.9	11,654	0.043	100	100
East and Southern Africa	Kenya 2008-09	44.4	35.9	42.6	6,079	0.002	100	100
East and Southern Africa	Lesotho 2009	62.3	45.6	58.7	3,999	0.000	100	100
East and Southern Africa	Madagascar 2008-09	35.0	38.1	35.3	12,448	0.127	0	0
East and Southern Africa	Malawi 2010	73.8	69.1	73.2	19,967	0.000	100	100
East and Southern Africa	Namibia 2006-07	81.7	77.3	80.8	5,168	0.017	100	100
East and Southern Africa	Rwanda 2010	72.7	56.6	68.9	9,002	0.000	100	100
East and Southern Africa	Swaziland 2006-07	78.5	67.2	74.1	2,812	0.000	100	100
East and Southern Africa	Tanzania 2010	51.0	41.7	50.2	8,023	0.000	100	100
East and Southern Africa	Uganda 2011	58.5	52.4	57.4	7,879	0.002	100	100
East and Southern Africa	Zambia 2007	48.0	44.7	47.7	6,401	0.206	100	0
East and Southern Africa	Zimbabwe 2010	68.5	62.5	67.9	5,247	0.008	100	100
West and Central Africa	Benin 2006	77.6	81.8	78.1	16,075	0.004	0	0
West and Central Africa	Burkina Faso 2010	66.1	69.1	66.3	15,045	0.168	0	0
West and Central Africa	Congo (Brazzaville) 2005	82.6	75.2	82.2	4,835	0.155	100	0
West and Central Africa	Congo Democratic Republic 2007	70.0	71.3	70.1	8,994	0.707	0	0
West and Central Africa	Ghana 2008	56.7	60.0	57.1	2,992	0.335	0	0
West and Central Africa	Guinea 2005	30.7	31.5	30.8	6,364	0.754	0	0
West and Central Africa	Liberia 2007	37.1	35.0	36.9	5,799	0.625	100	0
West and Central Africa	Mali 2006	45.2	44.5	45.1	14,238	0.807	100	0
West and Central Africa	Niger 2006	17.0	29.4	17.2	9,193	0.004	0	0
West and Central Africa	Nigeria 2008	35.0	34.6	35.0	28,653	0.837	100	0
West and Central Africa	Sao Tome and Principe 2008-09	81.3	71.8	78.8	1,931	0.002	100	100
West and Central Africa	Senegal 2010-11	72.8	71.8	72.7	12,337	0.619	100	0
West and Central Africa	Sierra Leone 2008	25.0	20.5	24.6	5,631	0.073	100	0
Middle East/North Africa	Egypt 2008	73.5	63.3	71.7	10,872	0.000	100	100
Middle East/North Africa	Jordan 2007	98.7	98.6	98.6	10,426	0.949	100	0
Eastern Europe/NIS	Albania 2008-09	96.9	95.6	96.7	1,616	0.434	100	0
Eastern Europe/NIS	Armenia 2010	99.3	100.0	99.4	1,473	0.595	0	0
Eastern Europe/NIS	Azerbaijan 2006	78.7	68.0	77.7	2,297	0.002	100	100
Eastern Europe/NIS	Ukraine 2007	99.1	97.4	99.0	1,221	0.193	100	0
South Asia	Bangladesh 2007	17.5	7.4	14.6	6,150	0.000	100	100
South Asia	India 2005-06	43.6	25.4	38.7	51,555	0.000	100	100
South Asia	Maldives 2009	95.5	91.9	95.1	3,817	0.003	100	100
South Asia	Nepal 2011	40.6	21.8	35.3	5,306	0.000	100	100
South Asia	Pakistan 2006-07	35.4	29.6	34.3	9,177	0.000	100	100
East Asia/Pacific	Cambodia 2010	55.1	43.8	53.8	8,232	0.000	100	100
East Asia/Pacific	Indonesia 2007	46.6	46.3	46.6	18,645	0.890	100	0
East Asia/Pacific	Philippines 2008	48.9	30.6	44.2	6,572	0.000	100	100
East Asia/Pacific	Timor-Leste 2009	21.9	24.0	22.1	9,806	0.359	0	0
Latin America and Caribbean	Bolivia 2008	75.3	55.7	67.5	8,605	0.000	100	100
Latin America and Caribbean	Colombia 2010	80.7	77.4	79.9	17,756	0.000	100	100
Latin America and Caribbean	Dominican Republic 2007	97.6	96.8	97.5	11,149	0.100	100	0
Latin America and Caribbean	Guyana 2009	90.0	85.6	89.0	2,178	0.013	100	100
Latin America and Caribbean	Haiti 2005-06	29.8	14.1	24.7	6,015	0.000	100	100
Latin America and Caribbean	Honduras 2005-06	69.3	58.3	66.5	10,800	0.000	100	100
Latin America and Caribbean	Peru 2004-08	65.8	53.9	61.9	17,189	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	57.4	50.1	55.9	8,186	0.031	92.3	84.6
West and Central Africa		13	53.6	53.6	53.5	10,161	0.392	53.8	7.7
Middle East/North Africa		2	86.1	81.0	85.2	10,649	0.475	100.0	50.0
Eastern Europe/NIS		4	93.5	90.3	93.2	1,652	0.306	75.0	25.0
South Asia		5	46.5	35.2	43.6	15,201	0.001	100.0	100.0
East Asia/Pacific		4	43.1	36.2	41.7	10,814	0.312	75.0	50.0
Latin America and Caribbean		7	72.6	63.1	69.6	10,527	0.016	100.0	85.7
Tercile <46.1		16	32.3	26.9	30.7	12,165	0.227	75.0	50.0
Tercile 46.1-72		16	62.6	54.9	60.7	9,354	0.145	81.3	68.8
Tercile >72		16	86.6	82.8	85.8	7,191	0.193	87.5	50.0
Total		48	60.5	54.9	59.1	9,570	0.188	81.3	56.3

Appendix Table 8: Percentage of births in the last five years that were delivered in a health facility by planning status of the birth, retrospective measure (intended vs. unintended)

		intended	unintended	Total	N	P-value	Expected direction (100= unintended lower)	Result is statistically significant and unintended lower = 100
East and Southern Africa	Burundi 2010	59.8	58.7	59.5	7,742	0.441	100	0
East and Southern Africa	Ethiopia 2011	9.9	10.2	9.9	11,654	0.726	0	0
East and Southern Africa	Kenya 2008-09	45.8	38.2	42.6	6,079	0.000	100	100
East and Southern Africa	Lesotho 2009	63.8	54.1	58.7	3,995	0.000	100	100
East and Southern Africa	Madagascar 2008-09	35.3	35.3	35.3	12,448	0.987	0	0
East and Southern Africa	Malawi 2010	74.0	72.0	73.2	19,967	0.043	100	100
East and Southern Africa	Namibia 2006-07	81.3	80.8	81.0	5,149	0.684	100	0
East and Southern Africa	Rwanda 2010	71.0	65.2	68.9	9,002	0.000	100	100
East and Southern Africa	Swaziland 2006-07	77.5	72.2	74.1	2,812	0.009	100	100
East and Southern Africa	Tanzania 2010	49.9	51.0	50.2	8,023	0.527	0	0
East and Southern Africa	Uganda 2011	58.2	56.3	57.4	7,878	0.199	100	0
East and Southern Africa	Zambia 2007	46.1	50.1	47.7	6,401	0.009	0	0
East and Southern Africa	Zimbabwe 2010	70.6	62.6	68.0	5,234	0.000	100	100
West and Central Africa	Benin 2006	75.7	90.1	78.1	16,075	0.000	0	0
West and Central Africa	Burkina Faso 2010	65.7	73.9	66.3	15,044	0.000	0	0
West and Central Africa	Congo (Brazzaville) 2005	81.7	83.2	82.2	4,835	0.376	0	0
West and Central Africa	Congo Democratic Republic 2007	68.7	73.7	70.1	8,992	0.005	0	0
West and Central Africa	Ghana 2008	56.8	57.7	57.1	2,992	0.730	0	0
West and Central Africa	Guinea 2005	29.6	39.1	30.9	6,336	0.000	0	0
West and Central Africa	Liberia 2007	34.5	43.0	36.9	5,799	0.001	0	0
West and Central Africa	Mali 2006	43.8	52.8	45.1	14,238	0.000	0	0
West and Central Africa	Niger 2006	16.0	28.5	17.2	9,193	0.000	0	0
West and Central Africa	Nigeria 2008	34.2	42.0	35.0	28,647	0.000	0	0
West and Central Africa	Sao Tome and Principe 2008-09	78.8	78.7	78.8	1,931	0.946	100	0
West and Central Africa	Senegal 2010-11	71.8	76.2	72.8	12,326	0.005	0	0
West and Central Africa	Sierra Leone 2008	24.1	25.9	24.6	5,631	0.377	0	0
Middle East/North Africa	Egypt 2008	73.2	62.4	71.7	10,872	0.000	100	100
Middle East/North Africa	Jordan 2007	98.8	98.1	98.6	10,426	0.049	100	100
Eastern Europe/NIS	Albania 2008-09	97.2	93.6	96.7	1,616	0.052	100	0
Eastern Europe/NIS	Armenia 2010	99.5	98.3	99.4	1,473	0.280	100	0
Eastern Europe/NIS	Azerbaijan 2006	78.3	74.4	77.7	2,297	0.195	100	0
Eastern Europe/NIS	Ukraine 2007	99.0	99.0	99.0	1,221	0.977	0	0
South Asia	Bangladesh 2007	15.5	12.4	14.6	6,150	0.003	100	100
South Asia	India 2005-06	40.5	31.5	38.7	51,555	0.000	100	100
South Asia	Maldives 2009	95.6	93.9	95.1	3,817	0.058	100	0
South Asia	Nepal 2011	36.8	30.8	35.3	5,306	0.004	100	100
South Asia	Pakistan 2006-07	34.6	33.0	34.3	9,177	0.281	100	0
East Asia/Pacific	Cambodia 2010	54.9	47.6	53.8	8,232	0.001	100	100
East Asia/Pacific	Indonesia 2007	46.8	45.4	46.6	18,645	0.390	100	0
East Asia/Pacific	Philippines 2008	46.0	40.9	44.2	6,572	0.001	100	100
East Asia/Pacific	Timor-Leste 2009	20.9	29.6	22.1	9,806	0.000	0	0
Latin America and Caribbean	Bolivia 2008	77.4	61.1	67.5	8,605	0.000	100	100
Latin America and Caribbean	Colombia 2010	79.3	80.4	79.9	17,756	0.165	0	0
Latin America and Caribbean	Dominican Republic 2007	97.0	98.1	97.5	11,149	0.005	0	0
Latin America and Caribbean	Guyana 2009	88.9	89.2	89.0	2,178	0.817	0	0
Latin America and Caribbean	Haiti 2005-06	26.8	22.1	24.7	6,015	0.004	100	100
Latin America and Caribbean	Honduras 2005-06	70.9	62.0	66.5	10,800	0.000	100	100
Latin America and Caribbean	Peru 2004-08	65.3	59.3	61.9	17,189	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	57.2	54.4	55.9	8,183	0.279	69.2	46.2
West and Central Africa		13	52.4	58.8	53.5	10,157	0.188	7.7	0.0
Middle East/North Africa		2	86.0	80.3	85.2	10,649	0.025	100.0	100.0
Eastern Europe/NIS		4	93.5	91.3	93.2	1,652	0.376	75.0	0.0
South Asia		5	44.6	40.3	43.6	15,201	0.069	100.0	60.0
East Asia/Pacific		4	42.2	40.9	41.7	10,814	0.098	75.0	50.0
Latin America and Caribbean		7	72.2	67.5	69.6	10,527	0.142	57.1	57.1
Tercile <46.1		16	30.9	32.2	30.7	12,163	0.149	43.8	37.5
Tercile 46.1-72.1		16	62.4	58.8	60.7	9,353	0.144	68.8	50.0
Tercile >72.1		16	85.9	86.1	85.8	7,189	0.291	56.3	18.8
Total		48	59.7	59.1	59.1	9,568	0.195	56.3	35.4

Appendix Table 9: Percentage of births in the last five years that were delivered in a health facility by planning status of the birth, retrospective measure (wanted vs. unwanted)

		wanted	unwanted	Total	N	P-value	Expected direction (100= unwanted lower)	Result is statistically significant and unwanted lower = 100
East and Southern Africa	Burundi 2010	59.7	55.0	59.5	7,742	0.116	100	0
East and Southern Africa	Ethiopia 2011	9.9	10.8	9.9	11,654	0.518	0	0
East and Southern Africa	Kenya 2008-09	43.7	37.1	42.6	6,079	0.013	100	100
East and Southern Africa	Lesotho 2009	60.9	51.1	58.7	3,995	0.000	100	100
East and Southern Africa	Madagascar 2008-09	35.2	36.5	35.3	12,448	0.608	0	0
East and Southern Africa	Malawi 2010	73.5	72.3	73.2	19,967	0.260	100	0
East and Southern Africa	Namibia 2006-07	81.1	80.9	81.0	5,149	0.923	100	0
East and Southern Africa	Rwanda 2010	70.3	58.7	68.9	9,002	0.000	100	100
East and Southern Africa	Swaziland 2006-07	76.4	70.5	74.1	2,812	0.002	100	100
East and Southern Africa	Tanzania 2010	50.0	54.9	50.2	8,023	0.231	0	0
East and Southern Africa	Uganda 2011	58.1	51.7	57.4	7,878	0.006	100	100
East and Southern Africa	Zambia 2007	47.0	51.4	47.7	6,401	0.026	0	0
East and Southern Africa	Zimbabwe 2010	68.7	63.0	68.0	5,234	0.027	100	100
West and Central Africa	Benin 2006	77.7	89.3	78.1	16,075	0.000	0	0
West and Central Africa	Burkina Faso 2010	66.1	78.5	66.3	15,044	0.003	0	0
West and Central Africa	Congo (Brazzaville) 2005	82.1	84.2	82.2	4,835	0.659	0	0
West and Central Africa	Congo Democratic Republic 2007	69.9	72.5	70.1	8,992	0.358	0	0
West and Central Africa	Ghana 2008	55.7	65.4	57.1	2,992	0.003	0	0
West and Central Africa	Guinea 2005	30.6	38.3	30.9	6,336	0.040	0	0
West and Central Africa	Liberia 2007	36.6	43.7	36.9	5,799	0.107	0	0
West and Central Africa	Mali 2006	44.7	58.9	45.1	14,238	0.000	0	0
West and Central Africa	Niger 2006	17.1	52.6	17.2	9,193	0.000	0	0
West and Central Africa	Nigeria 2008	34.6	44.5	35.0	28,647	0.000	0	0
West and Central Africa	Sao Tome and Principe 2008-09	79.1	77.4	78.8	1,931	0.659	100	0
West and Central Africa	Senegal 2010-11	72.9	71.3	72.8	12,326	0.592	100	0
West and Central Africa	Sierra Leone 2008	24.3	27.4	24.6	5,631	0.234	0	0
Middle East/North Africa	Egypt 2008	72.7	62.0	71.7	10,872	0.000	100	100
Middle East/North Africa	Jordan 2007	98.9	96.7	98.6	10,426	0.000	100	100
Eastern Europe/NIS	Albania 2008-09	96.9	92.9	96.7	1,616	0.120	100	0
Eastern Europe/NIS	Armenia 2010	99.4	100.0	99.4	1,473	0.774	0	0
Eastern Europe/NIS	Azerbaijan 2006	78.6	66.2	77.7	2,297	0.002	100	100
Eastern Europe/NIS	Ukraine 2007	99.0	98.5	99.0	1,221	0.696	100	0
South Asia	Bangladesh 2007	15.7	8.3	14.6	6,150	0.000	100	100
South Asia	India 2005-06	40.5	23.7	38.7	51,555	0.000	100	100
South Asia	Maldives 2009	95.6	92.9	95.1	3,817	0.012	100	100
South Asia	Nepal 2011	37.9	18.6	35.3	5,306	0.000	100	100
South Asia	Pakistan 2006-07	34.7	30.5	34.3	9,177	0.044	100	100
East Asia/Pacific	Cambodia 2010	54.8	43.6	53.8	8,232	0.000	100	100
East Asia/Pacific	Indonesia 2007	46.6	45.6	46.6	18,645	0.699	100	0
East Asia/Pacific	Philippines 2008	45.4	37.9	44.2	6,572	0.000	100	100
East Asia/Pacific	Timor-Leste 2009	22.1	21.4	22.1	9,806	0.833	100	0
Latin America and Caribbean	Bolivia 2008	75.1	53.9	67.5	8,605	0.000	100	100
Latin America and Caribbean	Colombia 2010	80.0	79.6	79.9	17,756	0.684	100	0
Latin America and Caribbean	Dominican Republic 2007	97.5	97.1	97.5	11,149	0.436	100	0
Latin America and Caribbean	Guyana 2009	89.9	84.8	89.0	2,178	0.006	100	100
Latin America and Caribbean	Haiti 2005-06	27.9	15.7	24.7	6,015	0.000	100	100
Latin America and Caribbean	Honduras 2005-06	70.0	55.5	66.5	10,800	0.000	100	100
Latin America and Caribbean	Peru 2004-08	65.3	52.4	61.9	17,189	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	56.5	53.4	55.9	8,183	0.210	69.2	46.2
West and Central Africa		13	53.2	61.8	53.5	10,157	0.204	15.4	0.0
Middle East/North Africa		2	85.8	79.4	85.2	10,649	0.000	100.0	100.0
Eastern Europe/NIS		4	93.5	89.4	93.2	1,652	0.398	75.0	25.0
South Asia		5	44.9	34.8	43.6	15,201	0.011	100.0	100.0
East Asia/Pacific		4	42.2	37.1	41.7	10,814	0.383	100.0	50.0
Latin America and Caribbean		7	72.2	62.7	69.6	10,527	0.161	100.0	71.4
Tercile <46.1		16	31.3	31.6	30.7	12,163	0.150	50.0	43.8
Tercile 46.1-72.1		16	61.9	57.2	60.7	9,353	0.092	68.8	56.3
Tercile >72.1		16	86.2	84.7	85.8	7,189	0.364	81.3	31.3
Total		48	59.8	57.8	59.1	9,568	0.202	66.7	43.8

Appendix Table 10: Percentage of living children ages 12-59 months old who received all basic immunizations recommended by the WHO by planning status of the birth, Lightbourne measure (wanted vs. unwanted)

		wanted	unwanted	Total	N	P-value	Expected direction (100= unwanted lower)	Result is statistically significant and unwanted lower = 100
East and Southern Africa	Burundi 2010	81.9	81.7	81.9	5,792	0.904	100	0
East and Southern Africa	Ethiopia 2011	24.6	21.3	24.0	8,554	0.108	100	0
East and Southern Africa	Kenya 2008-09	65.0	66.8	65.3	4,459	0.474	0	0
East and Southern Africa	Lesotho 2009	63.8	55.4	61.8	2,773	0.003	100	100
East and Southern Africa	Madagascar 2008-09	64.7	66.5	64.9	9,262	0.441	0	0
East and Southern Africa	Malawi 2010	75.5	77.9	75.9	14,593	0.111	0	0
East and Southern Africa	Namibia 2006-07	59.9	63.9	60.7	3,777	0.101	0	0
East and Southern Africa	Rwanda 2010	88.9	87.2	88.5	6,935	0.131	100	0
East and Southern Africa	Swaziland 2006-07	73.3	76.9	74.7	1,978	0.104	0	0
East and Southern Africa	Tanzania 2010	77.7	77.2	77.6	5,934	0.847	100	0
East and Southern Africa	Uganda 2011	51.4	51.9	51.5	5,767	0.852	0	0
East and Southern Africa	Zambia 2007	31.0	31.1	31.0	4,576	0.946	0	0
East and Southern Africa	Zimbabwe 2010-11	68.7	63.3	68.1	3,874	0.073	100	0
West and Central Africa	Benin 2006	45.4	45.4	45.4	11,370	0.971	0	0
West and Central Africa	Burkina Faso 2010	76.3	74.1	76.2	10,792	0.234	100	0
West and Central Africa	Congo (Brazzaville) 2005	52.8	50.6	52.7	3,421	0.674	100	0
West and Central Africa	Congo Democratic Republic 2007	30.5	33.7	30.8	6,203	0.393	0	0
West and Central Africa	Ghana 2008	71.5	72.9	71.7	2,147	0.710	0	0
West and Central Africa	Guinea 2005	36.4	39.4	36.7	4,279	0.387	0	0
West and Central Africa	Liberia 2007	30.7	28.3	30.5	4,158	0.540	100	0
West and Central Africa	Mali 2006	41.2	44.8	41.4	9,649	0.234	0	0
West and Central Africa	Niger 2006	24.3	26.4	24.4	6,364	0.686	0	0
West and Central Africa	Nigeria 2008	21.7	19.9	21.6	19,633	0.341	100	0
West and Central Africa	Sao Tome and Principe 2008-09	77.5	79.9	78.1	1,445	0.498	0	0
West and Central Africa	Senegal 2010-11	58.6	60.3	58.8	9,120	0.471	0	0
West and Central Africa	Sierra Leone 2008	36.8	39.5	37.0	3,759	0.436	0	0
Middle East/North Africa	Egypt 2008	93.9	92.8	93.7	8,146	0.160	100	0
Middle East/North Africa	Jordan 2007	82.0	77.1	81.0	8,074	0.011	100	100
Eastern Europe/NIS	Albania 2008-09	96.6	95.8	96.5	1,318	0.649	100	0
Eastern Europe/NIS	Armenia 2010	89.6	96.1	89.9	1,131	0.184	0	0
Eastern Europe/NIS	Azerbaijan 2006	51.8	41.7	50.9	1,736	0.041	100	100
South Asia	Bangladesh 2007	84.8	78.9	83.0	4,674	0.000	100	100
South Asia	India 2005-06	47.5	34.6	44.0	39,110	0.000	100	100
South Asia	Maldives 2009	93.7	92.2	93.5	2,897	0.314	100	0
South Asia	Nepal 2011	89.7	84.7	88.3	4,044	0.000	100	100
South Asia	Pakistan 2006-07	53.4	52.0	53.1	6,679	0.470	100	0
East Asia/Pacific	Cambodia 2010	79.6	68.2	78.2	6,276	0.000	100	100
East Asia/Pacific	Indonesia 2007	57.5	56.1	57.3	14,127	0.470	100	0
East Asia/Pacific	Philippines 2008	83.3	75.6	81.3	5,123	0.000	100	100
East Asia/Pacific	Timor-Leste 2009	42.4	40.0	42.2	7,401	0.364	100	0
Latin America and Caribbean	Bolivia 2008	79.0	75.0	77.4	6,555	0.005	100	100
Latin America and Caribbean	Colombia 2010	72.3	68.6	71.4	14,119	0.002	100	100
Latin America and Caribbean	Dominican Republic 2007	58.6	56.8	58.2	8,683	0.427	100	0
Latin America and Caribbean	Guyana 2009	61.6	57.4	60.6	1,644	0.304	100	0
Latin America and Caribbean	Haiti 2005-06	44.2	42.3	43.6	4,375	0.359	100	0
Latin America and Caribbean	Honduras 2005-06	80.3	77.4	79.5	8,406	0.024	100	100
Latin America and Caribbean	Peru 2004-08	58.8	53.3	57.0	13,530	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	63.6	63.2	63.5	6,021	0.392	46.2	7.7
West and Central Africa		13	46.4	47.3	46.6	7,103	0.506	30.8	0.0
Middle East/North Africa		2	88.0	85.0	87.4	8,110	0.086	100.0	50.0
Eastern Europe/NIS		3	79.3	77.9	79.1	1,395	0.291	66.7	33.3
South Asia		5	73.8	68.5	72.4	11,481	0.157	100.0	60.0
East Asia/Pacific		4	65.7	60.0	64.8	8,232	0.209	100.0	50.0
Latin America and Caribbean		7	65.0	61.5	64.0	8,187	0.160	100.0	50.0
Tercile <52.8		16	38.3	36.9	38.0	8,772	0.458	50.0	12.5
Tercile 52.8-76.1		15	64.2	63.2	64.0	7,384	0.277	53.3	20.0
Tercile >76.1		16	84.7	82.1	84.0	5,471	0.248	87.5	43.8
Total		47	62.4	60.7	62.0	7,206	0.329	63.8	25.5

Appendix Table 11: Percentage of living children ages 12-59 months old who received all basic immunizations recommended by the WHO by planning status of the birth, retrospective measure (intended vs. unintended)

		intended	unintended	Total	N	P-value	Expected direction (100= unintended lower)	Result is statistically significant and unintended lower = 100
East and Southern Africa	Burundi 2010	80.7	85.1	81.9	5,792	0.001	0	0
East and Southern Africa	Ethiopia 2011	23.2	26.2	24.0	8,554	0.039	0	0
East and Southern Africa	Kenya 2008-09	66.6	63.6	65.3	4,459	0.166	100	0
East and Southern Africa	Lesotho 2009	61.5	62.2	61.8	2,771	0.738	0	0
East and Southern Africa	Madagascar 2008-09	65.2	62.3	64.9	9,262	0.139	100	0
East and Southern Africa	Malawi 2010	75.0	77.0	75.9	14,593	0.061	0	0
East and Southern Africa	Namibia 2006-07	62.8	59.1	60.8	3,763	0.045	100	100
East and Southern Africa	Rwanda 2010	88.6	88.4	88.5	6,935	0.834	100	0
East and Southern Africa	Swaziland 2006-07	76.3	73.8	74.7	1,978	0.211	100	0
East and Southern Africa	Tanzania 2010	76.6	80.9	77.6	5,934	0.015	0	0
East and Southern Africa	Uganda 2011	51.2	51.9	51.5	5,767	0.658	0	0
East and Southern Africa	Zambia 2007	32.8	28.0	31.0	4,576	0.005	100	100
East and Southern Africa	Zimbabwe 2010-11	69.5	64.8	68.1	3,874	0.013	100	100
West and Central Africa	Benin 2006	44.8	48.8	45.4	11,370	0.018	0	0
West and Central Africa	Burkina Faso 2010	75.9	79.2	76.2	10,791	0.119	0	0
West and Central Africa	Congo (Brazzaville) 2005	52.5	53.2	52.7	3,421	0.755	0	0
West and Central Africa	Congo Democratic Republic 200	30.1	32.7	30.8	6,203	0.324	0	0
West and Central Africa	Ghana 2008	71.1	72.9	71.7	2,147	0.449	0	0
West and Central Africa	Guinea 2005	36.3	40.4	36.8	4,266	0.186	0	0
West and Central Africa	Liberia 2007	28.8	34.9	30.5	4,158	0.021	0	0
West and Central Africa	Mali 2006	40.9	44.2	41.4	9,649	0.129	0	0
West and Central Africa	Niger 2006	23.5	33.5	24.4	6,364	0.000	0	0
West and Central Africa	Nigeria 2008	21.1	25.5	21.6	19,632	0.001	0	0
West and Central Africa	Sao Tome and Principe 2008-09	76.9	79.3	78.1	1,445	0.313	0	0
West and Central Africa	Senegal 2010-11	58.7	59.4	58.8	9,118	0.626	0	0
West and Central Africa	Sierra Leone 2008	37.0	36.7	37.0	3,759	0.912	100	0
Middle East/North Africa	Egypt 2008	93.9	92.6	93.7	8,146	0.120	100	0
Middle East/North Africa	Jordan 2007	82.5	76.9	81.0	8,074	0.000	100	100
Eastern Europe/NIS	Albania 2008-09	96.3	97.8	96.5	1,318	0.475	0	0
Eastern Europe/NIS	Armenia 2010	89.6	93.5	89.9	1,131	0.295	0	0
Eastern Europe/NIS	Azerbaijan 2006	51.9	45.7	50.9	1,736	0.156	100	0
South Asia	Bangladesh 2007	84.3	79.7	83.0	4,674	0.002	100	100
South Asia	India 2005-06	45.3	38.6	44.0	39,110	0.000	100	100
South Asia	Maldives 2009	94.0	92.3	93.5	2,897	0.147	100	0
South Asia	Nepal 2011	89.2	85.2	88.3	4,044	0.106	100	0
South Asia	Pakistan 2006-07	53.7	51.2	53.1	6,679	0.166	100	0
East Asia/Pacific	Cambodia 2010	80.0	68.3	78.2	6,276	0.000	100	100
East Asia/Pacific	Indonesia 2007	57.6	56.0	57.3	14,127	0.358	100	0
East Asia/Pacific	Philippines 2008	81.8	80.3	81.3	5,123	0.290	100	0
East Asia/Pacific	Timor-Leste 2009	42.6	39.7	42.2	7,401	0.269	100	0
Latin America and Caribbean	Bolivia 2008	79.5	76.1	77.4	6,555	0.015	100	100
Latin America and Caribbean	Colombia 2010	72.3	70.6	71.4	14,119	0.100	100	0
Latin America and Caribbean	Dominican Republic 2007	60.3	55.4	58.2	8,683	0.004	100	100
Latin America and Caribbean	Guyana 2009	63.0	56.9	60.6	1,644	0.064	100	0
Latin America and Caribbean	Haiti 2005-06	43.2	44.0	43.6	4,375	0.742	0	0
Latin America and Caribbean	Honduras 2005-06	80.5	78.5	79.5	8,406	0.060	100	0
Latin America and Caribbean	Peru 2004-08	60.7	54.0	57.0	13,530	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	63.8	63.3	63.5	6,020	0.225	53.8	23.1
West and Central Africa		13	46.0	49.3	46.6	7,102	0.296	7.7	0.0
Middle East/North Africa		2	88.2	84.8	87.4	8,110	0.060	100.0	50.0
Eastern Europe/NIS		3	79.3	79.0	79.1	1,395	0.309	33.3	0.0
South Asia		5	73.3	69.4	72.4	11,481	0.084	100.0	40.0
East Asia/Pacific		4	65.5	61.1	64.8	8,232	0.229	100.0	25.0
Latin America and Caribbean		7	65.6	62.2	64.0	8,187	0.141	100.0	25.0
Tercile <52.8		16	37.8	39.0	38.0	8,771	0.263	31.3	12.5
Tercile 52.8-76.1		15	65.0	62.6	64.0	7,383	0.209	73.3	26.7
Tercile >76.1		16	84.4	83.4	84.0	5,471	0.175	62.5	25.0
Total		47	62.3	61.6	62.0	7,205	0.216	55.3	21.3

Appendix Table 12: Percentage of living children ages 12-59 months old who received all basic immunizations recommended by the WHO by planning status of the birth, retrospective measure (wanted vs. unwanted)

		wanted	unwanted	Total	N	P-value	Expected direction (100= unwanted lower)	Result is statistically significant and unwanted lower = 100
East and Southern Africa	Burundi 2010	81.7	85.6	81.9	5,792	0.123	0	0
East and Southern Africa	Ethiopia 2011	23.7	27.9	24.0	8,554	0.096	0	0
East and Southern Africa	Kenya 2008-09	64.9	67.6	65.3	4,459	0.377	0	0
East and Southern Africa	Lesotho 2009	62.8	58.7	61.8	2,771	0.116	100	0
East and Southern Africa	Madagascar 2008-09	65.1	58.7	64.9	9,262	0.041	100	100
East and Southern Africa	Malawi 2010	75.6	76.6	75.9	14,593	0.389	0	0
East and Southern Africa	Namibia 2006-07	61.4	59.3	60.8	3,763	0.390	100	0
East and Southern Africa	Rwanda 2010	88.8	86.2	88.5	6,935	0.049	100	100
East and Southern Africa	Swaziland 2006-07	75.0	74.3	74.7	1,978	0.740	100	0
East and Southern Africa	Tanzania 2010	77.4	83.6	77.6	5,934	0.097	0	0
East and Southern Africa	Uganda 2011	51.7	50.0	51.5	5,767	0.515	100	0
East and Southern Africa	Zambia 2007	31.5	28.2	31.0	4,576	0.127	100	0
East and Southern Africa	Zimbabwe 2010-11	68.4	63.8	68.1	3,874	0.214	100	0
West and Central Africa	Benin 2006	45.4	45.8	45.4	11,370	0.886	0	0
West and Central Africa	Burkina Faso 2010	76.2	74.6	76.2	10,791	0.714	100	0
West and Central Africa	Congo (Brazzaville) 2005	52.8	51.2	52.7	3,421	0.781	100	0
West and Central Africa	Congo Democratic Republic 2007	30.5	33.8	30.8	6,203	0.295	0	0
West and Central Africa	Ghana 2008	71.8	70.9	71.7	2,147	0.772	100	0
West and Central Africa	Guinea 2005	36.5	46.3	36.8	4,266	0.055	0	0
West and Central Africa	Liberia 2007	30.3	35.1	30.5	4,158	0.297	0	0
West and Central Africa	Mali 2006	41.4	40.4	41.4	9,649	0.806	100	0
West and Central Africa	Niger 2006	24.2	54.6	24.4	6,364	0.000	0	0
West and Central Africa	Nigeria 2008	21.4	25.0	21.6	19,632	0.059	0	0
West and Central Africa	Sao Tome and Principe 2008-09	77.6	79.9	78.1	1,445	0.542	0	0
West and Central Africa	Senegal 2010-11	58.9	57.0	58.8	9,118	0.581	100	0
West and Central Africa	Sierra Leone 2008	36.9	37.2	37.0	3,759	0.934	0	0
Middle East/North Africa	Egypt 2008	93.7	93.9	93.7	8,146	0.894	0	0
Middle East/North Africa	Jordan 2007	82.0	73.8	81.0	8,074	0.000	100	100
Eastern Europe/NIS	Albania 2008-09	96.3	100.0	96.5	1,318	0.336	0	0
Eastern Europe/NIS	Armenia 2010	89.8	100.0	89.9	1,131	0.244	0	0
Eastern Europe/NIS	Azerbaijan 2006	51.7	40.8	50.9	1,736	0.060	100	0
South Asia	Bangladesh 2007	83.9	78.2	83.0	4,674	0.001	100	100
South Asia	India 2005-06	45.5	31.3	44.0	39,110	0.000	100	100
South Asia	Maldives 2009	93.7	92.8	93.5	2,897	0.508	100	0
South Asia	Nepal 2011	89.5	80.1	88.3	4,044	0.001	100	100
South Asia	Pakistan 2006-07	53.3	52.0	53.1	6,679	0.618	100	0
East Asia/Pacific	Cambodia 2010	79.5	65.6	78.2	6,276	0.000	100	100
East Asia/Pacific	Indonesia 2007	57.6	53.3	57.3	14,127	0.125	100	0
East Asia/Pacific	Philippines 2008	81.6	79.7	81.3	5,123	0.288	100	0
East Asia/Pacific	Timor-Leste 2009	42.1	45.4	42.2	7,401	0.482	0	0
Latin America and Caribbean	Bolivia 2008	79.1	74.4	77.4	6,555	0.001	100	100
Latin America and Caribbean	Colombia 2010	72.7	67.4	71.4	14,119	0.000	100	100
Latin America and Caribbean	Dominican Republic 2007	59.5	50.7	58.2	8,683	0.000	100	100
Latin America and Caribbean	Guyana 2009	61.8	55.1	60.6	1,644	0.121	100	0
Latin America and Caribbean	Haiti 2005-06	43.2	44.7	43.6	4,375	0.534	0	0
Latin America and Caribbean	Honduras 2005-06	79.9	78.2	79.5	8,406	0.245	100	0
Latin America and Caribbean	Peru 2004-08	58.9	51.6	57.0	13,530	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	63.7	63.1	63.5	6,020	0.252	61.5	15.4
West and Central Africa		13	46.5	50.1	46.6	7,102	0.517	38.5	0.0
Middle East/North Africa		2	87.9	83.9	87.4	8,110	0.447	50.0	50.0
Eastern Europe/NIS		3	79.3	80.3	79.1	1,395	0.213	33.3	0.0
South Asia		5	73.2	66.9	72.4	11,481	0.226	100.0	60.0
East Asia/Pacific		4	65.2	61.0	64.8	8,232	0.224	75.0	25.0
Latin America and Caribbean		7	65.0	60.3	64.0	8,187	0.129	75.0	25.0
Tercile <52.8		16	38.1	39.9	38.0	8,771	0.370	37.5	6.3
Tercile 52.8-76.1		15	64.5	61.1	64.0	7,383	0.299	86.7	26.7
Tercile >76.1		16	84.4	82.9	84.0	5,471	0.253	62.5	37.5
Total		47	62.3	61.3	62.0	7,205	0.308	61.7	23.4

Appendix Table 13: Percentage of measured, living children who are stunted (height-for-age z-score < -2 standard deviations below the WHO international reference standard), by planning status of the birth, Lightbourne measure (wanted vs. unwanted)

		wanted	unwanted	Total	N	P-value	Expected direction (100= unwanted higher)	Result is statistically significant and unwanted higher = 100
East and Southern Africa	Burundi 2010	57.2	60.2	57.9	3,450	0.20	100	0
East and Southern Africa	Ethiopia 2011	44.5	43.4	44.3	9,611	0.63	0	0
East and Southern Africa	Kenya 2008-09	34.9	36.4	35.3	5,096	0.57	100	0
East and Southern Africa	Lesotho 2009	35.6	43.9	37.6	1,623	0.02	100	100
East and Southern Africa	Madagascar 2008-09	49.9	54.7	50.4	4,861	0.10	100	0
East and Southern Africa	Malawi 2010	46.9	47.9	47.1	4,586	0.72	100	0
East and Southern Africa	Namibia 2006-07	28.8	28.4	28.7	3,695	0.85	0	0
East and Southern Africa	Rwanda 2010	42.3	49.3	44	4,075	0.00	100	100
East and Southern Africa	Swaziland 2006-07	27	28.3	27.5	2,043	0.54	100	0
East and Southern Africa	Tanzania 2010	41.4	43.7	41.6	6,792	0.31	100	0
East and Southern Africa	Uganda 2011	33.1	33.4	33.2	2,070	0.93	100	0
East and Southern Africa	Zambia 2007	45.6	43.5	45.3	5,121	0.42	0	0
East and Southern Africa	Zimbabwe 2010-11	31	31.7	31.1	4,299	0.74	100	0
West and Central Africa	Benin 2006	43	41.8	42.9	12,246	0.42	0	0
West and Central Africa	Burkina Faso 2010	34.7	30.2	34.5	6,532	0.08	0	0
West and Central Africa	Congo (Brazzaville) 2005	29.7	36.3	30	3,893	0.11	100	0
West and Central Africa	Congo Democratic Republic 2007	44.9	39.7	44.5	3,265	0.37	0	0
West and Central Africa	Ghana 2008	27.5	27.5	27.5	2,379	0.98	0	0
West and Central Africa	Liberia 2007	37.7	38.8	37.8	4,324	0.71	100	0
West and Central Africa	Mali 2006	38	35.6	37.9	10,778	0.27	0	0
West and Central Africa	Nigeria 2008	40.7	38.6	40.6	19,010	0.30	0	0
West and Central Africa	Sao Tome and Principe 2008-09	28.2	32.5	29.4	1,454	0.33	100	0
West and Central Africa	Senegal 2010-11	27.1	23.1	26.6	3,548	0.14	0	0
West and Central Africa	Sierra Leone 2008	35.7	33.3	35.5	2,024	0.61	0	0
Middle East/North Africa	Egypt 2008	28.9	28.6	28.9	9,478	0.80	0	0
Middle East/North Africa	Jordan 2007	14.2	15.1	14.4	4,408	0.69	100	0
Eastern Europe/NIS	Albania 2008-09	17.8	27.8	19.3	1,291	0.01	100	100
Eastern Europe/NIS	Armenia 2010	18.9	25	19.2	1,330	0.36	100	0
Eastern Europe/NIS	Azerbaijan 2006	24.4	32.3	25.1	1,942	0.07	100	0
South Asia	Bangladesh 2007	41.1	47.6	43	5,300	0.00	100	100
South Asia	India 2005-06	46.3	52.8	48	41,306	0.00	100	100
South Asia	Maldives 2009	17.6	21.3	18	2,353	0.20	100	0
South Asia	Nepal 2011	36.8	49.3	40.3	2,335	0.00	100	100
East Asia/Pacific	Cambodia 2010	38.5	43.5	39.1	3,699	0.14	100	0
East Asia/Pacific	Timor-Leste 2009	57.8	55.1	57.6	7,544	0.24	0	0
Latin America and Caribbean	Bolivia 2008	21.1	36.1	27.1	7,716	0.00	100	100
Latin America and Caribbean	Colombia 2010	12	16.3	13.1	15,979	0.00	100	100
Latin America and Caribbean	Dominican Republic 2007	8.8	13.6	9.8	9,255	0.00	100	100
Latin America and Caribbean	Guyana 2009	16.7	25.2	18.7	1,560	0.00	100	100
Latin America and Caribbean	Honduras 2005-06	27.1	35.9	29.4	9,215	0.00	100	100
Latin America and Caribbean	Peru 2004-08		22.9	38.4	28	10,421	0.00	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	39.9	41.9	40.3	4,409	0.464	76.9	15.4
West and Central Africa		11	35.2	34.3	35.2	6,314	0.392	27.3	0.0
Middle East/North Africa		2	21.6	21.9	21.7	6,943	0.746	50.0	0.0
Eastern Europe/NIS		3	20.4	28.4	21.2	1,521	0.144	100.0	33.3
South Asia		4	35.5	42.8	37.3	12,824	0.049	100.0	75.0
East Asia/Pacific		2	48.2	49.3	48.4	5,622	0.191	50.0	0.0
Latin America and Caribbean		5	17.1	25.4	19.6	8,745	0.000	100.0	100.0
Tercile <28.8		14	20.3	25.6	21.6	4,851	0.274	78.6	42.9
Tercile 28.8-39.9		13	33.3	35.4	33.8	4,960	0.408	69.2	15.4
Tercile >39.9		14	45.6	47.7	46.3	9,250	0.265	57.1	28.6
Total		40	33.1	36.2	33.9	6,388	0.313	68.3	29.3

Appendix Table 14: Percentage of measured, living children who are stunted (height-for-age z-score < -2 standard deviations below the WHO international reference standard), by planning status of the birth, retrospective measure (intended vs. unintended)

		intended	unintended	Total	N	P-value	Expected direction (100= unintended higher)	Result is statistically significant and unintended higher = 100
East and Southern Africa	Burundi 2010	58.3	56.9	57.9	3,450	0.517	0	0
East and Southern Africa	Ethiopia 2011	44.7	43.5	44.3	9,611	0.486	0	0
East and Southern Africa	Kenya 2008-09	34.6	36.1	35.3	5,096	0.505	100	0
East and Southern Africa	Lesotho 2009	36.3	38.6	37.6	1,623	0.399	100	0
East and Southern Africa	Madagascar 2008-09	50.4	50.5	50.4	4,861	0.962	100	0
East and Southern Africa	Malawi 2010	45.4	49.2	47.1	4,586	0.035	100	100
East and Southern Africa	Namibia 2006-07	26.5	30.8	28.7	3,686	0.009	100	100
East and Southern Africa	Rwanda 2010	43.6	44.6	44.0	4,075	0.554	100	0
East and Southern Africa	Swaziland 2006-07	28.0	27.3	27.5	2,043	0.735	0	0
East and Southern Africa	Tanzania 2010	41.7	41.2	41.6	6,792	0.786	0	0
East and Southern Africa	Uganda 2011	31.1	35.9	33.2	2,070	0.041	100	100
East and Southern Africa	Zambia 2007	46.9	43.1	45.3	5,121	0.014	0	0
East and Southern Africa	Zimbabwe 2010-11	29.4	34.9	31.1	4,299	0.000	100	100
West and Central Africa	Benin 2006	43.6	39.5	42.9	12,246	0.002	0	0
West and Central Africa	Burkina Faso 2010	34.6	32.6	34.5	6,532	0.385	0	0
West and Central Africa	Congo (Brazzaville) 2005	29.3	31.5	30.0	3,893	0.289	100	0
West and Central Africa	Congo Democratic Republic 2007	46.1	40.4	44.5	3,265	0.092	0	0
West and Central Africa	Ghana 2008	26.6	28.9	27.5	2,379	0.252	100	0
West and Central Africa	Liberia 2007	38.8	35.3	37.8	4,324	0.161	0	0
West and Central Africa	Mali 2006	38.4	35.1	37.9	10,778	0.067	0	0
West and Central Africa	Nigeria 2008	41.0	36.9	40.6	19,010	0.002	0	0
West and Central Africa	Sao Tome and Principe 2008-09	27.9	30.9	29.4	1,454	0.388	100	0
West and Central Africa	Senegal 2010-11	27.4	24.3	26.6	3,548	0.177	0	0
West and Central Africa	Sierra Leone 2008	37.1	30.6	35.5	2,024	0.027	0	0
Middle East/North Africa	Egypt 2008	28.8	29.3	28.9	9,478	0.734	100	0
Middle East/North Africa	Jordan 2007	14.4	14.4	14.4	4,408	0.970	0	0
Eastern Europe/NIS	Albania 2008-09	18.5	24.8	19.3	1,291	0.089	100	0
Eastern Europe/NIS	Armenia 2010	19.7	13.6	19.2	1,330	0.210	0	0
Eastern Europe/NIS	Azerbaijan 2006	25.4	23.9	25.1	1,942	0.716	0	0
South Asia	Bangladesh 2007	42.9	43.1	43.0	5,300	0.899	100	0
South Asia	India 2005-06	47.3	50.7	48.0	41,306	0.000	100	100
South Asia	Maldives 2009	16.8	20.8	18.0	2,353	0.060	100	0
South Asia	Nepal 2011	38.8	44.7	40.3	2,335	0.052	100	0
East Asia/Pacific	Cambodia 2010	38.2	44.4	39.1	3,699	0.019	100	100
East Asia/Pacific	Timor-Leste 2009	57.7	57.2	57.6	7,544	0.812	0	0
Latin America and Caribbean	Bolivia 2008	20.7	31.2	27.1	7,716	0.000	100	100
Latin America and Caribbean	Colombia 2010	11.2	14.8	13.1	15,979	0.000	100	100
Latin America and Caribbean	Dominican Republic 2007	8.6	11.3	9.8	9,255	0.001	100	100
Latin America and Caribbean	Guyana 2009	17.4	20.5	18.7	1,560	0.294	100	0
Latin America and Caribbean	Honduras 2005-06	25.1	33.8	29.4	9,215	0.000	100	100
Latin America and Caribbean	Peru 2004-08	21.8	32.7	28.0	10,421	0.000	100	100

Region	Regional averages						Percentages with expected relationships	
East and Southern Africa		13	39.8	41.0	40.3	4,409	0.388	61.5	30.8
West and Central Africa		11	35.5	33.3	35.2	6,314	0.167	27.3	0.0
Middle East/North Africa		2	21.6	21.9	21.7	6,943	0.852	50.0	0.0
Eastern Europe/NIS		3	21.2	20.8	21.2	1,521	0.338	33.3	0.0
South Asia		4	36.5	39.8	37.3	12,824	0.253	100.0	25.0
East Asia/Pacific		2	48.0	50.8	48.4	5,622	0.416	50.0	50.0
Latin America and Caribbean		5	16.6	22.3	19.6	8,745	0.059	100.0	80.0
Tercile <28.8		14	20.2	22.8	21.6	4,851	0.251	64.3	35.7
Tercile 28.8-39.9		13	33.0	34.5	33.8	4,960	0.232	69.2	30.8
Tercile >39.9		14	46.3	45.8	46.3	9,250	0.372	42.9	14.3
Total		40	33.2	34.4	33.9	6,388	0.286	58.5	26.8

Appendix Table 15: Percentage of measured, living children who are stunted (height-for-age z-score < -2 standard deviations below the WHO international reference standard), by planning status of the birth, retrospective measure (wanted vs. unwanted)

		wanted	unwanted	Total	N	P-value	Expected direction (100= unwanted higher)	Result is statistically significant and unwanted higher = 100
East and Southern Africa	Burundi 2010	57.9	56.7	57.9	3,450	0.787	0	0
East and Southern Africa	Ethiopia 2011	44.6	42.1	44.3	9,611	0.363	0	0
East and Southern Africa	Kenya 2008-09	34.6	38.5	35.3	5,096	0.142	100	0
East and Southern Africa	Lesotho 2009	36.7	40.4	37.6	1,623	0.356	100	0
East and Southern Africa	Madagascar 2008-09	50.3	51.7	50.4	4,861	0.725	100	0
East and Southern Africa	Malawi 2010	46.8	48.0	47.1	4,586	0.552	100	0
East and Southern Africa	Namibia 2006-07	27.9	30.9	28.7	3,686	0.166	100	0
East and Southern Africa	Rwanda 2010	43.5	47.2	44.0	4,075	0.139	100	0
East and Southern Africa	Swaziland 2006-07	27.2	28.2	27.5	2,043	0.668	100	0
East and Southern Africa	Tanzania 2010	41.6	40.6	41.6	6,792	0.794	0	0
East and Southern Africa	Uganda 2011	32.5	38.2	33.2	2,070	0.113	100	0
East and Southern Africa	Zambia 2007	46.3	40.0	45.3	5,121	0.002	0	0
East and Southern Africa	Zimbabwe 2010-11	30.8	35.0	31.1	4,299	0.139	100	0
West and Central Africa	Benin 2006	43.1	37.5	42.9	12,246	0.036	0	0
West and Central Africa	Burkina Faso 2010	34.7	24.0	34.5	6,532	0.026	0	0
West and Central Africa	Congo (Brazzaville) 2005	30.0	30.9	30.0	3,893	0.830	100	0
West and Central Africa	Congo Democratic Republic 2007	45.1	37.8	44.5	3,265	0.149	0	0
West and Central Africa	Ghana 2008	27.4	27.6	27.5	2,379	0.953	100	0
West and Central Africa	Liberia 2007	37.9	34.3	37.8	4,324	0.387	0	0
West and Central Africa	Mali 2006	37.9	35.4	37.9	10,778	0.489	0	0
West and Central Africa	Nigeria 2008	40.8	34.5	40.6	19,010	0.002	0	0
West and Central Africa	Sao Tome and Principe 2008-09	29.3	29.8	29.4	1,454	0.910	100	0
West and Central Africa	Senegal 2010-11	26.6	25.8	26.6	3,548	0.843	0	0
West and Central Africa	Sierra Leone 2008	36.0	30.9	35.5	2,024	0.239	0	0
Middle East/North Africa	Egypt 2008	29.0	27.3	28.9	9,478	0.327	0	0
Middle East/North Africa	Jordan 2007	14.3	14.7	14.4	4,408	0.914	100	0
Eastern Europe/NIS	Albania 2008-09	18.5	37.3	19.3	1,291	0.002	100	100
Eastern Europe/NIS	Armenia 2010	19.2	22.3	19.2	1,330	0.761	100	0
Eastern Europe/NIS	Azerbaijan 2006	25.3	23.4	25.1	1,942	0.616	0	0
South Asia	Bangladesh 2007	42.4	46.3	43.0	5,300	0.085	100	0
South Asia	India 2005-06	47.2	54.6	48.0	41,306	0.000	100	100
South Asia	Maldives 2009	16.5	24.9	18.0	2,353	0.000	100	100
South Asia	Nepal 2011	38.8	49.4	40.3	2,335	0.001	100	100
East Asia/Pacific	Cambodia 2010	38.2	48.8	39.1	3,699	0.002	100	100
East Asia/Pacific	Timor-Leste 2009	57.4	64.9	57.6	7,544	0.040	100	100
Latin America and Caribbean	Bolivia 2008	21.7	36.6	27.1	7,716	0.000	100	100
Latin America and Caribbean	Colombia 2010	12.0	16.6	13.1	15,979	0.000	100	100
Latin America and Caribbean	Dominican Republic 2007	9.2	13.0	9.8	9,255	0.003	100	100
Latin America and Caribbean	Guyana 2009	17.6	23.6	18.7	1,560	0.053	100	0
Latin America and Caribbean	Honduras 2005-06	26.4	38.3	29.4	9,215	0.000	100	100
Latin America and Caribbean	Peru 2004-08		23.6	39.9	28.0	10,421	0.000	100	100
Region	Regional averages							Percentages with expected relationships	
East and Southern Africa		13	40.1	41.3	40.3	4,409	0.380	69.2	0.0
West and Central Africa		11	35.3	31.7	35.2	6,314	0.442	27.3	0.0
Middle East/North Africa		2	21.7	21.0	21.7	6,943	0.621	50.0	0.0
Eastern Europe/NIS		3	21.0	27.7	21.2	1,521	0.460	66.7	33.3
South Asia		4	36.2	43.8	37.3	12,824	0.022	100.0	75.0
East Asia/Pacific		2	47.8	56.9	48.4	5,622	0.021	100.0	100.0
Latin America and Caribbean		5	17.4	25.6	19.6	8,745	0.011	100.0	80.0
Tercile <28.8		14	20.5	26.1	21.6	4,851	0.356	85.7	42.9
Tercile 28.8-39.9		13	33.4	34.8	33.8	4,960	0.305	61.5	15.4
Tercile >39.9		14	46.1	46.5	46.3	9,250	0.263	50.0	21.4
Total		40	33.3	35.8	33.9	6,388	0.308	65.9	26.8

Appendix Table 16: Logistic regression models for receipt of ANC for births in the last five years: Adjusted odds ratios (AOR) for planning status of the birth: Lightborne unwantedness (Model 1), retrospective unintendedness (Models 2 and 3), and retrospective unwantedness (Models 4 and 5) measures.

		Lightbourne		Retrospective unintendedness				Retrospective unwantedness			
		Model 1		Model 2		Model 3		Model 4		Model 5	
		AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
East and Southern Africa	Burundi 2010	0.76	0.27,2.11	0.32***	0.17,0.58	0.32***	0.17,0.59	0.25*	0.08,0.75	0.26*	0.09,0.78
East and Southern Africa	Ethiopia 2011	0.99	0.81,1.22	0.93	0.79,1.08	0.95	0.81,1.11	0.9	0.72,1.14	0.94	0.74,1.19
East and Southern Africa	Kenya 2008-09	0.73	0.48,1.12	0.63***	0.48,0.83	0.65**	0.49,0.86	0.47***	0.33,0.66	0.48***	0.33,0.70
East and Southern Africa	Lesotho 2009	0.47***	0.32,0.69	0.32***	0.22,0.48	0.35***	0.23,0.52	0.33***	0.24,0.46	0.36***	0.25,0.50
East and Southern Africa	Madagascar 2008-09	1.27	0.90,1.80	0.69**	0.54,0.88	0.72**	0.56,0.92	0.77	0.53,1.13	0.84	0.57,1.24
East and Southern Africa	Malawi 2010	0.68	0.43,1.06	0.58**	0.40,0.86	0.61*	0.41,0.91	0.46***	0.32,0.66	0.47***	0.32,0.70
East and Southern Africa	Namibia 2006-07	0.74	0.49,1.12	1.00	0.63,1.57	1.05	0.66,1.67	0.68	0.43,1.08	0.71	0.44,1.13
East and Southern Africa	Rwanda 2010	0.83	0.45,1.54	0.45***	0.30,0.67	0.47***	0.31,0.71	0.64	0.36,1.11	0.72	0.41,1.25
East and Southern Africa	Swaziland 2006-07	0.5	0.25,1.01	0.55	0.28,1.10	0.61	0.30,1.26	0.44*	0.22,0.87	0.47*	0.23,0.95
East and Southern Africa	Tanzania 2010	0.66	0.32,1.37	1.71	0.90,3.26	1.87	0.97,3.58	0.92	0.34,2.49	0.99	0.36,2.70
East and Southern Africa	Uganda 2011	0.94	0.55,1.61	0.52**	0.35,0.78	0.55**	0.37,0.82	0.49*	0.28,0.86	0.53*	0.30,0.92
East and Southern Africa	Zambia 2007	2.17*	1.03,4.54	0.94	0.58,1.51	0.93	0.58,1.51	1.03	0.60,1.79	1.03	0.59,1.80
East and Southern Africa	Zimbabwe 2010-11	0.70*	0.49,0.99	0.58***	0.45,0.74	0.63***	0.48,0.82	0.72	0.46,1.13	0.8	0.51,1.26
West and Central Africa	Benin 2006	1.72***	1.29,2.29	2.74***	2.07,3.62	2.99***	2.25,3.96	2.27***	1.41,3.65	2.75***	1.69,4.48
West and Central Africa	Burkina Faso 2010	1.08	0.77,1.51	1.15	0.75,1.75	1.22	0.80,1.87	0.89	0.46,1.71	1.02	0.53,1.96
West and Central Africa	Congo (Brazzaville) 2005	0.64	0.38,1.06	0.48***	0.35,0.66	0.54***	0.39,0.74	0.60*	0.37,0.98	0.72	0.42,1.23
West and Central Africa	Congo Democratic Republic 2007	1.34	0.72,2.51	0.98	0.77,1.25	0.99	0.77,1.26	0.9	0.65,1.25	0.91	0.65,1.26
West and Central Africa	Ghana 2008	1.30	0.55,3.07	0.9	0.56,1.44	1	0.62,1.61	0.76	0.42,1.37	0.86	0.47,1.57
West and Central Africa	Guinea 2005	1.20	0.87,1.67	1.02	0.76,1.37	1.08	0.81,1.45	0.9	0.53,1.52	0.98	0.58,1.66
West and Central Africa	Liberia 2007	0.63	0.31,1.26	1.46	0.96,2.22	1.54*	1.00,2.38	0.83	0.46,1.48	0.91	0.50,1.67
West and Central Africa	Mali 2006	0.98	0.77,1.24	1.22	0.99,1.50	1.26*	1.02,1.55	1.22	0.84,1.76	1.27	0.88,1.84
West and Central Africa	Niger 2006	0.87	0.52,1.44	1.54**	1.17,2.04	1.62**	1.22,2.15	0.69	0.32,1.52	0.71	0.31,1.62
West and Central Africa	Nigeria 2008	0.83	0.68,1.03	0.77**	0.65,0.91	0.80**	0.68,0.95	0.73**	0.57,0.92	0.76*	0.60,0.97
West and Central Africa	Sao Tome and Principe 2008-09	0.80	0.26,2.41	1.22	0.46,3.26	1.28	0.46,3.58	1.61	0.32,8.27	1.75	0.32,9.75
West and Central Africa	Senegal 2010-11	1.16	0.84,1.60	0.94	0.72,1.22	1.03	0.78,1.37	1.13	0.68,1.86	1.38	0.82,2.29
West and Central Africa	Sierra Leone 2008	0.86	0.55,1.35	1.64**	1.21,2.23	1.63**	1.19,2.21	1.42	0.91,2.23	1.39	0.88,2.22
Middle East/North Africa	Egypt 2008	0.82*	0.70,0.95	0.74***	0.63,0.86	0.89	0.75,1.04	0.76**	0.63,0.91	0.98	0.80,1.19
Middle East/North Africa	Jordan 2007	0.74	0.38,1.44	0.26***	0.13,0.49	0.32**	0.16,0.64	0.24**	0.10,0.60	0.33*	0.12,0.89
Eastern Europe/NIS	Albania 2008-09	0.73	0.28,1.91	0.5	0.21,1.21	0.51	0.20,1.29	0.41	0.13,1.28	0.42	0.12,1.48
Eastern Europe/NIS	Azerbaijan 2006	0.63	0.37,1.07	0.54**	0.37,0.78	0.63*	0.43,0.92	0.38***	0.24,0.60	0.47**	0.30,0.74
South Asia	Bangladesh 2007	0.80*	0.65,0.99	0.89	0.74,1.07	1.05	0.86,1.26	0.88	0.68,1.14	1.17	0.89,1.53
South Asia	India 2005-06	0.66***	0.60,0.72	0.76***	0.68,0.84	0.93	0.84,1.03	0.62***	0.55,0.70	0.80***	0.71,0.91
South Asia	Maldives 2009	1.01	0.25,4.11	1.43	0.60,3.36	1.82	0.85,3.87	0.96	0.37,2.46	1.18	0.51,2.72
South Asia	Nepal 2011	0.71**	0.56,0.89	0.76*	0.58,0.99	0.91	0.68,1.23	0.74*	0.56,0.99	0.96	0.70,1.32
South Asia	Pakistan 2006-07	0.96	0.80,1.16	1.33***	1.13,1.57	1.48***	1.25,1.76	1.27*	1.02,1.57	1.45**	1.16,1.82
East Asia/Pacific	Cambodia 2010	0.67**	0.51,0.89	0.58***	0.46,0.73	0.68**	0.52,0.87	0.62**	0.46,0.83	0.77	0.57,1.04
East Asia/Pacific	Indonesia 2007	1.12	0.76,1.66	0.65**	0.49,0.86	0.76	0.57,1.02	0.55*	0.34,0.87	0.66	0.41,1.05
East Asia/Pacific	Philippines 2008	0.55**	0.38,0.80	0.64**	0.46,0.88	0.74	0.53,1.03	0.67*	0.45,0.98	0.81	0.54,1.20
East Asia/Pacific	Timor-Leste 2009	0.98	0.72,1.32	1.74***	1.34,2.25	1.77***	1.36,2.29	2.00**	1.23,3.28	2.04**	1.26,3.31
Latin America and Caribbean	Bolivia 2008	0.74*	0.56,0.97	0.58***	0.45,0.74	0.60***	0.46,0.77	0.69**	0.54,0.89	0.73*	0.55,0.96
Latin America and Caribbean	Colombia 2010	0.42***	0.31,0.56	0.41***	0.32,0.54	0.55***	0.42,0.72	0.33***	0.25,0.42	0.44***	0.34,0.58
Latin America and Caribbean	Dominican Republic 2007	0.81	0.47,1.39	1.69**	1.19,2.39	1.99***	1.35,2.95	1.71*	1.01,2.90	2.32**	1.30,4.15
Latin America and Caribbean	Guyana 2009	0.59	0.32,1.11	1.18	0.66,2.11	1.3	0.69,2.45	0.8	0.40,1.59	0.88	0.42,1.86
Latin America and Caribbean	Haiti 2005-06	0.72*	0.54,0.95	0.91	0.74,1.14	1.03	0.83,1.27	0.84	0.67,1.07	0.98	0.77,1.25
Latin America and Caribbean	Honduras 2005-06	0.63***	0.50,0.78	0.51***	0.42,0.63	0.57***	0.46,0.71	0.53***	0.43,0.65	0.61***	0.49,0.75
Latin America and Caribbean	Peru 2004-08	0.72*	0.54,0.97	0.74*	0.58,0.94	0.83	0.65,1.07	0.72*	0.54,0.96	0.87	0.64,1.17

Region	Number of surveys	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05
East and Southern Africa	13	84.6	15.4	84.6	61.5	84.6	61.5	92.3	46.2	92.3	46.2
West and Central Africa	13	53.8	0.0	38.5	15.4	23.1	15.4	61.5	15.4	53.8	7.7
Middle East/North Africa	2	100.0	50.0	100.0	100.0	100.0	50.0	100.0	100.0	100.0	50.0
Eastern Europe/NIS	2	100.0	0.0	100.0	50.0	100.0	50.0	100.0	50.0	100.0	50.0
South Asia	5	80.0	60.0	60.0	40.0	40.0	0.0	80.0	40.0	40.0	20.0
East Asia/Pacific	4	75.0	50.0	75.0	75.0	75.0	25.0	75.0	75.0	75.0	0.0
Latin America and Caribbean	7	100.0	71.4	71.4	57.1	57.1	42.9	85.7	57.1	85.7	42.9
Total	46	78.3	28.3	67.4	47.8	58.7	34.8	80.4	43.5	73.9	28.3
Number of surveys with expected relationships		36	13	31	22	27	16	37	20	34	13
Z-scores		3.69	6.90	2.21	12.99	1.03	8.93	3.98	11.64	3.10	6.90
P-values		0.00	<0.001	0.14	<0.001	0.15	<0.001	<0.001	<0.001	0.00	<0.001

* indicates p<0.05; ** indicates p<0.01, and *** indicates p<0.001

Models 1, 2, and 4 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, and maternal age^2.

Models 3 and 5 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, maternal age^2, and child's birth order.

Armenia and Ukraine excluded from analysis

Appendix Table 17: Logistic regression models for health facility delivery among all births in the last 5 years: Adjusted odds ratios (AOR) for planning status of the birth: Lightborne unwantedness (Model 1), retrospective unintendedness (Models 2 and 3), and retrospective unwantedness (Models 4 and 5) measures.

		Lightbourne		Retrospective unintendedness				Retrospective unwantedness			
		Model 1		Model 2		Model 3		Model 4		Model 5	
		AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
East and Southern Africa	Burundi 2010	1	0.84,1.20	0.89	0.78,1.01	0.94	0.82,1.07	1.04	0.78,1.38	1.16	0.87,1.55
East and Southern Africa	Ethiopia 2011	1.17	0.76,1.78	1.01	0.80,1.28	1.04	0.81,1.32	1.24	0.90,1.71	1.31	0.94,1.82
East and Southern Africa	Kenya 2008-09	0.87	0.66,1.13	0.72***	0.59,0.87	0.81*	0.67,0.98	0.81	0.63,1.03	0.91	0.72,1.17
East and Southern Africa	Lesotho 2009	0.70**	0.55,0.89	0.63***	0.53,0.74	0.71***	0.60,0.84	0.69***	0.55,0.85	0.80*	0.64,1.00
East and Southern Africa	Madagascar 2008-09	1.01	0.84,1.22	0.89	0.75,1.05	0.94	0.79,1.11	0.96	0.76,1.21	1.06	0.83,1.35
East and Southern Africa	Malawi 2010	0.94	0.82,1.08	0.90*	0.81,0.99	0.93	0.84,1.03	0.96	0.86,1.07	1.00	0.89,1.12
East and Southern Africa	Namibia 2006-07	0.81	0.63,1.04	0.93	0.78,1.11	1.01	0.84,1.21	0.82	0.67,1.02	0.88	0.71,1.09
East and Southern Africa	Rwanda 2010	0.71***	0.61,0.82	0.69***	0.62,0.77	0.80***	0.71,0.90	0.82*	0.69,0.96	1.04	0.87,1.24
East and Southern Africa	Swaziland 2006-07	0.71**	0.56,0.90	0.75**	0.60,0.93	0.84	0.67,1.05	0.76**	0.62,0.93	0.84	0.69,1.03
East and Southern Africa	Tanzania 2010	0.84	0.66,1.06	0.87*	0.76,1.00	0.98	0.85,1.13	1.29	0.90,1.85	1.44	0.99,2.12
East and Southern Africa	Uganda 2011	1.1	0.91,1.32	0.96	0.85,1.10	1.01	0.89,1.15	0.93	0.74,1.18	1.00	0.79,1.28
East and Southern Africa	Zambia 2007	1.13	0.87,1.48	1.00	0.86,1.16	1.05	0.90,1.22	1.06	0.88,1.28	1.11	0.91,1.35
East and Southern Africa	Zimbabwe 2010-11	0.79	0.60,1.04	0.83*	0.71,0.96	0.91	0.78,1.07	0.94	0.70,1.26	1.04	0.76,1.43
West and Central Africa	Benin 2006	1.60***	1.29,2.00	2.57***	2.09,3.16	2.86***	2.31,3.55	2.66***	1.77,3.98	3.40***	2.22,5.21
West and Central Africa	Burkina Faso 2010	1.21	0.97,1.51	0.99	0.80,1.23	1.06	0.85,1.32	1.58*	1.00,2.48	1.84**	1.16,2.91
West and Central Africa	Congo (Brazzaville) 2005	0.68	0.38,1.22	0.76*	0.59,0.97	0.79	0.62,1.01	0.95	0.51,1.76	1.01	0.55,1.85
West and Central Africa	Congo Democratic Republic 2007	1.14	0.80,1.62	1.04	0.84,1.28	1.06	0.86,1.32	0.87	0.64,1.17	0.89	0.66,1.20
West and Central Africa	Ghana 2008	1.22	0.87,1.69	0.88	0.71,1.09	0.97	0.78,1.21	1.17	0.85,1.62	1.32	0.96,1.83
West and Central Africa	Guinea 2005	1.24	0.96,1.60	1.10	0.83,1.45	1.18	0.89,1.57	1.38	0.95,1.99	1.59*	1.09,2.31
West and Central Africa	Liberia 2007	0.86	0.62,1.19	1.18	0.95,1.48	1.22	0.98,1.53	1.36	0.90,2.04	1.52*	1.00,2.31
West and Central Africa	Mali 2006	1.21	0.96,1.51	1.38***	1.16,1.64	1.42***	1.19,1.69	1.83***	1.34,2.49	1.91***	1.40,2.61
West and Central Africa	Niger 2006	1.09	0.50,2.34	0.93	0.74,1.17	0.96	0.76,1.20	1.05	0.45,2.43	1.04	0.45,2.41
West and Central Africa	Nigeria 2008	0.97	0.80,1.17	0.76***	0.66,0.87	0.82**	0.71,0.94	0.83	0.69,1.00	0.90	0.75,1.10
West and Central Africa	Sao Tome and Principe 2008-09	0.73	0.49,1.08	1.02	0.75,1.38	1.17	0.86,1.61	1	0.64,1.56	1.22	0.77,1.93
West and Central Africa	Senegal 2010-11	0.98	0.79,1.23	1.00	0.85,1.17	1.17	0.99,1.38	0.83	0.57,1.21	1.13	0.76,1.66
West and Central Africa	Sierra Leone 2008	0.84	0.62,1.16	0.92	0.74,1.13	0.95	0.76,1.18	0.95	0.71,1.28	0.99	0.73,1.35
Middle East/North Africa	Egypt 2008	0.65***	0.56,0.75	0.68***	0.58,0.80	0.88	0.75,1.04	0.69***	0.57,0.84	0.99	0.80,1.21
Middle East/North Africa	Jordan 2007	1.13	0.67,1.91	0.59*	0.36,0.96	0.71	0.42,1.20	0.28***	0.15,0.52	0.35**	0.17,0.71
Eastern Europe/NIS	Albania 2008-09	1.15	0.50,2.64	0.48	0.18,1.25	0.54	0.20,1.47	0.68	0.22,2.10	0.92	0.27,3.08
Eastern Europe/NIS	Azerbaijan 2006	0.69	0.42,1.12	0.74	0.49,1.09	0.85	0.56,1.29	0.52*	0.31,0.87	0.65	0.39,1.09
South Asia	Bangladesh 2007	0.41***	0.31,0.54	0.75**	0.62,0.92	1.1	0.90,1.34	0.60**	0.43,0.84	1.31	0.90,1.93
South Asia	India 2005-06	0.57***	0.52,0.62	0.67***	0.61,0.73	0.90*	0.82,0.98	0.59***	0.52,0.66	0.95	0.84,1.08
South Asia	Maldives 2009	0.97	0.60,1.57	1.07	0.74,1.55	1.23	0.83,1.84	1.09	0.71,1.66	1.27	0.81,1.99
South Asia	Nepal 2011	0.67***	0.54,0.84	0.75**	0.61,0.93	0.97	0.78,1.20	0.61**	0.45,0.84	1.00	0.73,1.36
South Asia	Pakistan 2006-07	0.84	0.70,1.01	0.83*	0.72,0.96	0.98	0.84,1.14	0.91	0.74,1.12	1.19	0.95,1.48
East Asia/Pacific	Cambodia 2010	0.84	0.68,1.05	0.86	0.71,1.06	1.04	0.85,1.28	0.91	0.72,1.16	1.20	0.93,1.56
East Asia/Pacific	Indonesia 2007	1.02	0.86,1.22	0.85*	0.72,0.99	1.07	0.91,1.26	0.96	0.74,1.24	1.33*	1.00,1.77
East Asia/Pacific	Philippines 2008	0.49***	0.42,0.59	0.80**	0.70,0.91	0.99	0.86,1.14	0.79**	0.67,0.94	1.11	0.92,1.32
East Asia/Pacific	Timor-Leste 2009	1.05	0.80,1.37	1.08	0.82,1.41	1.15	0.88,1.49	1.27	0.78,2.07	1.38	0.86,2.20
Latin America and Caribbean	Bolivia 2008	0.68***	0.56,0.82	0.66***	0.56,0.78	0.74***	0.63,0.88	0.69***	0.59,0.82	0.81*	0.68,0.97
Latin America and Caribbean	Colombia 2010	0.85**	0.75,0.96	1.21***	1.10,1.34	1.40***	1.27,1.56	1.09	0.97,1.23	1.34***	1.18,1.53
Latin America and Caribbean	Dominican Republic 2007	0.96	0.61,1.51	1.70**	1.21,2.38	1.93***	1.34,2.78	1.22	0.82,1.83	1.50	0.95,2.35
Latin America and Caribbean	Guyana 2009	0.99	0.68,1.45	1.35	0.99,1.84	1.50*	1.06,2.12	0.97	0.67,1.42	1.10	0.71,1.69
Latin America and Caribbean	Haiti 2005-06	0.57***	0.45,0.73	0.85	0.71,1.02	1.07	0.89,1.29	0.66***	0.52,0.84	0.96	0.76,1.21
Latin America and Caribbean	Honduras 2005-06	0.76**	0.65,0.90	0.74***	0.66,0.83	0.88*	0.78,0.99	0.71***	0.62,0.83	0.89	0.77,1.03
Latin America and Caribbean	Peru 2004-08	0.83**	0.74,0.94	0.99	0.90,1.09	1.15**	1.04,1.27	0.88*	0.78,0.99	1.14*	1.00,1.29

Region	Number of surveys	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05
East and Southern Africa	13	61.5	23.1	84.6	53.8	69.2	23.1	69.2	23.1	30.8	7.7
West and Central Africa	13	53.8	7.7	53.8	23.1	46.2	7.7	46.2	7.7	30.8	0.0
Middle East/North Africa	2	50.0	0.0	100.0	0.0	100.0	0.0	100.0	50.0	100.0	0.0
Eastern Europe/NIS	2	100.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	0.0
South Asia	5	60.0	20.0	80.0	60.0	40.0	0.0	80.0	20.0	0.0	0.0
East Asia/Pacific	4	100.0	50.0	25.0	0.0	0.0	0.0	50.0	25.0	25.0	0.0
Latin America and Caribbean	7	100.0	100.0	100.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0
Total	46	65.2	28.3	69.6	41.3	52.2	15.2	65.2	30.4	32.6	6.5
Number of surveys with expected relationships		30	13	32	19	24	7	30	14	15	3
Z-scores		1.92	6.90	2.51	10.96	0.15	2.84	1.92	7.58	-2.51	0.14
P-values		0.027	<0.001	0.006	<0.001	0.440	0.002	0.027	<0.001	na	0.444

* indicates p<0.05; ** indicates p<0.01, and *** indicates p<0.001

Models 1, 2, and 4 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, and maternal age^2.

Models 3 and 5 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, maternal age^2, and child's birth order.

Armenia and Ukraine excluded from analysis

Appendix Table 18: Logistic regression models for receipt of all basic vaccinations among children 12-59 months old: Adjusted odds ratios (AOR) for planning status of the birth: Lightborne unwantedness (Model 1), retrospective unintendedness (Models 2 and 3), and retrospective unwantedness (Models 4 and 5) measures.

		Lightbourne		Retrospective unintendedness				Retrospective unwantedness			
		Model 1		Model 2		Model 3		Model 4		Model 5	
		AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
East and Southern Africa	Burundi 2010	1.03	0.80,1.34	1.36**	1.13,1.64	1.38***	1.14,1.67	1.47	0.97,2.22	1.5	0.98,2.29
East and Southern Africa	Ethiopia 2011	0.8	0.63,1.02	1.11	0.96,1.29	1.12	0.96,1.30	1.15	0.88,1.50	1.16	0.89,1.52
East and Southern Africa	Kenya 2008-09	1.06	0.83,1.36	0.80*	0.66,0.96	0.84	0.69,1.01	1.09	0.83,1.44	1.16	0.88,1.54
East and Southern Africa	Lesotho 2009	0.68**	0.52,0.88	1.01	0.84,1.21	1.06	0.88,1.28	0.86	0.67,1.09	0.9	0.70,1.16
East and Southern Africa	Madagascar 2008-09	0.88	0.71,1.10	0.78**	0.66,0.92	0.82*	0.69,0.97	0.63**	0.48,0.84	0.68**	0.51,0.91
East and Southern Africa	Malawi 2010	1.07	0.90,1.29	1.04	0.93,1.17	1.03	0.92,1.17	1	0.88,1.14	0.99	0.87,1.13
East and Southern Africa	Namibia 2006-07	1.03	0.82,1.29	0.88	0.76,1.03	0.91	0.77,1.06	0.92	0.75,1.12	0.94	0.77,1.14
East and Southern Africa	Rwanda 2010	0.85	0.66,1.09	0.93	0.78,1.10	1.03	0.86,1.23	0.78	0.60,1.01	0.9	0.69,1.17
East and Southern Africa	Swaziland 2006-07	0.97	0.74,1.28	0.88	0.71,1.09	0.89	0.71,1.11	0.97	0.77,1.22	0.99	0.78,1.25
East and Southern Africa	Tanzania 2010	0.9	0.68,1.20	1.16	0.94,1.44	1.23*	1.00,1.52	1.36	0.82,2.27	1.47	0.90,2.40
East and Southern Africa	Uganda 2011	1.05	0.85,1.31	1.04	0.91,1.18	1.07	0.94,1.22	0.93	0.74,1.16	0.97	0.77,1.22
East and Southern Africa	Zambia 2007	1.24	0.94,1.64	0.96	0.80,1.14	0.98	0.82,1.17	0.91	0.74,1.13	0.93	0.75,1.16
East and Southern Africa	Zimbabwe 2010-11	0.85	0.65,1.13	0.86	0.72,1.02	0.91	0.76,1.08	0.91	0.66,1.25	0.96	0.70,1.33
West and Central Africa	Benin 2006	0.97	0.83,1.12	1.05	0.92,1.20	1.09	0.96,1.25	0.92	0.72,1.17	1.01	0.79,1.30
West and Central Africa	Burkina Faso 2010	0.82	0.66,1.01	1.06	0.84,1.35	1.11	0.87,1.42	0.87	0.55,1.38	0.95	0.60,1.52
West and Central Africa	Congo (Brazzaville) 2005	0.87	0.53,1.42	0.91	0.74,1.11	0.93	0.76,1.14	0.73	0.47,1.14	0.76	0.48,1.21
West and Central Africa	Congo Democratic Republic 2007	0.99	0.72,1.37	1.02	0.81,1.29	1.05	0.83,1.32	0.98	0.74,1.31	1.01	0.76,1.35
West and Central Africa	Ghana 2008	0.99	0.68,1.44	1.01	0.79,1.29	1.03	0.80,1.33	0.86	0.62,1.18	0.87	0.63,1.21
West and Central Africa	Guinea 2005	1.04	0.77,1.42	1.01	0.78,1.31	1.06	0.82,1.36	1.27	0.82,1.97	1.4	0.91,2.17
West and Central Africa	Liberia 2007	0.85	0.58,1.23	1.17	0.91,1.50	1.16	0.90,1.48	1.23	0.78,1.92	1.17	0.74,1.85
West and Central Africa	Mali 2006	1.09	0.85,1.40	1.06	0.89,1.26	1.05	0.88,1.25	0.87	0.60,1.24	0.86	0.60,1.22
West and Central Africa	Niger 2006	0.78	0.49,1.25	1.15	0.91,1.45	1.19	0.94,1.50	1.66	0.89,3.10	1.7	0.90,3.19
West and Central Africa	Nigeria 2008	0.88	0.70,1.10	0.88	0.76,1.02	0.95	0.82,1.10	0.85	0.68,1.06	0.93	0.75,1.15
West and Central Africa	Sao Tome and Principe 2008-09	1.13	0.68,1.88	1.2	0.91,1.60	1.25	0.95,1.64	1.19	0.74,1.93	1.26	0.79,2.02
West and Central Africa	Senegal 2010-11	1.03	0.83,1.28	0.97	0.86,1.11	1.03	0.91,1.17	0.85	0.64,1.14	0.94	0.70,1.27
West and Central Africa	Sierra Leone 2008	1.02	0.74,1.40	0.94	0.76,1.17	0.92	0.74,1.14	0.96	0.72,1.27	0.92	0.70,1.22
Middle East/North Africa	Egypt 2008	0.89	0.66,1.20	0.85	0.64,1.13	0.86	0.64,1.16	1.1	0.76,1.59	1.15	0.78,1.70
Middle East/North Africa	Jordan 2007	0.87	0.67,1.13	0.71***	0.59,0.86	0.71***	0.59,0.87	0.71**	0.54,0.92	0.71*	0.54,0.94
Eastern Europe/NIS	Albania 2008-09	0.73	0.27,2.02	1.78	0.40,7.94	1.53	0.32,7.39	1	1.00,1.00	1	1.00,1.00
Eastern Europe/NIS	Azerbaijan 2006	0.8	0.51,1.24	0.8	0.57,1.12	0.82	0.58,1.16	0.7	0.43,1.15	0.74	0.45,1.21
South Asia	Bangladesh 2007	0.83	0.64,1.06	0.78*	0.62,0.97	0.85	0.68,1.07	0.85	0.65,1.13	1	0.75,1.33
South Asia	India 2005-06	0.75***	0.69,0.81	0.79***	0.72,0.86	0.93	0.85,1.02	0.69***	0.61,0.78	0.89	0.78,1.01
South Asia	Maldives 2009	0.65	0.37,1.14	0.75	0.50,1.11	0.95	0.62,1.44	0.86	0.53,1.38	1.13	0.67,1.91
South Asia	Nepal 2011	0.81	0.62,1.07	0.72	0.44,1.19	0.93	0.57,1.53	0.57	0.31,1.04	0.79	0.43,1.45
South Asia	Pakistan 2006-07	0.94	0.79,1.13	0.86	0.74,1.01	0.93	0.79,1.09	0.96	0.77,1.19	1.08	0.86,1.35
East Asia/Pacific	Cambodia 2010	0.66**	0.51,0.85	0.59***	0.47,0.75	0.66***	0.52,0.84	0.60***	0.46,0.78	0.70*	0.53,0.92
East Asia/Pacific	Indonesia 2007	0.97	0.82,1.14	0.94	0.81,1.08	1.1	0.95,1.27	0.91	0.71,1.16	1.11	0.86,1.42
East Asia/Pacific	Philippines 2008	0.77*	0.62,0.95	0.92	0.76,1.11	1.05	0.86,1.27	1.02	0.79,1.31	1.24	0.95,1.60
East Asia/Pacific	Timor-Leste 2009	0.93	0.74,1.16	0.98	0.79,1.22	0.98	0.79,1.23	1.17	0.81,1.70	1.18	0.81,1.71
Latin America and Caribbean	Bolivia 2008	0.85	0.71,1.02	0.88	0.74,1.03	0.95	0.80,1.12	0.82*	0.69,0.98	0.92	0.76,1.11
Latin America and Caribbean	Colombia 2010	0.80***	0.71,0.90	0.95	0.86,1.05	1	0.91,1.11	0.76***	0.67,0.85	0.80***	0.70,0.91
Latin America and Caribbean	Dominican Republic 2007	0.99	0.82,1.19	0.87*	0.75,1.00	0.95	0.82,1.10	0.73**	0.61,0.88	0.87	0.72,1.06
Latin America and Caribbean	Guyana 2009	0.73	0.51,1.06	0.78	0.58,1.04	0.81	0.61,1.09	0.7	0.47,1.03	0.74	0.49,1.12
Latin America and Caribbean	Haiti 2005-06	0.85	0.70,1.03	1.08	0.90,1.28	1.21*	1.00,1.46	1.07	0.87,1.33	1.27*	1.02,1.60
Latin America and Caribbean	Honduras 2005-06	0.72***	0.60,0.85	0.83**	0.72,0.95	0.87*	0.76,1.00	0.78**	0.65,0.93	0.83*	0.69,0.99
Latin America and Caribbean	Peru 2004-08	0.76***	0.67,0.85	0.77***	0.70,0.85	0.82***	0.74,0.91	0.71***	0.63,0.80	0.79***	0.69,0.90

Region	Number of surveys	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR<1)	Percent of surveys with expected relationship significant at p<0.05
East and Southern Africa	13	53.8	7.7	53.8	15.4	46.2	7.7	61.5	7.7	69.2	7.7
West and Central Africa	13	61.5	0.0	30.8	0.0	23.1	0.0	69.2	0.0	53.8	0.0
Middle East/North Africa	2	100.0	0.0	100.0	50.0	100.0	50.0	50.0	50.0	50.0	50.0
Eastern Europe/NIS	2	100.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0
South Asia	5	100.0	20.0	100.0	40.0	100.0	0.0	100.0	20.0	40.0	0.0
East Asia/Pacific	4	100.0	50.0	100.0	25.0	50.0	25.0	50.0	25.0	25.0	25.0
Latin America and Caribbean	7	100.0	42.9	85.7	42.9	71.4	28.6	85.7	71.4	85.7	42.9
Total	46	76.1	15.2	63.0	19.6	52.2	10.9	69.6	19.6	58.7	13.0
Number of surveys with expected relationships		35	7	29	9	24	5	32	9	27	6
Z-scores		3.39	2.84	1.62	4.19	0.15	1.49	2.51	4.19	1.03	2.16
P-values		0.000	0.002	0.052	<0.001	0.440	0.068	0.006	<0.001	0.152	0.015

* indicates p<0.05; ** indicates p<0.01, and *** indicates p<0.001

Models 1, 2, and 4 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, and maternal age^2.

Models 3 and 5 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, maternal age^2, and child's birth order.

Armenia and Ukraine excluded from analysis

Appendix Table 19: Logistic regression models for stunting among measured living children less than 5 years old: Adjusted odds ratios (AOR) for planning status of the birth: Lightborne unwantedness (Model 1), retrospective unintendedness (Models 2 and 3), and retrospective unwantedness (Models 4 and 5) measures.

		Lightbourne		Retrospective unintendedness				Retrospective unwantedness			
		Model 1		Model 2		Model 3		Model 4		Model 5	
		AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
East and Southern Africa	Burundi 2010	1.21	0.95,1.55	1.15	0.94,1.36	1.15	0.95,1.38	1.10	0.72,1.68	1.08	0.70,1.67
East and Southern Africa	Ethiopia 2011	0.95	0.76,1.18	1.12	0.95,1.30	1.12	0.96,1.32	1.05	0.81,1.36	1.05	0.81,1.37
East and Southern Africa	Kenya 2008-09	0.95	0.73,1.23	1.00	0.84,1.21	0.97	0.80,1.17	1.11	0.88,1.41	1.08	0.86,1.37
East and Southern Africa	Lesotho 2009	1.31	0.89,1.94	1.25	1.00,1.61	1.25	0.98,1.60	1.22	0.83,1.78	1.21	0.82,1.79
East and Southern Africa	Malawi 2010	1.15	0.90,1.48	1.26**	1.05,1.42	1.25**	1.07,1.45	1.12	0.95,1.32	1.10	0.94,1.30
East and Southern Africa	Namibia 2006-07	1.06	0.84,1.33	1.27**	1.11,1.54	1.24*	1.05,1.46	1.26*	1.01,1.58	1.23	0.99,1.54
East and Southern Africa	Rwanda 2010	1.24*	1.03,1.48	1.11	0.98,1.30	1.04	0.89,1.20	1.09	0.87,1.36	0.97	0.76,1.22
East and Southern Africa	Swaziland 2006-07	1.08	0.83,1.41	0.95	0.78,1.20	0.9	0.72,1.13	1.06	0.84,1.35	1.02	0.80,1.30
East and Southern Africa	Tanzania 2010	1.06	0.86,1.31	1.08	0.92,1.29	1.07	0.90,1.27	0.93	0.66,1.31	0.91	0.65,1.29
East and Southern Africa	Uganda 2011	1.09	0.79,1.50	1.39**	1.01,1.62	1.33*	1.04,1.70	1.70**	1.17,2.46	1.59*	1.09,2.32
East and Southern Africa	Zambia 2007	0.99	0.79,1.24	0.94	0.82,1.06	0.92	0.81,1.05	0.83*	0.69,0.99	0.81*	0.68,0.98
East and Southern Africa	Zimbabwe 2010-11	1.00	0.80,1.25	1.36***	1.17,1.58	1.34***	1.15,1.56	1.24	0.94,1.62	1.21	0.92,1.59
West and Central Africa	Benin 2006	1.07	0.93,1.23	0.99	0.89,1.11	0.96	0.86,1.08	0.97	0.77,1.23	0.9	0.71,1.14
West and Central Africa	Burkina Faso 2010	0.94	0.71,1.23	1.23	0.93,1.50	1.19	0.94,1.50	0.74	0.46,1.19	0.68	0.42,1.10
West and Central Africa	Congo (Brazzaville) 2005	1.70**	1.14,2.54	1.28*	1.09,1.65	1.22	0.99,1.49	1.33	0.86,2.05	1.22	0.80,1.87
West and Central Africa	Congo Democratic Republic 2007	0.83	0.47,1.46	1.04	0.76,1.43	1.02	0.73,1.40	1.00	0.67,1.49	0.95	0.63,1.43
West and Central Africa	Ghana 2008	1.08	0.73,1.59	1.2	1.00,1.52	1.16	0.94,1.44	1.17	0.87,1.58	1.13	0.83,1.54
West and Central Africa	Liberia 2007	1.21	0.91,1.61	0.99	0.80,1.26	0.99	0.79,1.24	1.07	0.70,1.64	1.05	0.70,1.59
West and Central Africa	Mali 2006	0.84	0.69,1.02	1.00	0.85,1.16	0.97	0.84,1.13	0.95	0.68,1.33	0.91	0.65,1.29
West and Central Africa	Nigeria 2008	0.99	0.84,1.17	1.08	0.97,1.22	1.05	0.94,1.18	1.01	0.84,1.20	0.98	0.82,1.16
West and Central Africa	Sao Tome and Principe 2008-09	1.19	0.75,1.88	1.05	0.75,1.46	0.97	0.68,1.37	0.94	0.61,1.46	0.84	0.55,1.30
West and Central Africa	Senegal 2010-11	0.83	0.63,1.11	1.00	0.79,1.24	0.97	0.76,1.23	1.07	0.67,1.73	1.01	0.62,1.64
West and Central Africa	Sierra Leone 2008	0.99	0.64,1.51	0.90	0.69,1.17	0.89	0.68,1.18	1.00	0.66,1.50	0.99	0.65,1.49
Middle East/North Africa	Egypt 2008	0.96	0.84,1.11	1.01	0.88,1.17	1	0.85,1.17	0.89	0.74,1.09	0.86	0.71,1.06
Middle East/North Africa	Jordan 2007	1.02	0.71,1.47	0.99	0.71,1.39	0.94	0.67,1.32	0.99	0.62,1.59	0.91	0.56,1.47
Eastern Europe/NIS	Albania 2008-09	1.53	0.99,2.37	1.33	0.86,2.11	1.24	0.78,1.95	2.21**	1.23,4.00	1.99*	1.05,3.77
Eastern Europe/NIS	Azerbaijan 2006	1.32	0.85,2.05	0.97	0.64,1.50	0.95	0.62,1.45	0.85	0.56,1.30	0.82	0.54,1.23
South Asia	Bangladesh 2007	1.06	0.88,1.28	1.00	0.85,1.16	0.94	0.80,1.10	0.94	0.76,1.17	0.84	0.67,1.05
South Asia	India 2005-06	1.21***	1.13,1.30	1.18***	1.08,1.24	1.07	0.99,1.15	1.28***	1.16,1.41	1.10	0.99,1.21
South Asia	Maldives 2009	1.07	0.72,1.59	1.14	0.90,1.59	1.07	0.79,1.46	1.47*	1.07,2.02	1.41*	1.01,1.96
South Asia	Nepal 2011	1.48**	1.11,1.97	1.38*	1.09,1.78	1.29	0.97,1.70	1.38*	1.03,1.85	1.22	0.87,1.71
East Asia/Pacific	Cambodia 2010	1.17	0.85,1.61	1.22	0.93,1.47	1.08	0.84,1.38	1.37*	1.00,1.88	1.18	0.85,1.63
East Asia/Pacific	Timor-Leste 2009	0.95	0.78,1.15	1.12	0.95,1.33	1.12	0.95,1.32	1.47*	1.07,2.01	1.46*	1.06,2.00
Latin America and Caribbean	Bolivia 2008	1.63***	1.39,1.91	1.34***	1.18,1.57	1.20*	1.03,1.40	1.46***	1.23,1.72	1.27**	1.07,1.51
Latin America and Caribbean	Colombia 2010	1.32***	1.13,1.53	1.28***	1.15,1.48	1.14	1.00,1.30	1.33***	1.15,1.54	1.14	0.98,1.33
Latin America and Caribbean	Dominican Republic 2007	1.61***	1.25,2.07	1.28*	1.05,1.54	1.12	0.92,1.37	1.39*	1.05,1.83	1.09	0.81,1.46
Latin America and Caribbean	Guyana 2009	1.70**	1.17,2.48	1.01	0.74,1.48	0.9	0.65,1.26	1.17	0.80,1.70	0.98	0.64,1.50
Latin America and Caribbean	Honduras 2005-06	1.29***	1.11,1.49	1.42***	1.26,1.59	1.29***	1.15,1.45	1.41***	1.24,1.61	1.25**	1.09,1.43
Latin America and Caribbean	Peru 2004-08	1.57***	1.36,1.82	1.39***	1.21,1.59	1.21**	1.05,1.39	1.45***	1.25,1.69	1.17	0.99,1.39

Region	Number of surveys	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05	Percent of surveys with expected relationship (AOR>1)	Percent of surveys with expected relationship significant at p<0.05
East and Southern Africa	12	66.7	8.3	75.0	33.3	75.0	33.3	83.3	16.7	75.0	16.7
West and Central Africa	11	45.5	9.1	54.5	9.1	45.5	0.0	45.5	0.0	36.4	0.0
Middle East/North Africa	2	50.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eastern Europe/NIS	2	100.0	0.0	50.0	0.0	50.0	0.0	50.0	50.0	50.0	50.0
South Asia	4	100.0	50.0	75.0	50.0	75.0	0.0	75.0	75.0	75.0	25.0
East Asia/Pacific	2	50.0	0.0	100.0	0.0	100.0	0.0	100.0	100.0	100.0	50.0
Latin America and Caribbean	6	100.0	100.0	100.0	83.3	83.3	50.0	100.0	83.3	83.3	33.3
Total	39	69.2	25.6	71.8	30.8	64.1	17.9	69.2	33.3	61.5	17.9
Number of surveys with expected relationships		27	10	28	12	25	7	27	13	24	7
Z-scores		2.24	5.55	2.56	7.02	1.60	3.34	2.24	7.75	1.28	3.34
P-values		0.013	<0.001	0.005	<0.001	0.055	0.000	0.013	<0.001	0.100	0.000

* indicates p<0.05; ** indicates p<0.01, and *** indicates p<0.001

Models 1, 2, and 4 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, and maternal age^2.

Models 3 and 5 also include child's age in months, age^2, urban/rural residence, household wealth, maternal education, maternal age in years, maternal age^2, and child's birth order.

Only surveys that collected height and weight of children are included in analysis.