



Variation in the link between parental divorce and children's health disadvantage in low and high divorce settings



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ABSTRACT

Like in other world regions, children with divorced parents in sub-Saharan Africa experience significant health disadvantages relative to their peers with married parents. Preliminary evidence suggests this disadvantage may not be uniform across the subcontinent's diverse settings. Research from other world regions shows that the childhood health consequences of divorce vary across different contexts. Specifically, we hypothesize that the childhood disadvantages associated with divorce are more severe in regions of sub-Saharan Africa where divorce is rare, and less so where divorce is a more common family experience. Using Demographic and Health Survey data from 290 subnational regions within 31 sub-Saharan African countries, multilevel models document the previously shown link between having a divorced mother and child morbidity and mortality. The study results further demonstrate that the childhood health disadvantage is accentuated in subnational African regions where fewer women are divorced and muted in areas where more women are divorced. The findings demonstrate that the broader context can powerfully moderate childhood health inequalities traditionally thought of as operating at the family or individual level.

Introduction

Across diverse regions of the world, divorce is associated with health disadvantages for the adults and children who experience it (Amato, 2010; Bhuiya & Chowdhury, 1997; Cherlin, Chase-Lansdale, & McRae, 1998; Schmeer, 2013). Only recently, however, has research explored the health implications of divorce in sub-Saharan Africa, where the public health environment suggests the potential for severe health effects is profound. Studies on the link between parental divorce and children's health have developed a clear consensus: African children with divorced mothers have worse health, worse developmental profiles, and lower survival rates, relative to their peers with married mothers (Chae, 2013; Clark & Hamplová, 2013; Thiombiano, LeGrand, & Kobiané, 2013).

Extending this multinational evidence linking parental divorce and children's health disadvantage, we ask whether this association is uniform or if it varies across the subcontinent—specifically, according to the commonality of divorce. Studies of Europe have found that the societal level and acceptability of divorce strongly shape how consequential divorce is for individuals' well-being (Kalmijn & Uunk, 2007; Kalmijn, 2009; Soons & Kalmijn, 2009). The tremendous variation in the prevalence of divorce across Africa motivates our interest in

assessing the relevance of these findings to the African context. At the country level, for example, over 40% of first unions end in divorce within 20 years in Central African Republic, Congo (Brazzaville), and Liberia, compared to fewer than 10% in Mali (Clark & Brauner-Otto, 2015). Within countries there are also striking differences in the commonality of divorce. In Malawi, for instance, the probability of divorce for women in the northern region is nearly one half of what it is for women in the southern region (Reniers, 2003).

Based on this variation, we hypothesize that in geographic areas where divorce is a rare marital outcome, African children of divorced parents will have worse health profiles than in areas where divorce is more common. To test this hypothesis, we pool Demographic and Health Survey (DHS) data from 31 sub-Saharan African countries; these data feature nationally representative samples of reproductive-age women and include detailed information on their marital status and children's outcomes. With these data, we characterize 290 subnational regions by their highly variable prevalence of currently divorced women, and then estimate multilevel models to assess whether the association between divorce and childhood morbidity and mortality varies accordingly. This study highlights the benefit of explicitly considering the contexts in which family-based health inequalities unfold to understand whether they vary accordingly.

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Parental divorce and childhood health in sub-saharan Africa

Does context matter?

There are two primary reasons to hypothesize that the childhood health profiles of children with divorced mothers will be worse in African contexts where divorce is rare. The first reason is selection, which could operate at both the contextual and family levels. In terms of the contextual level, divorce may be more strongly correlated with poor childhood outcomes in low divorce settings because these are also the poorest, least-developed areas. That is, low divorce contexts in Africa may be some of the most socioeconomically disadvantaged settings, where children generally experience poor outcomes. For instance, low divorce areas in Africa tend to be rural settings (Clark & Brauner-Otto, 2015), where school participation is generally low (Zhang, 2006). Living in a rural, educationally disadvantaged setting, where adults have little education and health infrastructure is limited, is correlated with poor childhood health outcomes (Bocquier, Madise, & Zulu, 2011; Fotso, 2007; Kravdal, 2004). Children in these areas may thus experience worse health due to these other contextual realities. Less favorable socioeconomic environments may especially disadvantage children with single—including divorced—mothers, given their possibly limited access to resources at the household level as well. Thus, children with divorced mothers may have worse outcomes compared to their peers with married parents in low divorce societies, but mostly due to the double burden of the unfavorable socioeconomic conditions in their community and their home—not necessarily because of the rarity of divorce.

In addition to selection at the contextual level, selection could also operate at the family level to drive spurious cross-contextual variation in the association between divorce and childhood health disadvantages. That is, individuals who divorce in low divorce settings may be selected on factors associated with poor childhood health. In low divorce settings, the barriers to divorce are higher and thus raise the threshold for leaving a bad marriage (González & Viitanen, 2009; Goode, 1963). In these areas, divorce may be reserved for the most conflict-ridden, possibly even violent, marriages, whereas divorce in other areas may more commonly result from mild marital dissatisfaction (Soons & Kalmijn, 2009). African mothers who divorce where it is uncommon likely have more tumultuous experiences leading up to the divorce than do their peers whose marriages dissolve in settings where divorce is a more typical experience. Because Africa continues to have some of the world's highest rates of intimate partner violence (IPV) (García-Moreno, Jansen, Ellsberg, Heise, & Watts, 2006; Jewkes, Levin, & Penn-Kekana, 2002; Koenig et al., 2003), if divorced women in low divorce settings experience higher marital conflict, this could specifically translate to greater exposure to IPV. IPV is strongly associated with poor childhood health (Åsling-Monemi, Pena, Ellsberg, & Persson, 2003); thus, the circumstances that encourage mothers to divorce in low divorce settings could fully explain why their children have worse outcomes, compared to their peers with married mothers and their peers with divorced parents who live in high divorce settings. That is, in high divorce settings where the threshold for dissolving a marriage is lower, divorce is less likely to be concentrated among the most volatile situations, and thus it may be only weakly correlated with poor childhood health. From this perspective, although children with divorced mothers may have worse health in low divorce settings, accounting for their mothers' distinct profiles could explain the difference.

Aside from selection, a second possibility suggests that the contextual prevalence of divorce could more directly condition its relationship with children's well-being by moderating its economic, social, and psychological implications for mothers. Beginning with economic factors, divorcing in a low divorce setting may put women at especially high risk of poverty. In Africa, bridewealth is a common marital tradition, but it tends to be more common in low divorce settings. Although the norms and expectations surrounding bridewealth

vary tremendously across Africa, in its basic form, the practice involves a prospective husband paying the bride's family goods, such as livestock, clothing, beads, household items, or money (Browning & Miller, 1999). The payment of bridewealth transfers power and authority to the husband and limits a wife's financial autonomy from him and his family (Dodoo, 1998; Horne, Dodoo, & Dodoo, 2013). Thus, given the organization of marriage and family life in low divorce African settings, many divorced women in these areas may have fewer resources than their peers who divorce in a context where it is more common. Moreover, because women's families often have to repay bridewealth if the union ends, divorced mothers in low divorce settings may receive minimal familial support (Goode, 1963; Isiugo-Abanihe, 1994). Because economic disadvantage is closely associated with poor childhood health (Montgomery & Hewett, 2005), the greater economic consequences of divorce in low divorce settings could mean children with divorced parents have especially poor health and lower survival. Conversely, high divorce contexts are often matrilineal settings where women maintain their own budgets and enjoy land rights (O'Rourke, 1995), so divorce may not be as closely linked to financial hardship, thereby loosening its association with poor childhood health.

In addition to greater economic ramifications, divorcing in an African context where divorce is rare may also be more socially challenging for children's mothers than doing so in a place where it is more common. Evidence from across diverse contexts and historical periods suggests that the extent to which divorce—and other family processes—is perceived as socially acceptable increases with its prevalence (Blumer, 1986; DiFonzo, 1997; Spanier & Thompson, 1987; Thornton, 1985; Thornton & Young-DeMarco, 2001; White & Booth, 1991). In fact, in some African settings where divorce is common, it is locally understood as an acceptable, if unfortunate, part of marriage (Kaler, 2001). In high divorce regions of Malawi, even religious leaders support divorce as a strategy for addressing certain marital issues, such as sexual infidelity (Trinitapoli, 2011). Conversely, researchers describe divorce as culturally, religiously, and socially unacceptable in African societies where it is rare. For example, in southeastern Nigeria where divorce is uncommon, Smith (2009) reports that it is viewed as immoral. Divorced women living in African settings where divorce provokes social disapproval report discrimination and isolation (Clark, Beguy, & Cotton, 2013). Based on previous evidence that African children whose mothers are socially isolated experience higher mortality (Adams, Madhavan, & Simon, 2002), this social isolation could further contribute to children of divorced mothers in low divorce societies having worse health outcomes than their peers in high divorce areas.

Building on the notion that divorce is more isolating in low divorce settings, divorced women in these areas may face a greater psychological burden than women who divorce where it is more common (Diener, Gohm, Suh, & Oishi, 2000). Qualitative research of divorced women in Kenya confirms that they internalize the social disapproval of divorce. One divorced woman stated: "I am disrespected because I don't have a husband. The women around here feel that since I am not married then I am not a good member of the community" (Clark et al., 2013). Psychological research shows that negative self-perceptions interfere with emotional well-being (Yang et al., 2007), which could mean divorced women in low divorce settings are more likely to develop depression and anxiety; in turn, children whose mothers have mental health concerns are known to have worse health and developmental outcomes (Engle et al., 2007; Patel, Rahman, Jacob, & Hughes, 2004).

Current study

In light of these potential mechanisms, in this study we assess whether the poor childhood health outcomes associated with having a divorced mother vary across low versus high divorce contexts in sub-Saharan Africa. Although our data do not allow us to fully rule out the possibility that selection at either the contextual or family level drives

the findings, we consider both contextual- and family-level correlates of divorce to try to isolate whether the contextual prevalence of divorce uniquely conditions the link between parental divorce and children's health.

Our investigation focuses on the prevalence of divorce in children's subnational region of residence. Multinational research on divorce often focuses on variation in its prevalence at the country-level (Bracher, Santow, & Watkins, 2003; Clark & Brauner-Otto, 2015; Gage & Njogu, 1994; Locoh & Thariat, 1995; Tilson & Larsen, 2000), but divorce levels vary *within* African countries (Kaler, 2001; Reniers, 2003, 2008; Smith, 2009; Solivetti, 1994). Thus, rather than analyze if the consequences of divorce for children vary across African countries with distinct levels of divorce, we focus on variation across the smaller, subnational regions that more closely reflect the day-to-day environments in which mothers and children live.¹ By focusing on the subnational region-level, our results better capture the variation in the prevalence of divorced mothers in the cultural, social, economic, and institutional contexts in which divorced mothers pursue their lives as single mothers. The indicator also offers a crude sense of the extent to which divorced mothers are likely to interact with other divorced women, and the extent to which their status as a divorced mother will be common versus rare, and thus possibly stigmatizing, which could put them at elevated risk of discrimination and negative economic, social, and psychological outcomes.

Researchers have widely used subnational regions in contextual research in sub-Saharan Africa, including to track spatial variation in family processes (Ezeh, 1997; Reniers, 2003; Smith-Greenaway & Heckert, 2013; Smith-Greenaway & Trinitapoli, 2014), health environments (Korenromp et al., 2003), educational inequality (Weinreb, 2011), and even the likelihood of political conflict (Østby, Nordås, & Rød, 2009). Because we leverage data from 31 countries, allowing us to analyze 290 subnational regions across sub-Saharan Africa, we are able to capture a 20 percentage-point difference in the prevalence of currently divorced women in children's subnational regions. By illuminating this variation, our study demonstrates the wide degree to which the link between divorce and children's well-being varies across African families.

Data and analytic samples

We use data from 31 Demographic and Health Surveys (DHS) collected in sub-Saharan Africa since 2000 to analyze whether the link between divorce and poor childhood health is pronounced in low versus high divorce subnational regions of sub-Saharan Africa. We focus on the following countries: Burkina Faso, Benin, Burundi, Cameroon, Chad, Congo (Brazzaville), Democratic Republic of the Congo, Ethiopia, Gabon, Ghana, Guinea, Ivory Coast, Kenya, Liberia, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome Principe, Sierra Leone, Senegal, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe (see Appendix A).

The datasets come from nationally representative, cross-sectional surveys. The DHS uses a stratified random-sampling approach, with clusters providing the primary sampling unit. Within each selected cluster, the DHS randomly samples families. Household heads complete a full roster of members, from which the DHS identifies women ages 15 to 49. Because women report on children's health, and because the study focuses on child outcomes, in all analyses we focus on the maternal and child data that women provide. Data are representative at the subnational region-level.

We investigate the link between divorce and two child outcomes: child morbidity and mortality. In terms of child morbidity, we use

information on children's health in the two weeks preceding the survey (see full description in the Measures section), which is collected for all children under age 5 who are still alive at the time of the survey. Following the convention of prior work on the same health indicators (Stallings, 2004), we restrict these analyses to the 192,810 children age six months and older. We exclude less than 1 percent of cases with missing data, resulting in a final analytic sample of 192,335 children.

To analyze child mortality, we use data from mothers' retrospective reproductive history calendars, restricting the sample to births in the seven years prior to the survey. This restriction helps ensure that current family characteristics align with those at the time of the child's birth, while also reducing censoring by ensuring that a large proportion of the sample has reached their 5th birthday. By sampling children who were born more than five years prior to the survey, we help ensure that children are not omitted due to their mother slightly over-reporting their age to avoid the detailed health-related questionnaire the DHS administers for births within the past five years (Schoumaker, 2011). In ancillary analyses, we loosened the restriction to children born in the past 10 years and confirmed that the results are consistent. Finally, we exclude the less than 1 percent of children with missing data on key independent variables, resulting in a final sample of 357,474 children. Appendix A includes more information on the survey years and samples.

Note that in sensitivity analyses, we used the preceding round of each survey to ensure the stability of our findings regardless of the year of survey data. In all instances, our results were consistent regardless of the survey year, with the exception of Mozambique. Because women's reports of divorce/separation in the most recently available dataset were notably inconsistent with levels from the three prior surveys rounds, we made the analytic decision to leverage DHS data from the prior round—the 2003/04 survey—given concerns with the instability of divorce estimates in the more recent survey. As subsequent rounds of DHS data become available for Mozambique, future research should confirm the robustness of the findings we document here in the context of Mozambique.

In all analyses, we compare children according to their mothers' marital status, but we exclude children whose mothers are in their second or subsequent union. We do so because our cross-sectional data prohibit us from knowing if divorce preceded the remarriage (versus spousal death). Appendix B shows that the profiles of children whose mothers have been married more than once, and are thus excluded from the study, differ from their peers, as evidenced by their higher levels of mortality and greater family instability. Despite these differences, ancillary analyses (not shown but available upon request) confirm that including these children in our multivariate models and categorizing their mothers as "remarried" produces results consistent with those shown here.

To analyze cross-contextual variation in the health profiles of children with divorced parents, we categorize 290 subnational regions according to their prevalence of divorce. To characterize the 290 subnational regions, we aggregate data from a systematic, stratified, two-stage probability sample of households. We use data from interviews with household heads and reproductive-age women. In some instances, the household head or the mother of the children in our study are included in the samples from which we create contextual measures. Because excluding them does not alter the results, and because each subnational region has an average of 1,894 children, we include the index-family in creation of the aggregate measures.

In all analyses, we use the clustering feature in Stata to account for the fact that some children in the data are siblings. In supplementary analyses, we randomly sampled one child per mother among women with multiple children in the dataset and re-estimated each model. Results from these analyses are consistent with those shown here; this confirms that the presence of multiple siblings is not influencing the findings.

¹ Although the DHS does include smaller aggregate units (i.e., "clusters"), they are not intended for contextually focused analyses, but instead are enumeration areas drawn only for the purpose of sampling.

Measures

Dependent variables

Child morbidity. As noted above, the DHS asks mothers about their children's health in the two weeks before the survey. Specifically, interviewers ask mothers to report whether each (living) child had (1) a cough, accompanied by short, rapid breathing, (2) a fever, and/or (3) diarrhea in the two weeks preceding the survey. The presence of a cough and rapid breathing can signal acute respiratory infection (ARI), which remains a leading cause of child death worldwide (Nair et al., 2010). A fever can indicate a broad range of illnesses, from benign viruses to life-threatening infections, but in malaria-endemic settings in Africa, fevers are considered a meaningful health event (Organization, 2006). In some contexts, standard protocol is to treat fevers with anti-malarial medications to reduce the risk of death (Schellenberg et al., 2003). Diarrhea is a major cause of childhood morbidity, and it is often a contributory cause of child mortality, especially in communities where rehydration therapy is unavailable (Rice, Sacco, Hyder, & Black, 2000). We create a summative measure of the total number of symptoms (0 to 3) a child had in the two weeks prior to the survey (for a similar approach to using symptom-based data to study childhood illness, see Schellenberg et al. (2003)).

Child mortality. In a second set of analyses, we analyze children's hazard of mortality before age five. As noted above, we use mothers' retrospective reports of the birthday of each child born in the past seven years, whether the child is still alive, and, if not, the age at which the child died. With this information, we create a month-based hazard file analyzing child death prior to age five. Children who have not reached their 5th birthday at the time of the survey are censored, which we address using discrete-time hazard analysis.

Key independent variables

Subnational region-level divorce. We use data from all reproductive-age women interviewed—including women without children—to calculate the percentage of women who are *currently* divorced in each of the 290 subnational regions. This indicator offers a valuable single-point in time snapshot of the local marital context. This crude, static measure does not illuminate shifts in the prevalence of divorce. Nor does it necessarily reflect the divorce rate. Nonetheless, the indicator is likely correlated with the divorce rate, and thus it offers a rough sense of the extent to which divorce is prevalent. In subnational regions where remarriage is common and occurs soon after divorce, we will find a lower prevalence of currently divorced women relative to those who have ever experienced divorce. Conversely, in settings where divorced women do not remarry at high rates, this indicator will more closely resemble the divorce rate (Grover, 2011).

Mother's marital status. The DHS asks all mothers their marital status at the time of the survey, including whether they have never been married or are currently married, widowed, or divorced. To improve the specificity of this measure for the purposes of our analysis, we use additional data. First, as we described in the Analytic Sample section, we limit our sample to children whose mothers have never remarried, meaning that all married mothers in our sample have been continuously in their first union. Similarly, this means that divorced and widowed mothers in our sample have been continuously divorced or widowed since their first marriage ended. Second, we use information on the timing of mothers' first marriage and their children's birth—with monthly precision—to classify women who were married after their child's birth as "never married," to reflect their marital status at the time of birth. Yet, because marriage is a prolonged process in Africa, some couples who formally marry after their child's birth likely initiated the process during pregnancy. Thus, if women marry within six months of their child's birth, we classify them as having been "married" (we eliminated this condition in ancillary analyses and

confirmed that doing so does not significantly influence the results). Third, we leverage data on whether co-wives are present in the union, because polygyny is associated with poor childhood health outcomes (Omariba & Boyle, 2007; Smith-Greenaway & Trinitapoli, 2014). Thus, our ultimate measure of mothers' marital status is a five categorical variable: divorced, widowed, never married, married monogamously (reference group), and married polygynously. We discuss the limitations of this measure—and its consequence for our study's design—in the Measurement and Design Limitations section.

Interaction between subnational region-level divorce and mother's marital status. To assess whether the consequences of divorce vary in low and high divorce settings, we interact the subnational region-level prevalence of currently divorced women with mother's marital status. A negative coefficient/odds ratio less than one indicates that the risk of child morbidity and mortality associated with divorce is less severe in high divorce regions and exacerbated in low divorce ones. In the child mortality analyses, we also test for variation in the consequences of divorce in low versus high divorce settings by estimating Kaplan-Meier hazard curves for children of divorced mothers disaggregated according to their subnational region's divorce level.

Key covariates

Because a subnational region's divorce level and socioeconomic profile are likely correlated, we control for additional features of the subnational regional contexts that could drive cross-regional variation in the childhood consequences of divorce. We use the DHS's classification of households as "rural" versus "urban" to generate a continuous measure of the percentage of households in each area that are rural. We also include a continuous measure of the percentage of women employed at any period during the year prior to the survey. Finally, we create an aggregate measure of the highest level of education that the average woman (age 15 to 49 years old) attained.

We also include key maternal characteristics to account for variable selection of divorced mothers across low versus high divorce subnational regions, which could drive differences in the correlation between having a divorced mother and children's health. Drawing on past research suggesting that divorce is concentrated among high-conflict marriages in settings where it is uncommon (Soons & Kalmijn, 2009), we account for mothers' exposure to IPV. The DHS recently incorporated a special module into select country surveys to track IPV. DHS interviewers asked women if their current partner (or most recent partner if divorced/widowed) ever (1) pushed, shook, threw something at them, (2) slapped, (3) punched with fist or something hard, (4) kicked or dragged, (5) tried to strangle or burn, (6) threatened with a knife/gun or other weapon, (7) ever attacked with a knife/gun or other weapon, (8) physically forced sex when not wanted, or (9) ever forced sexual acts when not wanted. Similar to approaches used by the World Health Organization, from these nine items, we create a binary indicator of whether a mother has ever experienced IPV (no = 0, yes = 1).

These data afford a rare opportunity to compare the prevalence of IPV among divorced women, but they are available in only 17 of the 31 countries in our study: Burkina Faso, Democratic Republic of Congo, Cameroon, Gabon, Ghana, Kenya, Ivory Coast, Liberia, Mali, Malawi, Nigeria, Rwanda, Sao Tome Principe, Tanzania, Uganda, Zambia, and Zimbabwe. Limiting our study to this sample would compromise our ability to capture a wide range in the prevalence of currently divorced women across children's subnational regions, and lessen the extent to which the study is representative of sub-Saharan African families, regions, and countries. We thus use the full sample and include a category representing "no data" in the multivariate results (see Liefbroer and Dourleijn (2006) as an example of a multinational study adopting this approach for handling missing data).

We also compare divorced mothers' socioeconomic profiles across low versus high divorce settings. We focus on two measures of socioeconomic resources: education and household wealth. We use a

continuous measure (ranging from 0 to 23 years) of mothers' educational attainment. We also use the DHS-constructed household wealth index. The DHS collects information on households' ownership of various assets (e.g., radio, television, refrigerator, bicycle, and car) and characteristics of the house (e.g., availability of electricity, source of drinking water, type of toilet facility, and number of rooms) and aggregates these variables into a principal component factor analysis. The factor scores are used to categorize households into the five quintiles we use here: poorest, poor, middle, rich, or richest (Bollen, Glanville, & Stecklov, 2007; Filmer & Pritchett, 1998; Houweling, Kunst, & Mackenbach, 2003). One must interpret findings based on the household wealth index with caution, because the index reflects a household's socioeconomic resources and may not necessarily reflect resources from which individual women and their children benefit. Moreover, without data on divorced women's economic standing before and after divorce, this indicator cannot tell us the extent to which divorce leads to mothers' current household conditions.

In all models, we include a set of demographic variables known to influence child morbidity and mortality: maternal age at the time of birth, birth order, whether the child is the first born, and whether the child is born fewer or more than 36 months after the prior child. We also control for the child's sex and twin status, and we account for the child's age. When modeling child morbidity, we include a continuous measure of the child's age in months. In models of child mortality, we restructured our data to a time-based dataset in which observations refer to time (i.e., months), and each birth contributes the number of months a child was observed. In addition to explicitly handling time through our event-history modeling approach, all models control for the child's age using a standard categorical approach (0 to 11 months, 12 to 23 months, 24 to 35 months, and 36+ months).

A country's political, cultural, and economic climate is likely associated with divorce levels across its subnational regions and the health of its child population. Thus, to address the possible confounding nature of country-level factors, we take a fixed-effects approach by including a set of dummy variables representing each of the 31 countries in our sample. This modeling strategy enables us to account for constant, unobserved country-level factors that may confound the associations of interest. For examples of multinational studies that use this approach, see Liefbroer and Dourleijn (2006) and Smith-Greenaway and Trinitapoli (2014).

Measurement and design limitations

Before describing our modeling approach, it is important to acknowledge our study's key measurement, and in turn, design limitations. Our study relies on a measure of women's marital status (and other family and household characteristics) only at the time of the cross-sectional survey. That is, we do not have data that track mothers' marital status over children's lives. This measurement limitation is of particular concern for the child mortality analyses, given that we rely on retrospective mortality data. That is, our analysis of child mortality focuses on event-history files that we constructed with information from mothers' retrospective reports (date of birth, vital status, and date of death) for children born within the past seven years. Ideally, we would leverage prospective data that follow families over time and track changes in their region's divorce level, parents' marital status, and children's vital status. Unfortunately, even in the most resource-rich countries, nationally representative, prospective data following children from infancy to age five are rare. Aside from Demographic Surveillance Systems (see Madhavan, Collinson, Townsend, Kahn, and Tollman (2007) for a detailed description of this approach), such data are virtually unheard of in resource-poor contexts like sub-Saharan Africa. Thus, we adopt the same analytic strategy as other recent studies of child mortality in Africa and other low-income regions (Clark & Hamplová, 2013; Shin, 2007; Smith-Greenaway & Trinitapoli, 2014; Van de Poel, O'Donnell, & Van Doorslaer, 2007). This means, however,

that establishing the temporal ordering of parental divorce and child death is not possible. Thus, these results should be interpreted cautiously as associations and not causal.

This measurement limitation highlights the value of our investigation of child morbidity alongside child mortality. The child morbidity measure refers to children's health in the two weeks prior to the survey—meaning we are better able to establish temporal ordering. Unless a mother divorced in the 14 days before the survey, we know the divorce occurred before the child's recent health episode. Of course, a child's health problems could have begun prior to the divorce—a reality we cannot rule out without longitudinal data that observe children's health pre- and post-divorce. However, the health symptoms we analyze (i.e., cough, fever, diarrhea) are not indicative of chronic health problems, but instead point to acute, infectious processes tied to children's immediate environment. Thus, our measurement of divorce is unlikely to bias these results.

Methods

We estimate two sets of multilevel, multivariate models that help us answer the study's central question of whether the childhood health disadvantage of having a divorced mother differs in low versus high divorce settings. We first estimate multilevel Poisson regression models to investigate child morbidity. The Poisson modeling approach appropriately handles the count outcome variable (i.e., number of symptoms) and its non-negative integer nature. In ancillary analyses, we explored the robustness of the findings to other generalizations of the Poisson modeling approach, including a negative binomial regression. We also estimated ordinary least squared regression models, treating the outcome linearly. Although the *p*-values were inflated, results from ancillary models were consistent with those derived from the following Poisson models. We thus show results from three models:

- (1) Child Morbidity = $\beta_0 + \beta_1 \text{Mothers' Marital Status}_{ijk} + \beta_2 \mathbf{X}_{ijk} + \beta_3 \mathbf{C}_k + u_j$
- (2) Child Morbidity = $\beta_0 + \beta_1 \text{Mothers' Marital Status}_{ijk} + \beta_2 (\text{Prev Divorce}_{jk} * \text{Mothers' Marital Status}_{ijk}) + \beta_3 \text{Prev Divorce}_{jk} + \beta_4 \mathbf{X}_{ijk} + \beta_5 \mathbf{C}_k + u_j$
- (3) Child Morbidity = $\beta_0 + \beta_1 \text{Mothers' Marital Status}_{ijk} + \beta_2 (\text{Prev Divorce}_{jk} * \text{Mothers' Marital Status}_{ijk}) + \beta_3 \text{Prev Divorce}_{jk} + \beta_4 \text{Indicators of Maternal Selection}_{ijk} + \beta_5 \text{Indicators of Contextual Selection}_{jk} + \beta_6 \mathbf{X}_{ijk} + \beta_7 \mathbf{C}_k + u_j$

We start with a base model (1) that estimates the association between mother's marital status and child morbidity. In this model, and all subsequent models, we include controls for child *i* in subnational region *j* in country *k*; where \mathbf{X}_{ijk} is a vector of standard demographic controls that are known to influence children's well-being; \mathbf{C}_k are country dummy variables; u_j is the subnational, region-level random effect; and the β s represent the corresponding coefficients. In Model 2 we include the subnational region-level of divorce, and we interact it with the marital status of the child's mother to test whether the association between divorce and child morbidity varies across settings. Model 3 includes indicators on which divorced women may differ in low versus high divorce settings, as well as indicators at the contextual level, to evaluate whether these factors drive cross-regional differences in the consequences of divorce.

To test the robustness of these findings, we next estimate a series of multilevel discrete-time hazard models of child mortality. In these

models, we must handle two methodological complexities: censoring and the hierarchical structure of the data. In terms of the former, the models address the fact that children who are still alive at the time of the observation period (i.e., at the survey), or who have not yet reached their 5th birthday, are right-censored. Our multilevel models calculate standard errors that adjust for the fact that children are nested within subnational regions, which are in turn nested within countries. We estimate a parallel series of hazard models predicting the month of death:

$$(1) \text{logit}(h_{ijk}) = \alpha_i + \beta_1 \text{Mothers' Marital Status}_{ijk} + \beta_2 X_{ijk} + \beta_3 C_k + u_j$$

$$(2) \text{logit}(h_{ijk}) = \alpha_i + \beta_1 \text{Mothers' Marital Status}_{ijk} + \beta_2 (\text{Prev Divorce}_{jk} * \text{Mothers' Marital Status}_{ijk}) + \beta_3 \text{Prev Divorce}_{jk} + \beta_5 X_{ijk} + \beta_6 C_k + u_j$$

$$(3) \text{logit}(h_{ijk}) = \alpha_i + \beta_1 \text{Mothers' Marital Status}_{ijk} + \beta_2 (\text{Prev Divorce}_{jk} * \text{Mothers' Marital Status}_{ijk}) + \beta_3 \text{Prev Divorce}_{jk} + \beta_4 \text{Indicators of Maternal Selection}_{ijk} + \beta_5 \text{Indicators of Contextual Selection}_{jk} + \beta_6 X_{ijk} + \beta_7 C_k + u_j$$

The base model (1) estimates the relationship between mother's marital status and the hazard (*h*) of child death. In this model, and all subsequent models, we include controls for child *i* in subnational region *j* in country *k*; where X_{ijk} is a vector of standard demographic controls known to influence child survival; C_k are country dummy variables; u_j is the subnational, region-level random effect; and the β s represent the corresponding coefficients. In Model 2 we again include the subnational, region-level of divorce and interact it with individual children's mothers' marital status to test whether the child mortality risk associated with divorce varies accordingly. In Model 3, we again account for indicators at the maternal and contextual levels that may correlate with the level of divorce and women's selection into it. We then graph Kaplan-Meier hazard functions to provide an illustration of the central finding.

Results

Table 1 provides descriptive statistics of the sample. The first column focuses on the sample of living children among whom we analyze morbidity. Among this sample, mothers reported their children experienced an average of 0.59 symptoms within the two weeks preceding the survey. The second column includes the full sample—including the 9 percent of children who died before their 5th birthday.

Although the table shows minor differences in sample characteristics, the analytic samples are generally comparable. In both analytic samples, children's mothers experienced diverse marital arrangements. The majority of children (over 60 percent) have mothers who have been continuously monogamously married, approximately one-fifth have polygynously married mothers, nearly 5 percent have divorced mothers, and small percentages have single mothers due to widowhood or having never married. The average child lives in a subnational region where over 6 percent of women are currently divorced. Yet, the large standard deviation confirms that the prevalence of divorce varies considerably across the 290 subnational regions in our data, ranging from less than 1 percent in the north-central region of Burkina Faso to over 18 percent in the Cabo Delgado region of Mozambique.

The descriptive results further show that nearly 20 percent of mothers have experienced IPV perpetrated by their current (or previous, if divorced) partner (among mothers in the 17 countries with IPV data). In general, children's mothers have fewer than four years of school. The average child lives in a rural context where about 65 percent of women have worked in the past year, and the average woman has just over four years of education; however, the large standard deviations point to the tremendous diversity across Africa.

Table 1
Descriptive Statistics.

	Child Morbidity Sample ^a Mean/%	Child Mortality Sample ^b Mean/%
Child morbidity: # of symptoms	0.59 (0.87)	
Child died		9.41
<i>Mothers' marital status</i>		
Divorced	4.20	4.39
Widowed	1.35	1.73
Never-married	6.79	7.07
Polygynously married	22.38	23.74
Monogamously married (reference)	65.28	63.07
Subnational region-level prevalence of divorced women (%)	6.34 (3.79)	6.36 (3.75)
<i>Key maternal characteristics</i>		
Experienced IPV ^c	18.71	18.43
Years of formal schooling	3.66 (4.15)	3.49 (4.09)
<i>Household wealth</i>		
Poorest	24.12	24.43
Poor	20.86	21.15
Average	19.56	19.64
Rich	18.38	18.35
Richest	17.08	16.43
<i>Additional controls</i>		
<i>Child-level</i>		
Maternal age at birth	26.06 (6.72)	25.91 (6.76)
Birth order	3.55 (2.40)	3.57 (2.43)
Length of preceding birth interval		
First born	23.05	23.28
Short interval	42.98	45.48
Long interval	33.97	31.24
Female	49.55	49.33
Multiple birth	2.70	3.32
<i>Subnational region-level</i>		
Percent households rural	69.60 (22.64)	69.89 (22.19)
Percent women employed	64.89 (17.47)	64.82 (17.51)
Average years of school among women	4.22 (2.53)	4.15 (2.54)

^a All living children six months and older N = 192,335 children.
^b All children born in the past seven years N = 357,474 children.
^c Among subsample of countries with domestic violence module.

Variation in divorce across subnational regions of Africa

To illustrate further diversity in the prevalence of divorced women across the 290 subnational regions in our sample, Fig. 1 plots each of the 290 regions according to their prevalence of divorced women, by country. The figure demonstrates two important findings. First, we see clear country-level differences in the average prevalence of divorce across subnational regions. In general, subnational regions in West African countries (e.g., Burkina Faso, Guinea, Mali, Benin, Nigeria, and Niger) have some of the lowest levels of divorced women, whereas subnational regions in southern and eastern African countries (e.g., Mozambique, Malawi, and Zambia) tend to have notably higher levels. Despite these overall trends, there are important exceptions. For example, Liberia, a West African country, has a generally high prevalence of currently divorced women across all subnational regions, whereas some regions in Namibia, a southern African country, have exceptionally low prevalence of currently divorced women. Second, Fig. 1 illustrates high levels of within-country variation in the regional prevalence of divorced women. In several countries—Ethiopia, Madagascar, Mozambique, Tanzania, and Uganda—the prevalence of currently divorced women varies by approximately a 10 percentage-point difference across subnational regions, illuminating the importance of capturing this within-country variation. In total, we capture a nearly 20 percentage-point difference in the prevalence of divorced women across the 290 subnational regions.

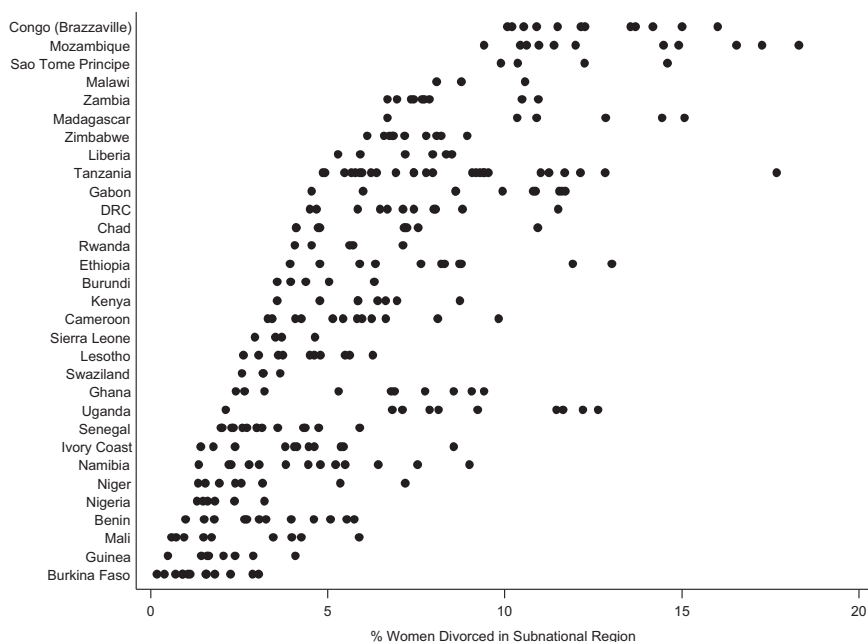


Fig. 1. Variation in the Prevalence of Currently Divorced Women across 290 subnational regions in Africa.

Contextual correlates of divorce and variation in the characteristics of divorced mothers in subnational regions of Africa with low versus high divorce

To assess whether subnational regions where a low prevalence of women are divorced share features that may make them unhealthy places for African children—especially children whose divorced mothers may be resource-constrained—Table 2 shows the association between the subnational region-level of divorced women and socioeconomic features. For the purposes of these analyses, we categorize the 290 subnational regions according to the level of divorce. “Low divorce” regions have a divorce prevalence one or more standard deviations below the mean value; in “medium divorce” regions, the prevalence of currently divorced women is within one standard deviation above/below mean value; and “high divorce” regions have a prevalence of divorce more than one standard deviation above the mean value. As Table 2 shows, subnational regions where there are fewer divorced women tend to be highly rural. Although we find no clear association between the degree of women’s engagement in formal work and the prevalence of currently divorced women, there is clear evidence that in contexts where divorce is less common, women generally tend to have limited education. Conversely, in African subnational regions where divorced women are more prevalent, women tend to have attained more education. These associations highlight the importance of accounting for other contextual attributes when studying the links between the prevalence of divorce, parental divorce, and children’s outcomes.

Results in Table 3 confirm that—in addition to the attributes of low divorce contexts differing from areas where divorce is more common—African women who divorce in low divorce settings also differ

Table 2
Characteristics of 290 Subnational Regions in sub-Saharan African Regions, by Prevalence of Divorce.
Source: Demographic and Health Survey.

	Low Divorce	Medium Divorce	High Divorce
Percent households rural	73.39 (9.13)	64.90 (24.76)	66.20 (28.00)
Percent women employed	71.61 (16.65)	60.63 (18.89)	70.59 (12.99)
Average years of school among women	2.34 (2.31)	5.03 (2.62)	5.24 (2.12)

(compared to their married peers) in ways that could explain their children’s worse health and survival. In line with the idea that divorce is concentrated among high-conflict marriages in low divorce societies, divorced women in African regions where divorce is less common are substantially more likely to have experienced IPV perpetrated by their previous spouse, compared to divorced women where divorce is more prevalent. Approximately 28 percent of divorced mothers experienced IPV in low divorce societies, compared to 13 percent of their married peers (a difference of 15 percentage points). In areas with high concentrations of divorced women, the difference between married and divorced mothers’ reports of IPV is cut in half.

Table 3 also shows variation in the size of the socioeconomic gap between divorced and married mothers by the subnational regional prevalence of divorced women. Although divorce is generally more common among disadvantaged groups in the United States (Stanley, Amato, Johnson & Markman, 2006), corroborating past work (Bernardi & Martínez-Pastor, 2011; Chen, 2012; Goode, 1963; Martin, 2006, Park & Raymo, 2013; Raymo, Iwasawa, & Bumpass, 2004), Table 3 shows that divorced mothers tend to be more highly educated and to live in better-off households in low versus high divorce settings in Africa. That is, despite evidence of aggregate-level socioeconomic disadvantage in regions where there are fewer divorced women (e.g., rurality, low female employment, and low female education), and although divorced mothers are more likely to have experienced IPV, divorced women’s socioeconomic profiles in settings with fewer divorced women hint at advantage compared to their married counterparts. In regions where divorce is more prevalent, divorced mothers are slightly more educated and likely to live in wealthier households compared to their married peers—however, the degree of the difference is smaller than in low divorce societies. This complicates the explanation that divorced mothers’ worse economic profiles could explain any observed elevation in the childhood disadvantage associated with divorce in low divorce societies.

Divorce and childhood disadvantage in sub-Saharan Africa: does context matter?

Table 4 presents multilevel Poisson models analyzing whether the subnational region-level of divorce moderates the association between divorce and child morbidity at the individual-level. The results in Model 1 show that having a divorced mother is associated with a rate of morbidity 1.09 times greater than for children with married mothers. In

Table 3
 Characteristics of divorced and monogamously married mothers, by subnational region-level prevalence of divorce.
 Source: Demographic and Health Survey.

	Full Sample			Low Divorce			Medium Divorce			High Divorce		
	Divorced	Married	Difference	Divorced	Married	Difference	Divorced	Married	Difference	Divorced	Married	Difference
<i>Child Morbidity Sample</i>	%/Mean	%/Mean	Difference	%/Mean	%/Mean	Difference	%/Mean	%/Mean	Difference	%/Mean	%/Mean	Difference
Experienced IPV ^b	28.00	20.46	7.54 ⁺	33.05	14.71	18.34 ⁺	29.19	23.23	5.96 ⁺	23.63	17.32	6.31 ⁺
Years of formal schooling	4.66	3.75	0.91 ⁺	3.84	2.84	1.00 ⁺	4.71	3.84	0.87 ⁺	4.65	4.34	0.31 ⁺
Average household wealth	2.75	2.88	-0.13	3.06	2.90	0.16 ⁺	2.87	2.93	-0.06 ⁺	2.54	2.71	-0.17 ⁺
<i>Child Mortality Sample</i>												
Experienced IPV ^b	26.41	19.17	7.24 ⁺	28.89	13.80	15.09 ⁺	27.09	21.86	5.23 ⁺	23.76	15.98	7.78 ⁺
Years of formal schooling	4.89	4.03	0.86 ⁺	3.97	2.99	0.98 ⁺	4.98	4.15	0.83 ⁺	4.83	4.65	0.18 ⁺
Average household wealth	2.98	2.97	0.01	3.14	2.93	0.21 ⁺	3.04	3.02	0.02 ⁺	2.77	2.85	-0.08 ⁺

* p < .05.

^b Among subsample of countries with domestic violence module.

Model 2, we include the subnational, region-level of currently divorced women and the cross-level interaction term. The negative cross-level interaction term confirms that the elevated risk of child morbidity associated with divorce varies in low versus high divorce societies: children with divorced mothers in low divorce societies have a significantly higher rate ratio of morbidity than do children with divorced mothers in high divorce settings. In Model 3, we include contextual and maternal traits that could drive a spurious association; however, we find no evidence that these factors explain the variation in the childhood disadvantage associated with divorce. Before turning to the child mortality results, it is important to note another key finding: the prevalence of divorce also suppresses the morbidity risk associated with having a never-married mother (see Table 4). This suggests that a larger number of divorced women in a subnational region reflects a social and marital context that is more favorable not only for divorced mothers, but also for mothers who are single due to other reasons, including premarital childbearing.

Table 5 presents results from multilevel discrete-time hazard models that confirm a similar story when analyzing the association between divorce and child mortality. The results in Model 1 corroborate mounting evidence from past country-specific studies: children with divorced mothers face 37 percent higher odds of dying than do their peers whose mothers are married. The results in Model 2 confirm that the childhood mortality risk associated with divorce varies according to its subnational prevalence. As shown, the child mortality risk associated with having a divorced mother is greater in regions where divorce is uncommon and substantially lessened in regions where it is more prevalent. In fact, for children with divorced mothers, living in a region where 10 percent more women are divorced corresponds with a 10 percent decrease in the likelihood of mortality (compared to their peers with married mothers). Adding other covariates on which low divorce African contexts—and the women who divorce within them—may be selected does not explain the findings. Instead, as Model 3 shows, inclusion of these maternal and contextual indicators helps clarify the distinctiveness of the childhood health consequences of having a divorced mother in low versus high divorce societies: each percentage increase in the subnational region-level of divorce corresponds with a two percentage-point reduction in the mortality risk associated with having a divorced mother.

Fig. 2 illustrates Kaplan-Meier survival estimates (holding all covariates in Model 3 at the mean value) that depict the systematic differences in the mortality profiles of children with divorced mothers by the subnational prevalence of divorce. The graph depicts the substantially higher likelihood of death among children with divorced mothers living where fewer than 3 percent of women are currently divorced, versus children whose mothers are divorced but live in a setting where more than one in ten women are currently divorced (log rank test, p

< .001).

Table 5 shows that the child mortality risk associated with having a widowed mother also differs in low versus high divorce regions. However, the association operates in the opposite direction: children of widowed mothers fare worse in places where divorce is more prevalent. Our supplemental investigation suggests this is likely due to the concentration of AIDS-related widowhood in high divorce settings concentrated in the southern/eastern African countries where HIV/AIDS prevalence is highest. This means widows are more likely to be HIV positive in high divorce settings (concentrated in southern/eastern Africa where HIV prevalence is high) than in low divorce ones (concentrated in western Africa where HIV prevalence is low). Death clustering within families may explain why the children of widows have elevated mortality in the former versus latter settings. HIV/AIDS prevalence data are not available for all countries and subnational regions, so we cannot include it as a contextual indicator. However, in supplementary analyses (not shown) we use the available data and exclude countries where HIV/AIDS prevalence exceeds 10 percent in one or more subnational regions (Cameroon, Namibia, Kenya, Malawi, Mozambique, Swaziland, Tanzania, Zambia, and Zimbabwe). In these analyses, the cross-regional variation in the childhood consequence of widowhood becomes non-significant, although the contextual variation in the divorce-child mortality association remains significant; this suggests the confounding nature of the HIV/AIDS epidemic likely explains the findings.

Discussion

Researchers increasingly recognize that having divorced parents is a marker of childhood health risks in sub-Saharan Africa, including lower levels of survival (Chae, 2013; Clark et al., 2013; Thiombiano et al., 2013). Given the tremendous variation in the prevalence of divorce across the subcontinent, we expand this burgeoning literature by investigating whether the magnitude of this disadvantage varies by the commonality of divorce in a child’s local context. To do so, we pooled data from 31 African countries and leveraged heterogeneity in the prevalence of currently divorced women across 290 subnational regions. Results confirm that although having a divorced mother is generally associated with an elevated risk of morbidity and mortality in early childhood, relative to children with monogamously married mothers, the size of the disparity varies by the level of divorce in a child’s local subnational region. In subnational regions where less than 1 percent of women are currently divorced, children with divorced mothers have a 20 percent higher rate ratio of childhood morbidity and a 40 percent larger risk of mortality—a level of disadvantage that dwarfs that of children with divorced mothers residing in regions where one in every five women are currently divorced. Although we cannot fully rule out that these associations are spuriously driven, we find no evidence

Table 4
 Multilevel Poisson Models Results Analyzing whether the Child Morbidity Risk Associated with Divorce Varies by its Subnational Region-Level Prevalence in sub-Saharan Africa.
 Source: Demographic and Health Survey.

	Model 1				Model 2				Model 3			
	IRR	Coeff	S.E.	Sig	IRR	Coeff	S.E.	Sig	IRR	Coeff	S.E.	Sig
Cross-level Interaction												
% Divorced women in subnational region*Mother divorced/separated					0.99	-0.01	0.00	**	0.99	-0.01	0.00	**
% Divorced women in subnational region*Mother widowed					1.00	0.00	0.01		1.00	0.00	0.01	
% Divorced women in subnational region*Mother never married					0.99	-0.01	0.00	**	0.99	-0.01	0.00	*
% Divorced women in subnational region*Mother polygynously married					1.00	0.00	0.00		1.00	0.00	0.00	
% Divorced women in subnational region*Mother married (ref)					—				—			
Mothers' marital status												
Divorced	1.09	0.09	0.01	***	1.20	0.18	0.04	***	1.19	0.17	0.04	***
Widowed	1.09	0.08	0.03	**	1.11	0.10	0.05		1.12	0.11	0.05	*
Never-married	1.01	0.01	0.01		1.07	0.07	0.03	**	1.10	0.09	0.03	***
Polygynously married	1.04	0.04	0.01	***	1.02	0.02	0.01		1.03	0.03	0.01	
Monogamously married (ref)	—				—				—			
Subnational region prevalence of divorced women (%)					1.01	0.01	0.01		1.01	0.01	0.01	
Key maternal characteristics												
Experienced IPV ¹									1.23	0.20	0.01	***
Years of formal schooling									1.00	0.00	0.00	***
Household wealth												
Poorest									—			
Poor									0.99	-0.01	0.01	
Average									0.99	-0.01	0.01	
Rich									1.00	0.00	0.01	
Richest									0.96	-0.04	0.01	**
Additional controls												
Child-level												
Maternal age at birth	0.99	-0.01	0.00	***	0.99	-0.01	0.00	***	0.99	-0.01	0.00	***
Birth order	1.02	0.02	0.00	***	1.02	0.02	0.00	***	1.02	0.02	0.00	***
Length of preceding birth interval												
First born	—				—				—			
Short interval	1.01	-0.06	0.01	***	0.94	-0.06	0.01	***	0.94	-0.07	0.01	***
Long interval	1.01	-0.04	0.01	***	0.96	-0.04	0.01	***	0.96	-0.04	0.01	***
Female	1.01	-0.03	0.01	***	0.97	-0.03	0.01	***	0.97	-0.03	0.01	***
Multiple birth	1.02	0.00	0.02		1.00	0.00	0.02		0.99	-0.01	0.02	
Child's age in months	1.00	-0.02	0.00	***	0.98	-0.02	0.00	***	0.98	-0.02	0.00	***
Subnational region-level												
Percent households rural									0.81	-0.22	0.11	*
Percent women employed									1.76	0.57	0.15	***
Average years of school among women									0.98	-0.02	0.02	
Country-level												
Country dummies (not shown)	—				—				—			
Variance components												
Between-subnational region variance	0.07				0.06				0.06			
Model Fit												
Log-likelihood	-192223.82				-192204.84				-191839.52			

* p < .05.
 ** p < .01.
 *** p < .001.

that these cross-contextual differences are due to socioeconomic disadvantage in regions with fewer divorced women. Similarly, we find no evidence that the selection of high-conflict marriages into divorce where it is less common drives the finding.

The variable nature of the size of the association between parental divorce and children's health across sub-Saharan Africa's diverse subnational regions raises the question of why divorce is associated with such worse child health profiles in African regions where fewer women are divorced. In fact, we find that children with divorced mothers experience worse outcomes in regions where divorce is less prevalent, compared to their peers with married parents, *despite* their mothers having relatively higher educational attainment and living in relatively wealthier households. Of course, data limitations restrict our ability to confirm that the variation remains net of socioeconomic factors. For instance, living in a wealthier household does not guarantee greater

access to resources, and this single measure of household wealth tells us little about the financial turmoil following divorce. Thus, future research needs to examine the economic circumstances of divorced mothers where divorce is rare with richer data, and to confirm whether economic factors contribute to their children's higher risk of experiencing poor health outcomes.

As discussed, another possibility is that the dampened association between parental divorce and children's health in settings where there are more divorced women is due to the limited social and psychological costs of divorce in these contexts. Implicit in this idea is that individuals are especially receptive to divorce in these settings; however, we are not aware of any study that confirms this is the case specifically in the African context. Thus, in supplemental analyses (not shown but available upon request) we used World Values Survey (WVS) data to confirm that the prevalence of divorce is systematically associated with

Table 5

Multilevel discrete-time hazard models: differential child mortality risk associated with parental divorce in low versus high divorce societies, 290 societies in 31 sub-Saharan African countries.

Source: Demographic and Health Survey.

	Model 1				Model 2				Model 3			
	OR	Coeff	S.E.	Sig	OR	Coeff	S.E.	Sig	OR	Coeff	S.E.	Sig
Cross-level Interaction												
% Divorced women in subnational region* <i>Mother divorced/separated</i>					0.99	-0.01	0.01	*	0.98	-0.02	0.01	*
% Divorced women in subnational region* <i>Mother widowed</i>					1.01	0.01	0.01	*	1.03	0.03	0.01	*
% Divorced women in subnational region* <i>Mother never married</i>					1.02	0.02	0.01		1.01	0.01	0.01	
% Divorced women in subnational region* <i>Mother polygynously married</i>					—				—			
% Divorced women in subnational region* <i>Mother married (ref)</i>					0.99	-0.01	0.00		0.99	-0.01	0.00	
Mothers' marital status												
Divorced	1.37	0.32	0.03	***	1.52	0.42	0.06	***	1.54	0.43	0.06	***
Widowed	1.46	0.38	0.04	***	1.25	0.23	0.07	**	1.22	0.20	0.07	**
Never-married	1.22	0.20	0.03	***	1.12	0.11	0.05	*	1.18	0.16	0.05	***
Polygynously married	1.17	0.16	0.01	***	1.19	0.18	0.02	***	1.17	0.16	0.02	***
Monogamously married (ref)	—				—				—			
Subnational region prevalence of divorced women (%)					0.99	-0.02	0.01		0.98	-0.02	0.01	
Key maternal characteristics												
Experienced IPV ¹									1.03	0.03	0.02	
Years of formal schooling									0.97	-0.03	0.00	***
Household wealth												
Poorest												
Poor									1.03	0.02	0.02	**
Average									0.96	-0.04	0.02	**
Rich									0.91	-0.10	0.02	***
Richest									0.78	-0.25	0.02	***
Additional controls												
<i>Child-level</i>												
Maternal age at birth	0.98	-0.02	0.00	***	0.98	-0.02	0.00	***	0.98	-0.02	0.00	***
Birth order	1.09	0.09	0.00	***	1.09	0.09	0.00	***	1.08	0.07	0.00	***
<i>Length of preceding birth interval</i>												
First born												
Short interval	0.91	-0.10	0.02	***	0.91	-0.10	0.02	***	0.89	-0.12	0.02	***
Long interval	0.55	-0.60	0.02	***	0.55	-0.60	0.02	***	0.54	-0.61	0.02	***
Female	0.86	-0.16	0.01	***	0.86	-0.16	0.01	***	0.86	-0.16	0.01	***
Multiple birth	3.81	1.34	0.02	***	3.82	1.34	0.02	***	3.86	1.35	0.02	***
Age dummies (not shown)												
Subnational region-level												
Percent households rural									0.92	-0.08	0.11	
Percent women employed									1.62	0.48	0.14	***
Average years of school among women									0.98	-0.02	0.02	
Country-level												
Country dummies (not shown)												
Variance components												
Between subnational region variance		0.02				0.01				0.01		
Model Fit												
Likelihood-ratio test		1146.49	***			755.03	***			768.30	***	

* p < .05
 ** p < .01.
 *** p < .001.

attitudes toward it at the aggregate level. In these analyses, we used the fact that the WVS and DHS were collected in Zambia—a southern African country—in the same year. Merging WVS and DHS data, we find a strong positive correlation between the proportion of people in Zambian regions who believe that divorce is “always justifiable” and the percentage of divorced women ($r = .73$; p

< .05; authors’ calculation). This finding provides preliminary support for the idea that social environment could be a key driver of the cross-contextual variation in the childhood disadvantages associated with divorce. Moreover, the fact that the prevalence of divorce also suppresses the morbidity risk associated with having a never-married mother (see Table 4) further supports the notion that a larger number of divorced women reflects a cultural and social context that is more

favorable to single mothers.

The study results convincingly demonstrate that what it means to have a divorced mother varies for African children depending on whether they reside in regions where divorce is more or less common, but our analyses are limited in ways that should be addressed in future research. Like almost all research interested in capturing contextual variation, the availability of data constrained our measurement of children’s—and their mothers’—exposure to other divorced families. Following past contextual studies in sub-Saharan Africa, we adopt subnational regions as our contextual unit of focus. This is an improvement over country-level analyses—given that we capture tremendous within-country variation that better correlates with children’s local contexts—but these subnational regions, in some instances,

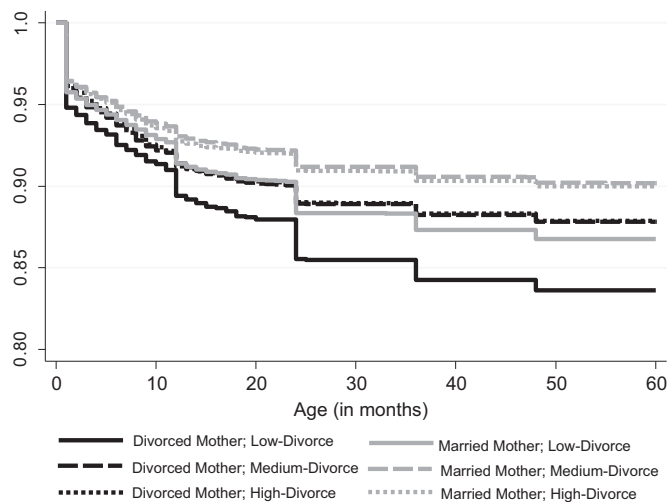


Fig. 2. Kaplan-Meier hazard estimate of child mortality risk, by family structure and the prevalence of currently divorced women in the child's subnational region.

represent quite large geographic boundaries. Thus, we are effectively averaging the prevalence of currently divorced women across distinct communities, which likely varies, to the subnational region-level. This likely leads to downwardly biased estimates of the moderating impact of the prevalence of divorce on the association between divorce and children's health disadvantage, if we cannot fully account for variation in the prevalence of currently divorced women in children's and mothers' immediate surroundings.

Moreover, these subnational regions are unlikely to reflect women's social networks. The marital experiences and prevalence of divorce among a woman's social network may powerfully condition her psychological response to divorce, as well as the degree of social stigma and familial support she receives in its wake. In addition, ethnic groups in sub-Saharan Africa have distinct customs for responding to divorce, so the prevalence of divorce in a woman's individual ethnic group may condition the degree to which it negatively influences her own and her children's lives. Future research that identifies the prevalence of divorce in a woman's ethnic group, and assesses whether that moderates her experience with divorce, may show that this indicator—which may better reflect a woman's social comparison group—more powerfully moderates her children's experiences relative to the commonality of divorced women in her subnational region.

Another notable limitation is our focus on the prevalence of currently divorced women rather than the divorce rate. Although these two measures likely correlate in African settings where remarriage is less common, our strategy likely underestimates the divorce rate in places where divorced women do not remain divorced for multiple years, but instead quickly remarry. Thus, our indicator likely underestimates the true variation in the divorce rate across Africa's subnational regions, and our study likely does not capture the full variation in the child health disadvantage associated with divorce.

Moreover, although our multinational, pooled analytic approach allows us to study 290 subnational regions, and to capture a wider range in the prevalence of currently divorced women than a country-specific study would allow, it comes with a key drawback. Our study offers only a general overview of the moderating influence of the subnational regional prevalence of currently divorced women on the association between having a divorced mother and children's health and survival for the subcontinent as a whole. Our country-level fixed-effects approach enables us to account for unobserved heterogeneity across

countries that we do not account for here; however, in doing so, we cannot speak to the extent to which these findings actually vary across Africa's tremendously diverse country contexts. Some countries have notable variation in the prevalence of divorce across subnational regions (e.g., Ethiopia, Uganda, Tanzania), and likely even more variation across smaller communities nested within these regions. Thus, more detailed, longitudinal studies in these countries could offer valuable evidence of the salience of these findings to individual country contexts.

Despite these limitations, this research shows that the childhood health consequences associated with divorce vary across subnational regions, offering insight for policies and programs aimed at assisting divorced mothers and their children. The results confirm that divorced mothers are in particular need of supportive policies and assistance in contexts where divorce is less common. These are the very settings in Africa where such policies and programs are unlikely to exist. Although policies and programs in low divorce settings would obviously serve far fewer families than they would where divorce is more common, efforts to encourage ex-husbands, extended family, and social institutions to support divorced mothers have the potential to substantially benefit this vulnerable group.

Governmental agencies and NGOs should thus develop context-specific interventions that may mitigate the impact of divorce in these settings. For example, governments could offer small grants or job-training programs for single mothers. The provision of subsidized childcare may be particularly beneficial to divorced mothers, allowing them to find suitable employment with less worry about their children's safety and care. Civil society, including NGOs and religious organizations, could also form organizations, such as the Single Mother's Association of Kenya, that offer specific job-training programs and small loans for unmarried mothers. Such organizations could be especially important in providing these mothers with social support and potentially reducing their isolation and stigmatization. Furthermore, countries across sub-Saharan Africa are starting to implement legal requirements for non-residential fathers to contribute to their children's welfare, regardless of their relationship status with the child's mother. Although such laws run the risk of further estranging divorced fathers who cannot provide support for their children, they can also help engender a norm in which obligations of childcare extend beyond marriage. By minimizing the financial and social impact of divorce, such policies could reduce the particular vulnerabilities of children with divorced mothers, especially in contexts where divorce is rare.

Non-human subject research

Deidentified, public-use data. Will provide letter from USC IRB if accepted for publication.

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Appendix A. List of countries, survey year, and sample size

	Survey year	<i>N</i> for Child Morbidity analysis	<i>N</i> for Child Mortality analysis
Benin	2011/12	10,099	17,187
Burkina Faso	2010	10,796	20,868
Burundi	2010/2011	5,812	10,230
Cameroon	2011	7,625	13,663
Chad	2004	3,521	7,177
Congo (Brazzaville)	2011/12	5,905	10,314
Democratic Republic of the Congo	2007	5,668	10,683
Ethiopia	2003	7,870	14,846
Gabon	2012	3,770	6,602
Ghana	2008	1,932	3,560
Guinea	2012	4,904	9,680
Ivory Coast	2011/12	5,191	9,508
Kenya	2008/09	4,705	8,308
Lesotho	2009/10	2,989	5,783
Liberia	2006/07	3,373	6,165
Madagascar	2008/09	7,906	13,901
Malawi	2010	12,825	23,386
Mali	2006	9,274	18,931
Mozambique	2003	6,206	12,220
Namibia	2006/07	3,522	6,868
Niger	2012	8,482	16,064
Nigeria	2008	19,297	37,659
Rwanda	2010/11	6,783	11,873
Sao Tome Principe	2008/09	989	1,725
Sierra Leone	2008	3,334	6,934
Senegal	2010/11	8,775	15,651
Swaziland	2006/07	2,026	3,992
Tanzania	2009/10	5,324	9,284
Uganda	2011	5,302	9,836
Zambia	2007	4,278	7,763
Zimbabwe	2010/11	3,852	6,813
N		192,335	357,474

Source: Demographic and Health Survey.

Appendix B. Sample characteristics of children excluded because mother has been in more than one union

	Child illness sample [*] Mean/%	Child death sample ^{**} Mean/%
Key variables		
Child morbidity (# of symptoms)	0.69 (0.86) [*]	
Child mortality (% ever died)		14.12 [*]
<i>Family structure</i>		
Divorced mother	8.90 [*]	9.08 [*]
Never-married mother	NA	NA
Widowed mother	1.79 [*]	2.39 [*]
Polygynously married mother	32.98 [*]	33.73 [*]
Monogamously married (ref)	56.33 [*]	54.80 [*]
Subnational region-level prevalence of divorced women (%)	7.05 (4.15) [*]	6.92 (4.15) [*]
Selection indicators		
<i>Marital conflict</i>		
Mother experienced domestic violence ¹	20.37 [*]	19.96 [*]
<i>Socioeconomic resources</i>		
Mother's years of formal schooling	2.91 (3.45) [*]	2.78 (3.42) [*]
<i>Household wealth</i>		
Poorest	28.73 [*]	28.50 [*]
Poor	23.66 [*]	23.60 [*]
Average	19.88 [*]	20.00
Rich	16.74 [*]	16.86 [*]
Richest	10.99 [*]	11.04 [*]

Child-level controls

Female	50.00	49.50
Multiple birth	3.04	3.87
Maternal age at birth	29.21 (6.78)*	27.92 (6.95)*
Birth order	4.57 (2.41)*	4.27 (2.46)*
<i>Length of preceding birth interval</i>		
First born	7.63*	12.38*
Short interval	44.55*	47.97*
Long interval	47.82*	39.65*
Subnational region-level controls		
Average years of schooling among adult women	4.09 (2.28)*	4.02 (2.28)*
Adult women's employment (%)	66.65 (16.33)*	66.43 (16.43)*
Rural (% households rural)	71.84 (21.61)*	71.75 (21.31)*

*N = 33,009; **N = 94,209 children.

¹Among subsample of countries with domestic violence module.**References**

- Adams, Alayne M., Madhavan, Sangeetha, & Simon, Dominique (2002). Women's social networks and child survival in Mali. *Social Science Medicine*, 54(2), 165–178.
- Amato, Paul R. (2010). Research on divorce: continuing trends and new developments. *Journal of Marriage and Family*, 72(3), 650–666.
- Åsling-Monemi, Kajsa, Pena, Rodolfo, Ellsberg, Mary Carroll, & Persson, Lars Åke (2003). Violence against women increases the risk of infant and child mortality: a case-referent study in Nicaragua. *Bulletin of the World Health Organization*, 81(1), 10–16.
- Bernardi, Fabrizio, & Martínez-Pastor, Juan-Ignacio (2011). Divorce risk factors and their variation over time in Spain. *Demographic Research*, 24(31), 771–800.
- Bhuiya, Abbas, & Chowdhury, Mushtaque (1997). The effect of divorce on child survival in a rural area of Bangladesh. *Population Studies*, 51(1), 57–61.
- Blumer, Herbert (1986). *Symbolic interactionism: Perspective and method*. Univ of California Press.
- Bocquier, Philippe, Madise, Nyovani Janet, & Zulu, Eliya Msiyaphazi (2011). Is there an urban advantage in child survival in Sub-Saharan Africa? Evidence from 18 countries in the 1990s. *Demography*, 48(2), 531–558.
- Bollen, Kenneth A., Glanville, Jennifer L., & Stecklov, Guy (2007). Socio-economic status, permanent income, and fertility: a latent-variable approach. *Population Studies*, 61(1), 15–34.
- Bracher, Michael, Santow, Gigi, & Watkins, Susan (2003). Moving” and marrying. *Demographic Research Special Collections*, 1(7), 207–246.
- Browning, Sandra Lee, & Miller, R. Robin (1999). *Till death do us part: A multicultural anthology on marriage*. Jai Press.
- Chae, Sophia (2013). Divorce, remarriage, and children's outcomes in rural Malawi. *Demographic and Institutional Change in Global Families*, 28–30.
- Chen, Wan-Chi (2012). The changing pattern of educational differentials in divorce in the context of gender Egalitarianization: The case of Taiwan. *Population Research and Policy Review*, 31(6), 831–853.
- Cherlin, Andrew J., Chase-Lansdale, P. Lindsay, & McRae, Christine (1998). Effects of parental divorce on mental health throughout the life course. *American Sociological Review*, 239–249.
- Clark, S. and Brauner-Otto S. (2015). “Divorce in Sub-Saharan Africa: Are Unions Becoming More Stable?” Paper presented at the Population Association of America Annual Meeting, San Diego, CA.
- Clark, S., Beguy D. and Cotton C. (2013). “Single Motherhood and Child Mortality: Is Poverty the Link “ Paper presented at the International Union for the Scientific Study of Population, XXVII International Population Conference August 30 Busan, Korea.
- Clark, Shelley, & Hamplová, Dana (2013). Single motherhood and child mortality in sub-Saharan Africa: A life course perspective. *Demography*, 50(5), 1521–1549.
- Diener, Ed, Gohm, Carol L., Suh, Eunkook, & Oishi, Shigehiro (2000). Similarity of the relations between marital status and subjective well-being across cultures. *Journal of Cross-cultural Psychology*, 31(4), 419–436.
- DiFonzo, J. Herbie (1997). *Beneath the fault line: The popular and legal culture of divorce in twentieth-century America*. University of Virginia Press.
- Dodoo, F. Nii-Amoo (1998). Marriage type and reproductive decisions: A comparative study in Sub-Saharan Africa. *Journal of Marriage and the Family*, 232–242.
- Engle, Patrice L., Black, Maureen M., Behrman, Jere R., Cabral de Mello, Meena, Gertler, Paul J., Kapiriri, Lydia, Martorell, Reynaldo, & Young, Mary Eming (2007). Strategies to avoid the loss of developmental potential in more than 200 million children in the developing world. *The Lancet*, 369(9557), 229–242.
- Ezeh, Alex Chika (1997). Polygyny and reproductive behavior in sub-Saharan Africa: A contextual analysis. *Demography*, 34(3), 355–368.
- Filmer, Deon, & Pritchett, Lant (1998). *The effect of household wealth on educational attainment: Demographic and health survey evidence*. World Bank Publications.
- Fotso, Jean-Christophe (2007). Urban–rural differentials in child malnutrition: Trends and socioeconomic correlates in sub-Saharan Africa. *Health Place*, 13(1), 205–223.
- Gage, A. and Njogu W. (1994). “Gender Inequalities and Demographic Behavior: Ghana/Kenya”
- García-Moreno, Claudia, Jansen, Henrica A. F. M., Ellsberg, Mary, Heise, Lori, & Watts, Charlotte H. (2006). Prevalence of intimate partner violence: Findings from the who multi-country study on women's health and domestic violence. *The Lancet*, 368(9543), 1260–1269.
- González, Libertad, & Viitanen, Tarja K. (2009). The effect of divorce laws on divorce rates in Europe. *European Economic Review*, 53(2), 127–138.
- Goode, W. (1963). “World Revolution and Family Patterns”
- Grover, Shalini (2011). Purani Aur Nai Shaadi: Separation, divorce, and remarriage in the lives of the urban poor in New Delhi. *Asian Journal of Women's Studies*, 17(1), 67–99.
- Horne, Christine, Dodoo, F. Nii-Amoo, & Dodoo, Naa Dodua (2013). The shadow of indebtedness: Bridewealth and norms constraining female reproductive autonomy. *American Sociological Review* (0003122413484923).
- Houweling, Tanja A. J., Kunst, Anton E., & Mackenbach, Johan P. (2003). Measuring health inequality among children in developing countries: Does the choice of the indicator of economic status matter? *International Journal for Equity in Health*, 2(1), 8.
- Isiugo-Abanihe, Uche C. (1994). The socio-cultural context of high fertility among Igbo women. *International Sociology*, 9(2), 237–258.
- Jewkes, Rachel, Levin, Jonathan, & Penn-Kekana, Loveday (2002). Risk factors for domestic violence: findings from a South African cross-sectional study. *Social Science Medicine*, 55(9), 1603–1617.
- Kaler, Amy (2001). Many divorces and many Spinsters”: Marriage as an invented tradition in Southern Malawi, 1946–1999. *Journal of Family History*, 26(4), 529–556.
- Kalmijn, Matthijs (2009). Country differences in the effects of divorce on well-being: The role of norms, support, and selectivity. *European Sociological Review*, jcp035.
- Kalmijn, Matthijs, & Uunk, Wilfred (2007). Regional value differences in Europe and the social consequences of divorce: A test of the stigmatization hypothesis. *Social Science Research*, 36(2), 447–468.
- Koenig, Michael A., Lutalo, Tom, Zhao, Feng, Nalugoda, Fred, Wabwire-Mangen, Fred, Kiwanuka, Noah, Wagman, Jennifer, Serwadda, David, Wawer, Maria, & Gray, Ron (2003). Domestic violence in rural Uganda: Evidence from a community-based study. *Bulletin of the World Health Organization*, 81(1), 53–60.
- Korenromp, Eline L., Miller, John, Cibulskis, Richard E., Cham, M. Kabir, Alnwick, David, & Dye, Christopher (2003). Monitoring mosquito net coverage for malaria control in Africa: Possession vs. use by children under 5 years. *Tropical Medicine International Health*, 8(8), 693–703.
- Kraval, Øystein (2004). Child mortality in India: The community-level effect of education. *Population Studies*, 58(2), 177–192.
- Liefbroer, Aart C., & Dourleijn, Edith (2006). Unmarried cohabitation and union stability: Testing the role of diffusion using data from 16 European countries. *Demography*, 43(2), 203–221.
- Locoh, Therese, & Thriart, Marie-Paule (1995). Divorce Et Remariage Des Femmes En Afrique De L'ouest. *Le Cas Du Togo. Population (French edition)*, 61–93.
- Madhavan, Sangeetha, Collinson, Mark, Townsend, Nicholas W., Kahn, Kathleen, & Tollman, Stephen M. (2007). The implications of long term community involvement for the production and circulation of population knowledge. *Demographic Research*, 17(13), 369.
- Martin, Molly A. (2006). Family structure and income inequality in families with children, 1976 to 2000. *Demography*, 43(3), 421–445.
- Montgomery, Mark R., & Hewett, Paul C. (2005). Urban poverty and health in developing countries: Household and neighborhood effects. *Demography*, 42(3), 397–425.
- Nair, Harish, Nokes, D. James, Gessner, Bradford D., Dherani, Mukesh, Madhi, Shabir A., Singleton, Rosalyn J., O'Brien, Katherine L., Roca, Anna, Wright, Peter F., & Bruce, Nigel (2010). Global burden of acute lower respiratory infections due to respiratory syncytial virus in young children: A systematic review and meta-analysis. *The Lancet*, 375(9725), 1545–1555.
- O'Rourke, Nancy (1995). Land rights and gender relations in areas of rural Africa: A question of power and discourse. *Social Legal Studies*, 4(1), 75–97.
- Omariba, D., & Boyle, Michael H. (2007). Family structure and child mortality in Sub-Saharan Africa: Cross-national effects of polygyny. *Journal of Marriage and Family*, 69(2), 528–543.
- Østby, Gudrun, Nordås, Ragnhild, & Rød, Jan Ketil (2009). Regional inequalities and civil conflict in sub-Saharan Africa 1. *International Studies Quarterly*, 53(2), 301–324.
- Park, Hyunjoon, & Raymo, James M. (2013). Divorce in Korea: trends and educational differentials. *Journal of Marriage and Family*, 75(1), 110–126.

- Patel, Vikram, Rahman, Atif, Jacob, K. S., & Hughes, Marcus (2004). Effect of maternal mental health on infant growth in low income countries: New evidence from South Asia. *Bmj*, 328(7443), 820–823.
- Raymo, James M., Iwasawa, Miho, & Bumpass, Larry (2004). Marital dissolution in Japan: Recent trends and patterns. *Demographic Research*, 11(14), 395–420.
- Reniers, G. (2003). "Divorce and Remarriage in Rural Malawi"
- Reniers, Georges (2008). Marital strategies for regulating exposure to Hiv. *Demography*, 45(2), 417–438.
- Rice, Amy L., Sacco, Lisa, Hyder, Adnan, & Black, Robert E. (2000). Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries. *Bulletin of the World Health organization*, 78(10), 1207–1221.
- Schellenberg, Joanna Armstrong, Victora, Cesar G., Mushi, Adiel, Don de Savigny, Schellenberg, David, Mshinda, Hassan, Bryce, Jennifer, & Tanzania IMCI MCE Baseline Household Survey Study Group (2003). Inequities among the Very Poor: Health care for children in rural Southern Tanzania. *The Lancet*, 361(9357), 561–566.
- Schmeer, Kammi K. (2013). Family structure and child anemia in Mexico. *Social Science Medicine*, 95, 16–23.
- Schoumaker, B. (2011). "Omissions of Births in Dhs Birth Histories in Sub-Saharan Africa: Measurement and Determinants." in *Population Association of America*.
- Shin, Heeju (2007). Child health in Peru: Importance of regional variation and community effects on children's height and weight. *Journal of Health and Social Behavior*, 48(4), 418–433.
- Smith, Daniel Jordan (2009). Managing men, marriage, and modern love: Women's perspectives on intimacy and male infidelity in Southeastern Nigeria. *Love in Africa*, 157–180.
- Smith-Greenaway, Emily, & Heckert, Jessica (2013). Does the orphan disadvantage "Spill Over?" An analysis of whether living in an area with a higher concentration of orphans is associated with children's school enrollment in Sub-Saharan Africa. *Demographic Research*, 28, 1167.
- Smith-Greenaway, Emily, & Trinitapoli, Jenny (2014). Polygynous contexts, family structure, and infant mortality in Sub-Saharan Africa. *Demography*, 51(2), 341–366.
- Solivetti, Luigi M. (1994). Family, marriage and divorce in a Hausa community: A sociological model. *Africa*, 64(02), 252–271.
- Soons, Judith P. M., & Kalmijn, Matthijs (2009). Is marriage more than cohabitation? Well-being differences in 30 European countries. *Journal of Marriage and Family*, 71(5), 1141–1157.
- Spanier, Graham B., & Thompson, Linda (1987). *Parting: The aftermath of separation and divorce*. Sage Publications.
- Stallings, R. (2004). "Child Morbidity and Treatment Patterns"
- Stanley, Scott M., Amato, Paul R., Johnson, Christine A., & Markman, Howard J. (2006). Premarital education, marital quality, and marital stability: Findings from a large, random household survey. *Journal of Family Psychology*, 20(1), 117.
- Thiombiano, Bilampoa Gnoumou, LeGrand, Thomas K., & Kobiané, Jean-François (2013). Effects of parental union dissolution on child mortality and schooling in Burkina Faso. *Demographic Research*, 29(29), 797–816.
- Thornton, Arland (1985). Changing attitudes toward separation and divorce: Causes and consequences. *American Journal of Sociology*, 856–872.
- Thornton, Arland, & Young-DeMarco, Linda (2001). Four decades of trends in attitudes toward family issues in the United States: The 1960s through the 1990s. *Journal of Marriage and Family*, 63(4), 1009–1037.
- Tilson, Dana, & Larsen, Ulla (2000). Divorce in Ethiopia: The impact of early marriage and childlessness. *Journal of Biosocial Science*, 32(03), 355–372.
- Trinitapoli, J. (2011). The aids-related activities of religious leaders in Malawi. *Global Public Health*, 6(1), 41–55.
- Van de Poel, Ellen, O'Donnell, Owen, & Van Doorslaer, Eddy (2007). Are urban children really healthier? Evidence from 47 developing countries. *Social Science Medicine*, 65(10), 1986–2003.
- Weinreb, A. (2011). "The Effects of Ethnic Political Networks on Educational Attainment in Africa." Paper presented at the Union for African Population Studies, Ouagadougou, Burkina Faso.
- White, Lynn K., & Booth, Alan (1991). Divorce over the life course the role of marital happiness. *Journal of Family Issues*, 12(1), 5–21.
- World Health Organization (2006). *Guidelines for the treatment of malaria*. World Health Organization.
- Yang, Lawrence Hsin, Kleinman, Arthur, Link, Bruce G., Phelan, Jo. C., Lee, Sing, & Good, Byron (2007). Culture and stigma: Adding moral experience to stigma theory. *Social Science Medicine*, 64(7), 1524–1535.
- Zhang, Yanhong (2006). Urban-rural literacy gaps in Sub-Saharan Africa: The roles of socioeconomic status and school quality. *Comparative Education Review*, 50(4), 581–602.