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Poverty Reduction: Does Reproductive Health Matter?

Margaret E. Greene and Thomas Merrick

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Health, Nutrition and Population (HNP) Discussion Paper

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Health, Nutrition and Population (HNP) Discussion Paper

Poverty Reduction: Does Reproductive Health Matter?

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Abstract: Funding for the reproductive health agenda agreed at the 1994 International Conference on Population and Development has fallen short of estimated requirements. In the changed funding environment, stronger evidence on the links between reproductive health and poverty reduction is needed. This paper reviews the evidence base on three reproductive health outcomes: early childbearing, maternal survival, and unintended pregnancy. Building on the "capacities" approach to poverty assessment advocated by Amartya Sen, this evidence is organized in a framework that includes health and education outcomes for mothers and children as well as household consumption and production effects. Generally speaking, the evidence on health effects is strongest, household well-being weakest, and education in between. Causal relationships are difficult to establish because reproductive health outcomes and other household-level explanatory variables are influenced by each other. An important finding is that relationships are context specific and that one cannot look at individual characteristics without reference to contextual variables. One reason why much existing research has not effectively addressed the effects of poor reproductive health on poverty is that studies have relied on survey data for a single point in time. Longitudinal surveys offer greater promise. Rather than propose new surveys, initial research could work with existing data resources. Frankenberg and colleagues (2005) have identified and catalogued 40 survey programs that are potentially useful for this purpose. Research should focus on a country or countries where (1) there has been social and economic change over time, (2) rich-poor differences in reproductive health outcomes persist, and (3) obtaining and working with promising datasets is feasible. Pursuit of causal relationships between poor reproductive health outcomes and poverty should not paralyze efforts to make better use of existing country-level evidence in Poverty Reduction Strategies and other documents that guide resource allocation.

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Table of Contents

8. CONCLUSIONS: WHERE TO GO WITH FURTHER RESEARCH 50

List of Tables

List of Figures

FOREWORD

Poverty reduction is a core objective of the World Bank and other development assistance agencies, and is the first of the Millennium Development Goals (MDGs). It was also a central theme of the 1994 International Conference on Population and Development (ICPD), which shifted the focus of population activities toward protection of the reproductive health and rights of women, men and their children. There was a general expectation at ICPD that the funding for population programs would be expanded to support the new approach, but a combination of factors has resulted in a decline in the needed financial and human resources. These include a shift from "project" to broader budgetary support for larger agendas such as poverty reduction and achievement of the MDGs. Increasingly donors' support is channeled through poverty reduction credits and sector wide approaches.

For mainly political reasons, the ICPD goal of universal access to reproductive health services was dropped from the list of MDGs, though some dimensions of reproductive health, most notably the reduction of maternal mortality and curbing the spread the HIV/AIDS, are included. Other critical aspects of reproductive health, including unintended and early childbearing, which disproportionately affect poorer women, are not on the priority list. Recent funding trends have favored infectious diseases, particularly HIV/AIDS, malaria and TB, and health systems development. Reproductive health and rights may be included in the funding "basket", but too often they are not. Reproductive health advocates have not been as effective as others (including earlier advocates for population programs) in demonstrating that failure to address the reproductive health needs of poor women can undermine poverty reduction, in part because the evidence base to support this assertion is thin. "*Poverty Reduction: Does Reproductive Health Matter*?" reviews the evidence base with a view to telling what we know, what we don't know, and what might be done to improve our knowledge about links between poor reproductive health outcomes and poverty reduction.

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1. WHY STUDY THE LINKS BETWEEN REPRODUCTIVE HEALTH OUTCOMES AND POVERTY?

The 1994 International Conference on Population and Development (ICPD) moved the rationale for "population" activities from macro-level concerns about the effects of population growth and structure on economic growth to individual reproductive rights and health needs. While family planning (as a means of slowing population growth) had been the main focus of the pre-ICPD population agenda, reproductive health includes not only family planning but also other sexual and reproductive health needs, including safe delivery, prevention and treatment of sexually transmitted infections, safe abortion, and violence against women. The costs of the broader approach were estimated, and there was an expectation that funding previously earmarked for population would support the new agenda. But in the years since ICPD, funding levels have fallen far short of what was called for. Direct funding for population and reproductive health has not increased, and in many countries it has declined.

The funding environment has changed in a number of ways. The reproductive health approach agreed upon in 1994 has come under increasing attack by social conservatives who oppose reproductive rights, adolescent reproductive health, safe abortion and even family planning. They succeeded in eliminating the ICPD goal of universal access to reproductive health care from the list of Millennium Development Goals (MDGs), which many donors and countries now are using to set priorities for allocation of scarce funding. The absence of reproductive health from the MDGs has made it easier for nations and donors to neglect the reproductive health and rights of the poor. While few donors have embraced the conservative agenda, there is an atmosphere of self-policing to avoid the controversy associated with reproductive health.

Another important change in the funding environment is the shift by donors from vertical, project financing for specific health services (such as malaria, tuberculosis, or family planning) to financing for an entire health sector program, or to a combination of program support and targeted support for high priority problems (HIV/AIDS, infectious diseases). These donors, and the parliaments that approve their budgets, have grown impatient with funding inputs that appear to get few results. They now favor reforms and results-oriented funding that address underlying systems and structural problems. The MDGs and their limited, specific objectives dovetail nicely with this results orientation, and sector-wide or multi-sector program funding has been used to support both reforms and health system development initiatives.

A key concern about "traditional" approaches to aid is that they have benefited the rich more than the poor. In response, poverty reduction has moved to center stage in setting of priorities for program funding. Countries seeking debt relief are preparing Poverty Reduction Strategy Papers (PRSPs) to guide the re-allocation of funds that were previously being used for debt service to social services that will help the poor to escape poverty. Poverty analyses are also guiding priority setting for program funding in countries that are not seeking debt relief. Though disease-specific projects are not completely gone, current health funding is more likely to be tied to broader sectoral or multi-sectoral grants and loans and aimed at priority goals like those embodied in the MDGs, the first of which is the elimination of extreme poverty and hunger.

This shift has given special importance to having a strong evidence base on how population and reproductive health (P/RH) affect poverty and how investments in P/RH might help poor households escape poverty. HIV and infectious disease advocates have done a better job demonstrating the impact of those adverse health outcomes on poverty than have the champions of reproductive health. While maternal health and HIV figure in the MDG list, family planning

and reproductive rights do not. Nor are any of the population and development goals agreed upon at ICPD. Even maternal mortality tends to get short shrift in the allocation of resources for MDGs.

While all this was occurring, there has been renewed research interest in evidence that population change (via age structure) may act as a stimulus to economic growth. The strongest case for this so-called "demographic bonus" comes from the experience of East Asia. The caveat is that the positive impact of favorable demographic change (principally a rapid decline in fertility and a temporary bulge in the working age population enabling a high rate of savings) depends on appropriate economic policies. Without appropriate policies, including openness to trade, investments in human capital, and flexible labor markets, countries may miss the one-off opportunity that the demographic bonus represents. Further research is needed on both the demographic and policy contexts in countries now experiencing rapid demographic transitions to determine whether the "bonus" argument is applicable, particularly in countries for which the particular set of economic policies that helped East Asian countries realize their demographic bonuses may not be appropriate. For example, the liberal trade and labor market policies that worked for East Asian "tigers" may not work for poor African countries.

A corollary of the bonus argument is that an unfavorable age distribution resulting from high fertility is a factor in the persistence of poverty, particularly in poor African countries. However, a host of other factors (bad governance and economic policy, adverse geographic conditions, unfavorable trade relations, and HIV/AIDS) are also implicated and typically receive more emphasis in policy discussions. The macro-economic case for accelerating fertility transitions in the poorest countries needs to be strengthened so that they might experience the potential demographic bonus sooner rather than later.

While more research is needed, particularly in poor countries where adverse demographics may indeed be undermining economic prospects, it is unlikely that demographic arguments alone will ever restore population funding to the privileged position that it once held. One of the ironies of this is that investments in family planning have helped to accelerate fertility declines in many countries and have created the impression that the "population problem" doesn't exist any more. This perspective particularly overlooks those poor countries that have not yet experienced fertility decline and may well be caught in a population/poverty trap. Also, the failure of markets to serve poor women in countries that have experienced fertility decline is not being addressed. Even when contraceptive devices are available for purchase, poor women may not have information about the effectiveness and safety of particular methods or they may be too poor to pay for them. Distance, travel costs and social exclusion may also impede access.

The case can and should be made for funding reproductive health care, including family planning, for poor women and men both as a right and as a means of helping them escape poverty. A stronger evidence base is needed to demonstrate that poor reproductive health outcomes do, in fact, undermine the chances of the poor to escape poverty. While common sense suggests that poor reproductive health outcomes—early pregnancy, unintended pregnancy, excess fertility (when actual births exceed desired fertility), poorly managed obstetric complications—adversely affect the chances of poor women, their children and families to escape poverty, the evidence base to support this argument is thin and the evidence that does exist could be more effectively marshaled. As already noted, HIV/AIDS and infectious-disease advocates have done a better job of demonstrating links between these health outcomes and poverty: as their funding increases, funding for reproductive health is stagnating, and services are being crowded out in the deployment of scarce organizational and health personnel at the service delivery level. A

stronger evidence base will support the appropriate inclusion of reproductive health in country-level poverty reduction strategies and in the allocation of poverty reduction funding.

2. PURPOSE AND DESIGN OF THIS PAPER

The primary goal of this paper is to review approaches and key findings about links between reproductive health (RH) and poverty and to suggest additional research to strengthen the evidence base for assessing those links in PRSPs and other poverty analyses. As noted, ICPD shifted the focus on "population" from macro-level concerns about rapid population growth and its consequences to individual and household-level reproductive health and rights. Measurement of population centered on population growth and distribution, fertility rates, and age composition at the societal level and numbers of children and contraceptive use at the household level. Reproductive health, while it includes fertility and family planning, encompasses other aspects of reproduction, including safe motherhood, reduction of maternal mortality and morbidity, reproductive infections and diseases, and a range of outcomes related to ensuring the women have choice and control over reproductive outcomes.

MEASURING REPRODUCTIVE HEALTH

There is no single measure of "reproductive health" (a problem that has plagued the field since the move away from "population", which typically focused on fertility and its demographic correlates). When we talk of "reproductive health outcomes", we are forced to "unpack" the concept into a potentially very large number of indicators, including the timing and wantedness of pregnancy, maternal mortality and morbidity, incidence/prevalence of reproductive tract infections, as well as traditional measures of fertility, family planning, and family size.

Dozens of pathways exist through which reproductive health outcomes could influence poverty, especially if one takes account of indirect as well as direct effects, along with approaches that link other health issues to poverty. For example, a U. S National Research Council report identified multiple hypothesized direct effects of reproductive patterns on women's and children's health:

- Morbidity and mortality risks associated with each pregnancy;
- High risk pregnancies (first and higher-order pregnancies, pregnancies at very young and older ages, shorter birth intervals, and for women in poor health) and a range of problems including maternal depletion, injuries to the reproductive tract, birth trauma for the child, greater risk of abnormalities;
- Unwanted pregnancies ending in unsafe abortion; and
- Problems associated with contraceptive use—inappropriate methods, poor counseling, etc. (National Research Council 1989: 14-17).

Thus the potential scope of the review is quite large. The first task is to identify a subset of pathways that appear to hold promise for strengthening our knowledge base about how P/RH affects poverty.

Within this subset of pathways, the review focuses on a few RH outcomes (early childbearing, maternal mortality and morbidities, and unwanted, unplanned and high fertility) that could affect poverty reduction, either directly or through such important variables as education, productivity and earnings, household savings and income, and health feedbacks. The review draws upon approaches adopted by analysts who have linked other health outcomes (malaria, HIV/AIDS) to

poverty and addresses methodological issues that arise when applying these approaches to the links between P/RH outcomes and poverty.

REPRODUCTIVE HEALTH AND POVERTY MEASUREMENT

The World Bank's 2001 World Development Report recognized ill health as one of the multiple dimensions of poverty, which it defined as "pronounced deprivation in well-being." According to that report, poverty encompasses not only material deprivation (income and consumption poverty) but also low levels of education and health when they accompany material deprivation. Additional dimensions of poverty include vulnerability and exposure to risk as well as voicelessness and powerlessness. Where income and health are concerned, vulnerability means that in addition to the possibility of falling into income or health poverty, there is also exposure to other risks, including "violence, crime, natural disasters and being pulled out of school." The report cites Amartya Sen's (1999) characterization of these forms of deprivation as restricting the "capabilities that a person has, that is, the substantive freedoms he or she enjoys to lead the kind of life he or she values."

The capabilities approach recognizes the connections between income/consumption poverty and capabilities, but views that former as "instrumental" in achieving the latter. In this approach, health and education are viewed as important ends in themselves as well as means to reducing poverty measured in terms of income and/or consumption. Health and education are also core assets in the economists' calculations of human capital. Other aspects of well-being include adequate nutrition, social inclusion and the opportunity to earn. There is debate whether and how to measure how these capabilities add up to "well-being", which leads many economists to prefer poverty metrics based on income/consumption. On the other hand, if health and education indicators are both poverty-reduction ends in themselves as well as being instrumental to the reduction of income/consumption poverty, it may ease the analytical burden of having to demonstrate causal links and the problems associated with that, as noted above.

Gender relations are also important in capabilities thinking. As Ruger (2004) notes, women's education "reduces child mortality directly through a woman's expanded ability and desire to obtain, understand, and act on health-related information, but also indirectly by increasing her respect and empowerment in intrafamilial and extrafamilial decision-making." Mason and Smith (2003) emphasize that gender power relationships within households (on whose definition and measurement they and their colleagues have focused in surveys in five Asian countries) are strongly influenced by social context. In a further note, Mason comments that "what is critical in conceptualizing and measuring empowerment is a focus on groups or categories of persons rather than individuals" (2005).

There is much survey evidence to show that poor women have worse reproductive health outcomes and make less use of health services (for example, delivery attendance by a medically trained person) than the non-poor. For example, tabulations by wealth quintiles of Demographic and Health Surveys (DHS) data carried out during the late 1990s for 56 countries show that an average of one-third of women in the poorest quintiles had attended deliveries compared to over four-fifths for women in the richest quintiles (Gwatkin et al, 2004). These tabulations rely on a measure of household assets (ownership of a bicycle or radio) and housing characteristics (numbers of rooms, toilet facilities) that has been shown to work as a good proxy for household income/consumption levels, which DHS surveys do not measure. Filmer and Pritchett (2001) argue that the "asset index, as a proxy of economic status for use in predicting enrollments, is at least as reliable as conventionally measure consumption expenditures, and sometimes more so."

4

The core question that this review addresses is whether poor reproductive health outcomes undermine the capabilities of poor women to escape poverty. Despite the plethora of survey data showing that poor households are larger and have higher fertility, there is much debate about whether these conditions cause lower consumption and income poverty or are themselves another symptom of poverty.

Further complicating matters is that simply dividing household consumption or income by the number of household members overstates the consumption impact of women and children compared to men, and ignores potential size economies from shared goods such as housing and fuel. To address the first problem, analysts have assigned "adult equivalency" weights to women and children. To understand household size economies better, Lanjouw and Ravallion (1995) tested the impact of changing values of an index of size economies on household poverty measures in Pakistan and found that the correlation between household size and poverty reversed itself at what they consider plausible levels of these size economies. Anand and Morduch (1998) arrived at a similar conclusion using data for Bangladesh, but noted that gender bias could create adverse effects of high fertility through higher mortality and morbidity for women and their daughters. Lloyd (1998) notes that "shared" resources may, in fact, be shared unequally among household members. Citing data from the Philippines (Haddad and Kanbur, 1990), Lloyd argues that ignoring intra-household inequality could result in inequality and poverty being understated by as much as 30 percent because women and children are most vulnerable to differential treatment because of their lack of power and relative youth.

There is general agreement that more microanalysis is needed, and that the micro level is more complex than the fertility/age structure/investment/economic growth channel at the macro level (see Behrman, 2001). Analysis of causal links between reproductive health outcomes and poverty at the household-level analysis is challenging because so many of the relationships involve mutual causality. As Schultz (2005) notes, interpretation of cross-effects of fertility (and other reproductive health outcomes) as causally contributing to poverty reduction is likely to overstate their impact on family welfare: "The most plausible explanation for this overstatement. . . . is that unobserved variables are responsible for both outcomes, such as the preferences of parents or features of the development process which improve women's opportunities beyond childrearing (cf. Moffitt, 2005)" As will be shown below, investigators have tried a number of analytical approaches to address these methodological problems. Care will be required in assessing the evidence base on both the directions and levels of potentially causal linkages which, because of the important role of contextual factors in shaping them, may not be the same in every case.

Because there are numerous potential channels through which reproductive health outcomes could be linked to poverty at the household level, we have selected and grouped reproductive health outcomes under three broad headings: early childbearing, maternal mortality and morbidity, and unwanted or unintended pregnancy and large family size. Clearly there is overlap in the groupings: early child bearing may be unintended, families may have numerous children despite wishing to regulate their fertility, and so on. The literature tends to focus on one or more of these outcomes. We group the materials this way and risk some overlap rather than try to work our way through the evidence without any structure. Similarly, we group poverty channels into three categories: health, education, and other household behavior processes (including work, household spending decisions and resource allocation) each of which has many dimensions.

Based on these findings, the paper offers recommendations for additional investments in research that might further strengthen the evidence base on P/RH and poverty linkages. It also recommends how this evidence base could be used in such key documents as Poverty Reduction Strategies to channel resources toward the reproductive health needs of poor women and men and demonstrate that such expenditures would not only benefit their health but would also help them and their families escape poverty.

3. WHAT HAVE WE ALREADY LEARNED ABOUT LINKS BETWEEN POPULATION, REPRODUCTIVE HEALTH, AND POVERTY?

Most of the early (1960s-1970s) literature on population and poverty focused on macroeconomic linkages between fertility levels and age structure at national and cross-national levels and on the ability of poor countries to escape income poverty through economic growth. The approach centered mainly on the effect of age structure changes on the savings/investment needed to stimulate economic growth and on how unfavorable demographics undermined countries' ability to invest, raise incomes and escape poverty. The best known work in this genre was that of Coale and Hoover (1958), whose seminal book on India and Mexico employed what was then state-of-the-art, investment-driven economic growth modeling. Coale-Hoover inspired many country-level modeling efforts to demonstrate that the age-dependency burden associated with high fertility was keeping poor countries from investing enough to increase national income fast enough to keep up with their rapidly growing populations. These models produced "what if" scenarios that compared projections of population size and structure with high and declining fertility over two to three decades, the impact of changing demographics on investment, the growth of income, and the levels of per-capita income that resulted. Low fertility brought economic growth and poverty reduction; high fertility inhibited it.

While these models drew attention to the population problem faced by poor countries and helped to motivate them and their aid donors to invest in family planning programs, there was very little empirical evidence to support the dependency/investment link, and they came under increasing criticism from economists. These criticisms culminated in the 1986 report of the U.S. National Academy of Sciences (NAS), which was much more cautious about the strength and relative importance of links between population, economic growth and poverty reduction and concluded that while government support for family planning may be justified on other grounds (health, human rights), the economic growth argument was, in fact, pretty weak (National Research Council, 1986).

As noted in the introduction, the age-structure/investment/economic growth approach enjoyed a revival during the 1990s, when Bloom, Kelley, Mason and others analyzed trend data for the 1980s and early 1990s and found that fertility decline and associated changes in the age structure of populations in East Asia created demographic windows of opportunity (rapid decline in youth dependency before dependency associated with population aging started to increase). When combined with good economic policies (investments in human capital, production of goods that required the skills in which those investments were made, openness to trade and good governance) the favorable age distribution produced a "demographic bonus" that would not have occurred without rapid fertility decline. This approach is more nuanced than earlier population/growth analysis in that it looks at both the positive and negative impact of population on growth, focuses on the specific time period when demographics are favorable to growth, requires supportive economic policies to achieve the demographic bonus, and says less about the growth-inhibiting effects of population in pre-transition settings (Birdsall et al. 2001).

6

Not all economists agree with the new approach. There is continued skepticism about the applicability of demographic bonus argument outside East Asia, and even about its contribution to savings in East Asia (Ahlburg, 2002; Schultz, 2004). For example, Schultz replicated the estimates of the impact of favorable demographics in East Asia on savings and found that the impact was reduced substantially when one of the variables (lagged savings) was made endogenous. Additional country-level studies are needed to address these issues, and to show what could be done to enhance the demographic bonus potential in countries that do not have the institutional and organizational advantages enjoyed by the East Asian countries when they experienced it. More attention also needs to be given to whether and how bonus-driven economic growth can be translated into improved living standards for the poor people within bonus countries. One would hope that macro-level linkages between fertility, age structure and capital formation would reflect or be consistent with changes household-level demographics and the chances of individuals and households to escape poverty.

Lipton and Eastwood (2001) have extended the analysis of macro-level linkages between population change and economic growth to ask whether bonus-driven growth has benefited the non-poor more than the poor. They focus on inequality as demographic transitions progress, and question whether the poor, whose fertility and mortality transitions usually lag behind those of the non-poor, do less well in taking advantage of the societal-level increases in average consumption resulting from the demographic bonus. In addition to the effects of changing demographics on macroeconomic growth (which they label the "growth channel"), Lipton and Eastwood suggest that there are two other channels, which they describe as the "distribution channel" and the "conversion efficiency channel." The distribution channel includes two effects: dependency and acquisition. The dependency effect dilutes household consumption when fertility raises the dependency burden of non-workers to workers more for poor than for non-poor households. The acquisition effect of higher fertility reduces the relative ability or willingness of poor households to acquire a given level of household consumption as a result of increased child costs, changes in labor supply or household savings. Eastwood and Lipton (2001) address capacity issues through their "conversion efficiency" channel, which they explain as the effect of high fertility on poor households' capacities to translate a given level of consumption or income per person (or adult equivalent) into welfare or capabilities (e.g., health, schooling).

Dasgupta's (1995) review of population and economics emphasizes the need to look more closely at the household as a collective decision-making unit and to recognize the social mechanisms in which a 'myriad of individual household decisions lead to outcomes that are a collective failure' (1995: 1880). The arguments for going beyond the household as a unit of analysis include:

- Differences across cultures about what constitutes a household and how it functions;
- Cultural and institutional factors that lead to differing interests among household members and unequal capacity to participate in household decisions, particularly for women; and
- Differing and often rapidly changing economic and natural resource bases on which household consumption and production depend.

He contrasts the unitary view of household decision-making that is constrained by income, prices and quality/quantity trade-offs with the reality in many low-income settings of gender imbalances in the capacity to decide whom and when to marry, intra-household disparities in who gets access to health care and education or to decide when and what kind of contraception to use, and who has the power to negotiate safe sex when the risk of sexually transmitted diseases and HIV/AIDS infection is high.

Investigators working in more developed country settings have taken the broader approach to household decision processes. Behrman and colleagues (1995), for example, expand on earlier studies of how parents allocate resources (particularly education) among children by looking at whether parents favor boys over girls, first-borns over younger siblings, and so on. While they find less gender bias than is common in such settings as South Asia, their work demonstrates that even in rich countries institutional forces influence these outcomes. In settings or groups with low intergenerational mobility, a child's economic destiny is largely determined by the family into which the child is born. This and related issues highlight the importance of the larger economic and social context in analyzing the effects of intra-family allocations on intergenerational economic mobility.

Behrman (1996) also explores possible flaws in households' capacity to adjust their intergenerational allocations during times of rapid societal change. As countries move through the transition from high to low fertility, they experience changes in the age structure at both the societal and household levels, moving from high child dependency through periods of rapid growth in the young adult and mature adult populations and eventually to rising old-age dependency. Much of the recent discussion of macro-level economic-demographic linkages has focused on the temporary windows of opportunity afforded by these age shifts for the accumulation of physical and human capital. There are parallels at the household level. Those groups in society at the leading edges of such change and able to take advantage of change by educating their children and finding good jobs will benefit in income and asset accumulation.

4. CONCEPTUALIZING THE LINKS BETWEEN REPRODUCTIVE HEALTH OUTCOMES AND POVERTY?

WHAT CAN WE LEARN FROM RESEARCH ON LINKS BETWEEN POOR HEALTH AND POVERTY?

It is helpful to set the stage for identifying links between these reproductive health outcomes and channels to poverty reduction by examining approaches that have been taken to link other health outcomes and poverty. These approaches also have societal-level or macro dimensions as well as household/micro links. Over et al (1992) have mapped the potential economic effects of a fatal adult illness on households, as shown in Table 1. These include effects on production and earnings, effects on investment and consumption, effects on household health and composition, and psychic costs, as shown in the rows of the table. Effects are broken down by the timing of the impact, as shown in the columns.

In the same spirit, Ruger, Jamison and Bloom (2001) have developed a schematic representation of channels or pathways between health outcomes and the level, growth rate, and distribution of income (see Figure 1 on the next page). Their illustration focuses on childhood illness, but the approach could be used for other conditions, including reproductive health outcomes. The top segment of the chart illustrates societal-level effects, including demographics (high fertility and its impact on age structure—similar to the demographic bonus discussion above) as well as the effect of adult mortality and morbidity on the number of productive working years. At the household level, childhood illness affects the health of adults in later life, as well as working through childhood malnutrition to influence schooling, cognitive capacity and labor productivity. Adult illness and malnutrition also impact productivity directly and through access to resources, and investments in physical capital. Ruger et al cite as examples of evidence on these links the

work of Fogel (1994) on child nutrition and adult morbidity, Behrman (1993) on nutritional status and productivity, Bhargava and colleagues (2000) on health status and income growth.

Table 1: Economic Effects of Fatal Illness in the Household

	Timing of impact			
Type of effect	**Before illness**	**During illness**	**Immediate effect of death**	**Long term effect of death**
Effect on production and earnings	Organization of economic activity Residential location	Reduced productivity of ill adult Reallocation of labor	Lost output of deceased	Lost output of deceased Reallocation of land and labor
Effect on investment and consumption	Insurance Medical costs of prevention Precautionary savings Transfer to other households	Medical cost of treatment Dissaving Changes in consumption and investment	Funeral costs Transfers Legal fees	Changes in type and quantity of investment and consumption
Effect on household health and composition	Extended family Fertility	Reduced allocation of labor to health maintaining activities	Loss of deceased	Poor health of surviving household members Dissolution or reconstitution of household
Psychic costs		Disutility of ill person	Disutility to person Grief of loved ones	
Based on Over et al., 1992				

Schultz (2001) notes the far-reaching economic benefits of improvements in health during the twentieth century, but also calls attention to the lack of rigorous research on linkages and on the reasons that the knowledge base is so limited. These reasons include a lack of consensus on how to conceptualize and measure health status at the individual level as well as the difficulties of using survey data on self-reported health status; a reluctance to assess the benefits of health only in terms of their impact of productivity or human capital, potentially marginalizing other dimensions and the variety of human health needs that may not affect productivity; and the problems created by feedbacks and two-directional causality, for example, when healthier workers who may spend more to maintain their good health. Schultz reviews a number of studies that have employed measures and analytical methods to address these challenges, focusing on physical characteristics (height and body mass) and wages, which are less subject to the measurement errors mentioned above, and on self-reported sick days in surveys. Both approaches indicate lower labor supply and wages for sicker individuals. Savedoff and Schultz (2000) report similar linkages between self-reported morbidity and lower wages in a series of studies conducted in Latin America by the Inter-American Development Bank.

Ruger et al (2001) also describe attempts to measure the economic burden of specific diseases, including malaria, tuberculosis and HIV/AIDS. Measurement approaches track both the direct costs of prevention and treatment and the indirect costs of labor time lost because of illness. They cite estimates by Leighton and Foster (1993) of the total annual value of malaria-related production loss by households at two to six percent of GDP in Kenya and one to five percent in Nigeria. Gallup and Sachs (1998) trace the effect of the disease on economic opportunities (investments not made because of malaria-related illness) and argue that its impact may be substantially greater than its effects on productivity at the household level. Similar methods have been used to track the economic impact of tuberculosis, for example work by Croft (1998) in Bangladesh, who found a loss of roughly 30 percent of average annual income among affected households.

Figure 1: Channels linking illness to per-capita income

From Ruger et al, 2001
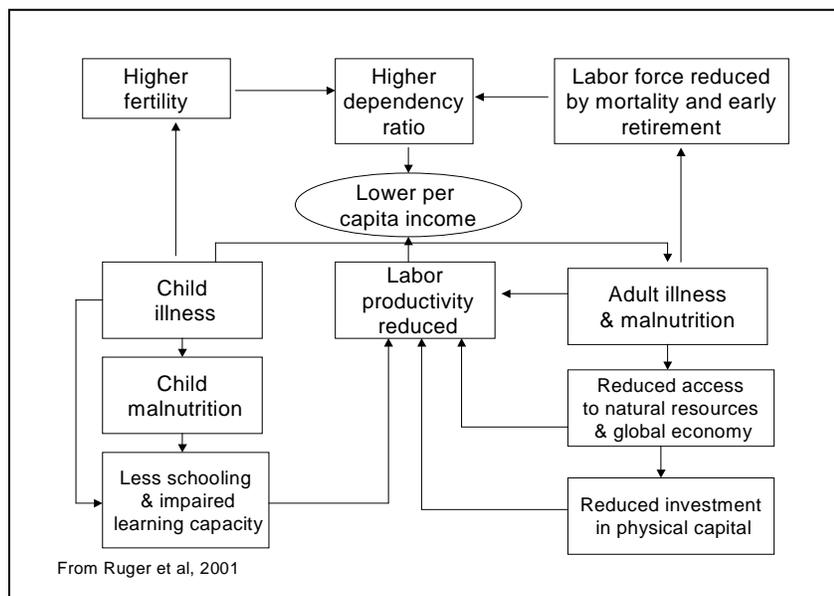
HIV/AIDS advocates have used analyses of the economic impact of the epidemic to convince policymakers that AIDS is as much a development problem as a health problem. Bonnel (2000) used cross-country regression analysis to study the effect of the epidemic in 47 countries and found a net annual loss of one percent of GDP attributable to the disease. The gross impact was higher, but dampened by the countervailing effect of increased labor productivity as workers died. Bell, Devarajan and Gersbach (2003) argue that the long-run impact of the disease will be much greater because the disease is undermining human capital formation and the potential for intergenerational transmission of potential productive capacity as parents die as well as a secondary impact on reduced schooling for children in AIDS-affected households. Thus assessments based on a current cross-sectional view miss the more insidious effects over the longer run.

5. EVIDENCE ON EARLY CHILDBEARING AND POVERTY

Can the framework outlined in Figure 1 be adapted to address links between poor reproductive health outcomes and poverty? The task is complicated by the fact that we have to consider a

range of reproductive health outcomes, including outcomes related to unintended or mistimed pregnancy, complications of pregnancy and delivery, abortion and abortion complications, as well as such consequences as early, poorly spaced, or excess (more than desired) childbearing. Figure 2 outlines some of the channels through which one reproductive health outcome, adolescent pregnancy, might affect the capacity of poor households to escape poverty. The structure of the chart is similar to Figure 1 in that "macro" or population-based channels (age structure, for example) are shown in the upper part and individual- and household-level pathways are depicted in the lower portion.

Early pregnancy and childbearing are widespread in poor countries. They are generally considered to be a problem, and are likely to be both causes and effects of poverty as recognized by the two-directional arrows linking most of the boxes in the chart. The potential channels through which these linkages run include:

- Poor health outcomes for the young mother and her child: higher risk of obstetric complications, leading to higher maternal mortality and morbidities if she survives, increased risk of abortion and abortion complications if the abortion is unsafe, low birth weight and other problems for the newborn;
- Poor educational outcomes for both the mother and her child, including dropping out of school and less schooling for the child;
- Lower and/or altered consumption patterns of the mother's immediate and extended family for rearing the child;
- Possibly lower labor force participation by the young mother, with less opportunity to contribute to household income; and
- Reduced acquisition of social capital through reduced community participation and greater chances of divorce or single parenthood (Lloyd, 2005).

Figure 2: Channels linking early pregnancy and childbearing to poverty
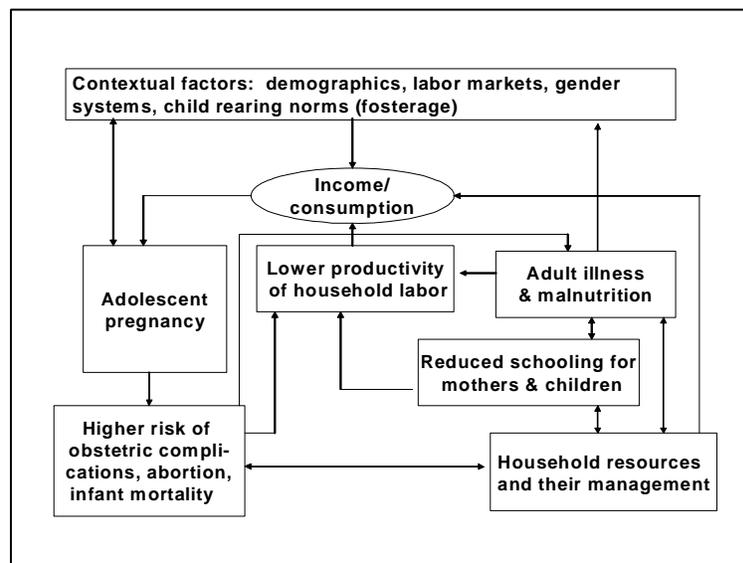
Despite commonly held views on the problems associated with early childbearing, the evidence base on the impact of early childbearing in poor countries is still limited compared to research on

adolescent childbearing in the United States, where the literature is especially well developed. The evolution of the US knowledge base is instructive for thinking about this issue in developing countries. Since the 1980s, teen childbearing in the United States has been considered a major social problem. The US had (and continues to have) the highest teen pregnancy rate among more developed countries. Because teen mothers and their children are more likely to have less schooling and poorer health as well as higher overall poverty rates and greater dependence on the welfare system, the causes and consequences of teen childbearing have been the subject of intense policy debate and research. The National Research Council report "Risking the Future" concluded that "women who become parents as teenagers are at greater risk of social and economic disadvantage throughout their lives than those who delay childbearing" (NRC, 1987). By the 1990s, however, this view was being challenged by researchers who argued that earlier research on the consequences of teen childbearing was flawed and that the adverse consequences of teen childbearing were exaggerated.

As Hoffman (1998) notes in his review of the debate, the issue was not whether teenage mothers and their children were worse off but whether giving birth as a teenager was the single cause of problems associated with teen childbearing—the issue of correlation vs. causality. Critics of the early consensus have employed a variety of analytical techniques to address this problem in analyzing outcomes for young women who gave birth and those who did not. They found that outcomes attributed to early childbearing disappear once social and economic characteristics of teen mothers were controlled, particularly for African Americans in high poverty areas.

For example, research by Geronimus and Korenman (1992) on panel data from sisters who had timed their first births differently showed significantly reduced effects of early childbearing, in contrast with the conventional cross-sectional data. Where mothers' well being was concerned, Geronimus and Bound's (1991) research suggested that delaying childbearing might well lead to *increased* health risks for mothers and their babies among the disadvantaged women most likely to give birth in adolescence. Additional sister research by Geronimus, Korenman and Hillemaier (1994) and Geronimus (2003) found that children of adolescent mothers did no worse than their cousins whose mothers had delayed childbearing on a wide range of achievement and behavioral measures.

Further research, including re-analysis of data from the National Longitudinal Survey (NLS), supports the view that children born to teen mothers suffer disadvantages. Haveman, Wolfe and Peterson (1997: 257) found that these children were more likely to grow up in a poor and mother-only family, live in a poor or underclass neighborhood, and experience high risks to both their health status and potential school achievement. In summing up findings from analyses of NLS, Maynard (1997) observed that even if there is little difference in the economic welfare of teen mothers themselves, "young teen childbearing has significant adverse consequences for the children", and the costs to society are substantial. However policies to reduce those costs need to go beyond delay of childbearing and address the full range of risk factors associated with it.

These findings are supported by Levine, Pollack and Comfort (2001), who do not dispute *that* children of teen mothers perform less well in school and exhibit more problem behaviors (truancy, early sexual activity) but rather question *how* the causal link between these outcomes and early childbearing operates once the background characteristics of their mothers are controlled. A corollary of these findings is that later childbearing would not have benefited these women very much because they were able to catch up for their lower incomes and in educational attainment through high-school equivalency programs and welfare programs. And, as Hofferth, Reid and Mott (2001) noted, the adverse effect of early childbearing on completion of schooling

was decreasing over time because school systems were adapting to the schooling of pregnant and parenting teenager so that they could remain in school whereas in the past they were not permitted to do so.

The debate on adolescent childbearing in the United States has become much more complex since Campbell made this sweeping statement in 1968: "When a 16 year old girl has a child… 90 percent of her life's script is written for her." In assessing these findings and their policy implications, Hoffman (1998) reminds us that the socio-economic conditions affecting the life-chances of teen mothers have changed substantially in the US since the 1970s-80s, when the teens being studied were having their children. Welfare reform, for example, has undermined the safety nets that enabled the NLS mothers to catch up with those who delayed childbearing. While recognizing the contribution of research that focused attention on difficult-to-measure family and individual characteristics that contribute to problems experienced by teen mothers, he says that it is too early to conclude that policy efforts to reduce teenage pregnancy are misguided: "Reduction of early parenthood will not eliminate the powerful effects of growing up in poverty and disadvantaged. But it represents a potentially productive strategy for widening the pathways out of poverty, or at the very least, not compounding the handicaps imposed by social disadvantage."

Table 2: Findings from US research on whether early childbearing causes poverty by disrupting schooling and employment opportunities, and by contributing to intergenerational transmission of poverty, etc.

Type of study	Citation	Findings
Review	Campbell, 1968	Provides an interesting historical perspective on this discussion, stating that, "When a 16 year old girl has a child… 90 percent of her life's script is written for her."
Review	National Research Council, 1987	"Women who become parents as teenagers are at greater risk of social and economic disadvantage throughout their lives than those who delay childbearing.
National Longitudinal Survey of Youth (NLSY)	Geronimus and Korenman 1992; Geronimus, Korenman & Hillemeier, 1994; Geronimus, 2003	"…[F]ailure to control adequately for family background differences among women who have births at different ages may lead to overstated estimates of the long-term socioeconomic consequences of teen childbearing" and "net of family background factors, teen childbearing may not adversely affect early childhood development casts doubt on the presumptive benefits to children of efforts to alter women's fertility behavior." Outcomes attributed to early childbearing disappear once social and economic characteristics of teen mothers are controlled, particularly for African Americans in high poverty areas.
Michigan Panel Survey of Income Dynamics	Hoffman, Foster and Furstenberg, 1993	Further analyzed sister data and obtained less dramatic results, finding that the average difference in economic well being was one-third rather than zero. The sisters also differed substantially in their chances of being poor, receiving welfare, and educational attainment.
Michigan Panel Survey of Income Dynamics	Haveman, Wolfe & Peterson, 1997	Children of adolescent mothers are more likely to grow up in poor and mother-only families, live in poor neighborhoods, and experience high risks to health and school achievement.

13

Review of studies in "Kids Having Kids"	Maynard, 1997	Even if early teen childbearing results in little difference in the economic welfare of teen mothers themselves, it has significant adverse consequences for the children: poor school performance for *all* children of women who give birth as teens, poorer overall health, more likely to be victims of abuse and neglect, three times as likely to experience incarceration.
Review of existing research	Hoffman, 1998	The socioeconomic conditions affecting the life-chances of teen mothers have changed substantially in the US since the 1970s-80s, when the teens being studied were having their children. Welfare reform, for example, has undermined the safety nets that enabled the NLS mothers to catch up with those who delayed childbearing. "Reduction of early parenthood will not eliminate the powerful effects of growing up in poverty and disadvantaged. But it represents a potentially productive strategy for widening the pathways out of poverty, or at the very least, not compounding the handicaps imposed by social disadvantage."
NLSY	Levine, Pollack and Comfort, 2001	The strong correlation of early motherhood with negative outcomes for children's test scores and grade repetition has almost everything to do with the individual and family characteristics of adolescent mothers themselves rather than the timing of their births.
Review	Hofferth, Reid & Mott, 2001	Adverse effects of early childbearing on completion of schooling have decreased over time as school systems adapt to pregnant and parenting teenagers. But the effect of early childbearing on *college* attendance is greater today than in the past. "Because years of completed schooling increased for everyone, teenage mothers are at least as disadvantaged today as they were in the past" (266).

ADOLESCENT PREGNANCY AND POVERTY IN POOR COUNTRIES

Early childbearing is common in poor countries, although its prevalence varies by country and region. In her review of levels of childbearing among adolescent women in Demographic and Health (DHS) surveys for 43 countries, Singh (1998) reported the highest levels of early childbearing in Africa, with proportions having given birth before age 20 ranging from 47 to 75 percent of women in 17 of the 20 surveys for which she reported. About one-third of Latin American women had given birth by age 20. The proportion was somewhat lower in North Africa, the Near East and Asia, ranging from 20 to 30 percent. Early childbearing is also more prevalent for poorer women within countries for which DHS data have been divided into wealth quintiles, as shown in Table 3.

Table 3: Adolescent Fertility Rates by Wealth Quintile and Region

Region	No. of countries	Regional average	Poorest quintile	Richest quintile	Poor/rich difference
East Asia	4	46.0	76.5	15.8	60.8
Europe/Central Asia	4	52.7	73.0	31.3	52.7
L. America, Caribbean	9	94.7	172.6	36.9	135.7
Middle East, N. Africa	3	62.7	111.7	99.0	12.7
South Asia	4	108.8	146.3	56.0	90.3
Sub-Saharan Africa	29	131.9	169.6	79.5	90.0
All country average	55	106.5	148.6	62.6	86.1

Source: Gwatkin et al, 2004.

Age-specific fertility tabulations for women aged 15-19 show that the average rate for women in the poorest quintile is more than twice that of women in the richest group for 55 countries as a whole, and nearly five times greater for poor women in Latin America and the Caribbean. The poor/rich differential is lowest in the three Middle East/North African countries and in Europe/Central Asia and East Asia, which also have lower regional average rates and close to the overall average for South Asia and Africa. On the other hand, the latter regions have the highest overall adolescent fertility rates.

Concerns about early childbearing in poor countries are similar to those voiced in the US literature—the risk of inter-generational transmission of poverty via its impact on a woman, her own and her children's health and education, and their life options. As Lloyd notes in a recent U.S. National Research Council report on youth issues, early childbearing could have a range of potential consequences. These include "premature exit from school, reduced earnings prospects, reduced chances of community participation and acquisition of social capital, a heightened possibility of divorce or single parenthood, and a greater risk of living in poverty" (2005: 8-2). Yet she and her colleagues argue that the suggestion that early childbearing causes negative outcomes, "is certainly a plausible hypothesis, there is insufficient evidence to make this assertion" (2005: 8-8-9). They note that the data are thin and that existing studies for the most part lack statistical rigor. Studies have generally used retrospective data to compare adolescent mothers, both single and married, to women who have their first births at older ages. The risks are greater for girls, who bear the primary responsibility for child care, and may coincide with "shrinking opportunities and reduced scope for independent action" (Lloyd, 2005).

Echoing the US debate, generalizations about these concerns have been challenged for several reasons. First, the disadvantages of early parenthood may be transitory and young mothers may overcome them over time; second, that negative outcomes of early childbearing may result from associated conditions such as poverty, and these women may fare poorly even if they delay childbearing (Buvinic 1998); and third, early childbearing's association with so many other factors – unwantedness, "illegitimacy," a lack of pre- and post-natal support, social stigma, and little social and material support – makes the effects of maternal age on child health outcomes unclear (Zabin and Kiragu 1998). As Gage (1998) notes, "the cultural and social circumstances surrounding adolescent fertility are so diverse that they defy generalization."

Picking up on the possible channels through which early childbearing might impact poverty reduction, what can we learn from existing research about the impact on the health of the mother and her children, on education, and on earnings, well being and life options?

HEALTH EFFECTS

Research on the links between early childbearing and poor maternal and neonatal health outcomes have concluded that most of the adverse health consequences (delivery complications and maternal mortality, prematurity and higher perinatal death rates) of teen pregnancy are associated more with socioeconomic factors than with the biological effects of age (Makinson, 1985; Miller, 1991). As Zabin and Kiragu (1998) note, African women are at greater risk of pregnancy-related death and disability whatever their age. Because of their physiological and social immaturity, the risks are more pronounced for teenage mothers. For developing countries, women aged 15-19 are twice as likely to die from childbearing as women in their 20s, and women under age 17 face especially higher risk. Young women who become pregnant are at risk of obstructed labor if they have not grown to their full height or pelvic size, and are also more likely to suffer from eclampsia, which threatens them and their babies (Upadhyay and Robey, 1999).

In her review of research on the consequences of adolescent childbearing in India, Jejeebhoy (1996) reports that infants of adolescent mothers are more likely to suffer higher perinatal and neonatal mortality, that levels of anemia and complications of pregnancy are higher for adolescent mothers, but that they are less likely to obtain antenatal care and trained attendance at delivery than older mothers. In a study conducted in a Hong Kong hospital, Lao and Ho (1997) find that adequate antenatal care can reduce the effects even of preterm labor, which is more common among young mothers. But in many settings a lack of access to such services is one of the important correlates of very early childbearing: analyses of longitudinal data from urban Mali and Burkina Faso and of clinic records from urban Mozambique showed that babies born to adolescent mothers had lower birthweights and higher mortality (LeGrand and Mbacke, 1993; Bacci et al., 1993). Research by Alam (2000) in Bangladesh also found higher infant mortality rates among younger mothers than older ones.

Gage (1998) reports that induced abortion is a leading cause of maternal mortality and morbidity for adolescents in developing countries. She cites evidence from Nigeria that induced abortion accounted for at least 70 percent of all maternal deaths for the 15-19 age group. Stigma and criminalization of abortion complicate assessment of the prevalence of abortion-related health problems, but hospital records for in many countries reveal high proportions of young women among those admitted for abortion complications.

The perception in much of the developing world is that loosened social controls over adolescent sexual behavior have led to premarital sexual behavior. But the risks are not restricted to unmarried women. Regardless of marital status, child bearing at a young age is risky. Changing social norms may also be a factor according to Meekers, who notes that, "the increase in age at marriage has increased the population at risk of premarital sexual intercourse" (Meekers 1994: 60). Mensch and colleagues (2001) report that while age at marriage has risen in Kenya and contributed to a decline in adolescent fertility, the proportion of teen births that occur outside of marriage increased. Declines in age at menarche are also likely to contribute to increased reproductive health risks for young women, who are exposed at an earlier age to STDs and pregnancy, though pelvic growth continues beyond menarche. Among the serious disabilities young women experience are obstetric fistulae, which have far reaching consequences, including abandonment, social isolation, and stigma (Bello, 1995; Hilton, 2003).

As age at marriage increases, the period between menarche and marriage is longer, with all of the additional social costs of sexual activity added to the strictly biological costs. Because of what is at stake for young women, especially unmarried women, and especially schoolgirls, who become

16

pregnant, pregnancy termination is common in most African countries despite legislation that prohibits it (e.g., Ladipo 1989; Ahman and Shah 2000).

Adolescent childbearing carries risks for the health and development of the children born prematurely and at low birth weight or through difficult labor. The tendency in research on early childbearing in the developing world has been to focus on non-marital fertility because this is viewed as a social problem, much as in the United States. While the health consequences occur for all young women, the socioeconomic consequences are greater for the unmarried because they are engaging in *socially stigmatized behavior* and cannot count on social support if they become pregnant or sick: "… those particular behaviors related to social and economic change are the ones that generally arouse concern, not those associated with traditional patterns of family formation. Therefore, much of the literature suggests that the problem of adolescent fertility in the sub-Saharan region is that of increasing premarital sexual activity, with its documented sequelae… Whereas this narrower definition may be more culturally sensitive when discussion focuses on the socioeconomic consequences of adolescent sexual behavior, in this review, this definition is shown to be inappropriate when discussing health sequelae. Negative health consequences for young, married women and their infants must also be understood if they are to be addressed within their cultural setting" (Zabin and Kiragu 1998: 224).

EDUCATION EFFECTS

Early pregnancy and early marriage may limit girls' educational and developmental opportunities as well as future full participation in society. Eighty-two million girls currently aged 10-17 will be married by the time they are 18. In their review of DHS data for 12 countries, Rani and Lule (2004) report that in most countries young women from the poorest households were more likely than those from the richest to be married by age 18 and have had at least one child by that age. Young mothers are least likely to continue their education, participate in the workforce, or secure employment and fair wages.

Girls' education offers returns not only for girls themselves, but also for their future children, in terms of smaller families, more investments in each child's health and education, and greater earning potential of better-educated girls – leading to breaks in the inter-generational transmission of poverty. Girls' education delays marriage and childbearing, with expanded opportunities for the development of their full potential as citizens and economic agents. Mensch and Lloyd note that for girls school may be the only place where they can meet women in the workplace and learn that existing gender roles and competencies are changeable (1998:167).

An analysis comparing young women in northeastern Brazil who had sought abortions or prenatal care when they became pregnant in adolescence found the following: while the women who continued their pregnancies were more likely than the others to drop out of school, those who had had abortions were experiencing low self-esteem (Bailey and Bruno 2001). The lower self-esteem was explained by conditions surrounding abortion, which is illegal and therefore stigmatized in this setting. A study of Yoruba women in Nigeria compared the life trajectories of women (independent of marital status) who had had a birth in adolescence with those who first give birth in their 20s (Omololu 1994). Women who had given birth as adolescents were more likely to have unsupportive partners and families, to have more children, and to be second wives than women who had given birth later. These women had generally had to end their schooling and tended to have had conflicted relationships with their parents and families.

Premarital fertility is common and there is much greater unhappiness with premarital versus marital fertility. The rise of primary and secondary schooling and the expulsion of pregnant girls from school mean that unmarried young women have much more to lose if they become pregnant. An analysis of DHS data shows that over 40% of births to teenage mothers in Botswana, Ghana, Kenya, Liberia and Togo were unwanted (Meekers 1994). The percentage reported to be unhappy about the timing of the first birth is higher for teenage mothers than for those starting childbearing later. Over 40 percent of women 15-24 said they would be unhappy if they got pregnant now, over two-thirds of women in Burundi and Liberia. This percentage is less than 17% in Mali where young women are almost all married. This figure in Mali is likely to be an underestimate as young women adjust to having a child once it is born.

Most of the evidence on links between childbearing and schooling focuses on the effects of family size and composition on enrollment and completion rates rather than on early childbearing alone (see the section on family size and poverty). Some studies report that pregnancy contributes to girls' dropping out of school, particularly at the secondary level, but as Eloundou-Enyegue (2004b) reports, secondary school dropouts attributed to pregnancy range between 10 and 20 percent for most countries and are above that for only a few countries. In her 1998 review, Gage was unable to find any studies for sub-Saharan Africa that sorted out the causal relationships between family background, educational attainment and adolescent pregnancy along the lines of the research that has been done in the US (Gage 1998:126).

In many countries increased educational participation has exposed girls to sexual advances by male teachers and fellow students, putting them at greater risk of becoming pregnant or being infected with an STD or HIV. Mensch and colleagues (2001) found that pregnancy was not the leading reason for dropping out of school (compared to lack of money, poor grades, and other demands placed on them). At the same time, the cumulative effect of exposure to pregnancy risk over several years and the difficulties girls face in returning to school after a pregnancy increase its negative impact on educational attainment (Meekers and Ahmed 1999). Fostering arrangements, which when prevalent play an important role in the relationship between presence of young children and education, may mitigate some of the adverse effects of pregnancy for teen mothers who have access to kind of support system (see Shapiro and Tambashe 2001).

Eloundou-Enyegue's analysis of the implications of reducing early fertility for girls' schooling explores the idea that policies to reduce unintended fertility can have secondary benefits on other development goals. Specifically, he estimates the gender gap in educational attainment as a function of the rate of pregnancy-related dropouts. This enables him to discuss whether fertility reduction policies might boost girls' education – and reduce gender inequities in education. He notes that countries have small budgets to spend on large and growing school-aged populations. "Such budget shortfalls put a premium on policy efficiency and warrant a search for indirect policies such as family planning that may improve education outcomes" (Eloundou-Enyegue 2004a: 3).

The payoffs to reducing unintended pregnancy are greater when early pregnancy rates are higher, where equity in *primary* education is being achieved (Eloundou-Enyegue 2004a), and when unintended pregnancies lead more unequivocally to dropping out of school. The study found that lack of money was the dominant cause of school dropout (33%), followed by poor grades (20%), and pregnancies (16%). This latter figure is 28% when looking only at girl dropouts. The discussion in this paper focuses on how gender parity in primary school completion (so a large proportion of girls make it to secondary school where they are first at risk of becoming pregnant) can help with overall gender equity in education, as it can "withstand" moderate levels of

unintended pregnancies. Parental discrimination in favor of girls can also reduce gender inequities in education under circumstances where girls are more likely to drop out.

While Mozambique and Namibia have similar levels of adolescent fertility (.52 and .53 children per young woman), many fewer Mozambican girls complete school, suggesting "differences in the laws, norms and institutions that facilitate the continued schooling of pregnant teens or the re-entry of young mothers" (Eloundou-Enyegue 2004a: 21). "The more pregnancies are concentrated among high-risk groups (e.g., girls from rural, poor, or large families), the smaller the actual benefits from reducing unintended fertility" because these girls might have dropped out anyway. These findings echo those for the USA on the point that context and changing socioeconomic conditions matter as much or more than individual characteristics in these relationships.

EARNINGS, WELL BEING AND LIFE OPTIONS EFFECTS

Research in Mexico by Buvinic (1998) suggests that early childbearing is associated with negative economic effects, lower monthly earnings for mothers, and lower child nutritional status result *among the poor* and not among women who are not poor. She controlled for child's age and mother's socioeconomic level and found the nutritional status of the children of adolescent mothers was significantly poorer than that of older mothers. Among poor adolescent mothers only, education and contributions to household income were associated with improved child health. She concludes that, "social policy that expands the educational and income-earning opportunities of poor women could help to contain the intergenerational poverty associated with early childbearing among the poor" (Buvinic 1998: 201). A final important finding of this research in Mexico found that "mothers who had had their first child with a biological father who was 17 years old or younger were two times more likely to be poor than were mothers who had had their first child with older biological fathers" (Buvinic 1998: 206). The age of the father is associated with his ability to support the woman and child, and also perhaps with the extent to which he is present in their lives.

Buvinic finds that even controlling for mothers' educational level, for poor women, adolescent childbearing is associated with lower earnings. "Poor adolescent mothers seem to work more and earn less than other mothers" (Buvinic 1998: 208). She then questions this result by explaining that the adult mothers with whom adolescent mothers were compared tend to be older, and older workers tend to earn more than younger (less experienced) workers. Still, she concludes, "The Chile study suggests that early childbearing and closely associated factors can have important economic costs, in terms of lower monthly earnings, especially for poor mothers who need those earnings most. Early childbearing seems to entrench women's poverty" (Buvinic 1998: 206).

Economic rationality – advantages when girls have sexual relations with teachers or sugar daddies who help pay for school fees (Luke and Kurz 2002). Surveys in Kenya showed 60% of male and female respondents said girls engage in sexual relations in order to receive money and gifts (Ocholla Ayayo 1990). The sexual *relationship* may be advantageous, but the *pregnancy* may not.

Reduced access to resources leads to poor health among women who bear children very early. "In summary, evidence suggests that the health of a young woman who begins motherhood early is placed in jeopardy as the result of factors: her developmental status, her subservient position in society, customs that affect and control her, and her inability to secure adequate prenatal and obstetrical services when she needs them most. In the long run, her situation is aggravated

because, by encountering these health complications early in her reproductive life, the young woman must endure their repercussions over a longer period of time. To the extent that they compromise her ability to rear her children, carry out her daily activities, or continue her education, these problems have profound effects on her family and on the society as a whole" (Zabin and Kiragu 1998: 218).

Most research on early childbearing focuses on unmarried girls. In regions where early marriage is prevalent, many of the socio-economic consequences of early childbearing are couple with the effects of early marriage, and one finds the evidence on these impacts in the literature on early marriage rather than early childbearing. This might explain why we find more research for Latin America, where age at marriage is higher, than for Asia and Africa. A recent WHO-UNFPA-Population Council (Haberland et al 2004) report on the consequences of early marriage notes that married girls:

- Consistently have less education and schooling opportunities;
- Have less household and economic power than older married women;
- Have less exposure to modern media and social networks;
- Are at great risk of gender-based violence; and
- Face greater health risks, particularly when they are poor, exposed to HIV, and/or having their first birth at a young age.

Table 4 summarizes findings on links between early childbearing and poverty through health, education, and well-being.

Table 4: Summary of research on effects of early childbearing on poverty

Country, Population & Method	Citation	Finding
Health consequences of early childbearing		
Global review	Save the Children, 2004	Girls in their teens in poor countries are twice as likely to die from pregnancy-or childbirth-related causes compared with older women, while girls aged 14 and below face even higher risk. Children born to young mothers are more likely to be born prematurely and at low birth weights, more likely to die in the first year of life, less likely to receive adequate nourishment and health care, less likely to receive good education, and more likely to be poor throughout life.
DHS data for 15 developing countries	Reynolds, Wong et al, 2003	Data on nearly 100,000 births in 15 developing countries showed significantly less use of prenatal and delivery care with a skilled provider among adolescents under age 17 compared to 19-23 year olds.
Global Review	King, 2003	Young girls who conceive within 2 years of menarche may enter pregnancy with low nutrient reserves because of the use of nutrients for their own growth.
India Review	Jejeebhoy, 1996	Adolescent mothers are more likely to suffer higher perinatal and neonatal mortality; levels of anemia and complications of pregnancy are higher, and they are less likely to obtain antenatal care and trained attendance at delivery than older mothers.

Africa Review	Zabin and Kiragu, 1998	Because of their physiological and social immaturity, the risks of pregnancy-related death and disability are more pronounced for teenage mothers.
Global Review	Upadhyay and Robey, 1999	Young women who become pregnant are at risk of obstructed labor if they have not grown to their full height or pelvic size, and are also more likely to suffer from eclampsia, which threatens them and their babies.
Effects on schooling.		
Comparative DHS data	Meekers, 1994	The rise of primary and secondary schooling and the expulsion of pregnant girls from school mean that unmarried young women have much more to lose if they become pregnant. An analysis of DHS data shows that over 40% of births to teenage mothers in Botswana, Ghana, Kenya, Liberia and Togo were unwanted. The percentage unhappy with the timing of the first birth is higher for teenage mothers than for those starting childbearing later.
Botswana Survey data	Meekers and Ahmed, 1999	The cumulative effect of exposure to this risk over several years and the difficulties girls face in returning to school after a pregnancy increase its negative impact on educational attainment.
Cameroon Survey data	Eloundou-Enyegue, 2004	Payoffs to reducing unintended pregnancy are greater when early pregnancy rates are higher, where equity in *primary* education is being achieved and when unintended pregnancies lead more unequivocally to dropping out of school. The study found that lack of money was the dominant cause of school dropout (33%), followed by poor grades (20%), and pregnancies (16%).
Review of survey research in Chile, Barbados, Guatemala and Mexico	Buvinic, 1998	Early childbearing seems to entrench women's poverty" (206). "[F]or poor women… adolescent motherhood is associated with lower earnings, even after controlling for mothers' educational level" (206). Younger adolescent mothers earn significantly less than older adolescent mothers. In all four countries, adolescent mothers are more likely to live in poverty even after controlling for mother's education and socioeconomic status as a child.
Global review	Save the Children, 2004	Early childbearing not only disrupts school but ruptures girls' connections with mentoring adults and peers who could provide linkages to useful information and institutions.
Effects on household well-being		
Global review	Population Council and ICRW, 2000	Most very young mothers work in the informal sector or are not paid.
Santiago, Chile Survey of adolescent mothers	Buvinic, 1998	Disadvantages of early parenthood may be transitory and young mothers may overcome them over time; and negative outcomes of early childbearing may result from associated conditions such as poverty, and these women may fare poorly even if they delay childbearing.

Mexico Survey of adolescent mothers	Buvinic, 1998	Even when child's age and mother's socioeconomic level were controlled for, the nutritional status of the children of younger childbearers was significantly poorer than that of older childbearers. Lower monthly earnings for mothers, and lower child nutritional status result *among the poor* and not among all adolescent mothers. Having children with *fathers* 17 years old or younger doubled adolescent mothers' chances of being poor.

KNOWLEDGE GAPS

Most of the evidence on the impact of childbearing on the health, education and well-being of women and their children relates to all women in reproductive ages rather than to younger mothers. Also, there is almost no research that looks at impacts by age of mother and by wealth status, which would provide insight into the experiences of poor women. More focus is needed on the immediate and longer-term consequences of early childbearing, including school attendance, work inside and outside the home, and the support systems. Recognizing the importance of context and the likelihood that early childbearing may hold women back when educational attainment is improving for most women in the countries where they live, particularly when the economic returns to education are also increasing, it will be important to be able to track the experiences of young mothers over time rather than rely on a one-time view of their individual characteristics.

6. MATERNAL MORTALITY AND MORBIDITY (POORLY MANAGED OBSTETRIC EMERGENCIES) AND OTHER REPRODUCTIVE HEALTH MORBIDITIES AND POVERTY

Every year more than half a million mothers in low and middle-income countries die giving birth, mostly among the poorest groups within these countries. There is an even larger toll of morbidities, more than 8 million each year (Koblinsky et al., 1993), resulting from non-fatal complications of delivery. Most of these deaths and disabilities are preventable, and the interventions required to prevent them are known. The sad reality is that in many instances these interventions are either not available to poor women or so poor in quality that they are ineffective.

Global, regional and country-level estimates of maternal mortality (Table 5) show a clear connection between high maternal mortality ratios (MMRs) and poverty. More than 99 percent of maternal deaths occur in developing regions, and more than 85 percent occur in the poorest countries of Sub-Saharan Africa and South Central Asia. Country-level estimates show that more than a quarter of those deaths occurred in India, and that several other poor countries in these two regions (Bangladesh, Ethiopia, the Democratic Republic of Congo, Nigeria, Pakistan, Tanzania) account for another quarter of them. The highest maternal mortality ratios are found in poor countries in Sub-Saharan Africa. With the exception of Afghanistan, all of the countries having maternal mortality ratios of 1000 or higher are found in Africa.

Table 5: Comparison of 1995 and 2000 regional and global totals

Region	2000		1995	
	Maternal Mortality Ratio	Maternal deaths (000s)	Maternal Mortality Ratio	Maternal deaths (000s)
WORLD TOTAL	400	529,000	400	515,000
DEVELOPED REGIONS*	20	2,500	21	2,800
Europe	28	2.2	36	3.2
DEVELOPING REGIONS	440	527,000	440	512,000
Africa	830	251,000	1,000	273,000
Northern Africa	130	4,600	200	7,200
Sub-Saharan Africa	920	247,000	1,100	265,000
Asia	330	253,000	280	217,000
Eastern Asia	55	11,000	60	13,000
South-central Asia	520	207,000	410	158,000
South-eastern Asia	210	25,000	300	35,000
Western Asia	190	9,800	230	11,000
Latin America & the Caribbean	190	22,000	190	22,000
Oceania	240	530	260	560

Source: AbouZahr and Wardlaw, 2004: *Developed regions include Canada, United States of America, Japan, Australia and New Zealand, which are excluded from the regional averages.

Measuring maternal and neonatal mortality for sub-groups of the population within countries is even more challenging than country-level estimates. Graham and colleagues have developed a technique for estimating rich-poor differentials in maternal mortality using Demographic and Health Survey (DHS) data for 10 countries (Burkina Faso, Chad, Ethiopia, Indonesia, Kenya, Mali, Nepal, Peru, Philippines and Tanzania) with large sample sizes using wealth-quintile methodology developed at the World Bank (Graham, Fitzmaurice, Bell, and Cairns, 2004; Gwatkin et al, 2004). In the country with the largest sample size and also with two surveys, Indonesia, they found that the poorest quintile accounted for one-third of all maternal deaths in both surveys, compared to fewer 13 percent of deaths in the richest quintile. They also found a high level of association between the survival status of women and poverty status in all of the countries, and a highly significant correlation between education and survival status.

It is also possible to get a sense of rich-poor differences for other countries (56 in all, including the 10 for which MMRs by wealth quintiles have been calculated) by using the DHS data on deliveries attended by medically trained persons for these same countries. This indicator is known to be highly correlated with maternal mortality (and has, in fact, been used to estimate the proportion of maternal deaths in countries lacking other maternal mortality data).

Table 6: Attendance at delivery by a medically trained person for wealth quintiles

Region	No. of countries	Regional average	Poorest quintile	Richest quintile	Poor/rich difference
East Asia	4	53.6	26.6	90.4	63.8
Europe/Central Asia	6	94.9	88.4	99.2	10.8
L. America, Caribbean	9	66.0	43.2	93.3	50.1
Middle East, N. Africa	4	52.5	33.6	80.3	46.7
South Asia	4	21.5	7.0	56.7	49.7
Sub-Saharan Africa	29	43.5	24.2	77.1	53.4
All country average	56	51.6	32.7	81.7	49.1

Source; Gwatkin et al 2004

Table 6 shows a 49 percentage point difference in the proportion of skilled attendance between the richest and poorest quintiles for all 56 countries for which the tabulations have been made—with the poorest quintile averaging 32.7 percent compared to 81.7 percent for the richest quintile. Rich poor differences are greatest (64 percentage points) in East Asia, though only four countries are included in the tabulations (Cambodia, Indonesia, the Philippines, and Vietnam) and least (11 percentage points) for Europe/Central Asia (six countries: Kazakhstan, the Kyrgyz Republic, Turkmenistan, and Uzbekistan, along with Armenia and Turkey). That region also has the highest average level of attendance, 88 percent. South Asia (four countries: Bangladesh, India, Nepal and Pakistan) has the lowest overall level of skilled attendance, 21.5 percent and a 49.7 percentage point poor-rich differential. Latin America has the second highest overall level of attendance (43 percent), but also a comparatively high (50 percentage point) differential between rich and poor.

Sub-Saharan Africa has a higher overall average for attended deliveries (43.5 percent) than South Asia, which is puzzling given the MMR estimates for Africa. DHS data are available for 29 countries in Africa, suggesting that the issue may be poor quality of delivery care rather than under-representation of regional experience in the tabulations. Rich-poor differences are in the middle range (53 percentage points) in Africa, though attendance for the poorest quintile (25 percent) is second lowest in the tabulations after South Asia. The Middle East/North Africa (MENA) group (four countries: Egypt, Morocco, Jordan, and Yemen) is in the middle of the range in terms of the regional average (52.5 percent) and rich-poor differential (46.7 percentage points).

A report on the 1998 US National Research Council (NRC) workshop on the consequences of maternal mortality and morbidity summarizes most of the evidence available at that time. As Henry Mosley noted during that workshop, because death in childbirth is comparatively rare, the evidence base about the impact of maternal deaths is limited. This makes it challenging to separate deaths in childbirth from deaths due to other causes, and because maternal deaths typically occur among poor households, may lead to selection bias in research on their consequences (NRC, 2000). The fact that monetary income of women is low, particularly in poor households, is a further measurement challenge.

As described in Table 7, the NRC report looks at the potential effects of maternal mortality and morbidity on children, families/households and society and reviews five groups of effects: demographic, economic, health, psychological and social. These categories are similar to those in the framework for assessing the consequences of poor health outcomes that was used in the discussion of early childbearing and allows us to group research findings into (1) the health effects for mothers who survive an emergency and the children of those who died, including

survival of children as well as health and nutrition, (2) the social/psychological effects, including schooling of children, and (3) household economic effects, including consumption and productivity.

Table 7: Potential effects on children, families and households, and communities and society due to maternal mortality and morbidity

Potential Effects	On Children	On Families and Households	On Communities and Society
Demographic	Death	Loss of deceased Dissolution or reconstitution of family/household	Loss of deceased Increased number of one-parent households Increased number of orphans
Economic	Increased labor force participation	Reduced productivity of ill adult Lost output of deceased adult Reallocation of land and labor Medical costs of treatment Dissaving Changes in consumption and investment Funeral costs, legal fees Transfers Changes in household management	Reduced productivity of ill adult Lost output of deceased adult Reallocation of land and labor Dissaving Changes in consumption and investment Transfers Economic burden of one-parent
Health	Illness Injury Malnutrition Poor hygiene	Reduced allocation of labor to health maintaining activities Poor health for surviving household members	Change in the allocation of labor to health maintaining activities
Psychological	Depression Other psychological problems	Depression Other psychological problems Grief of loved ones	Grief Loss of community cohesion
Social	Social isolation Reduced education Reduced parental supervision and care	Social isolation Changes in care for children, elderly, and disabled	Changes in responsibility for care of children, elderly, and disabled Loss of community/societal leaders Changes in women's rights, health policy, other public policy

Source: National Research Council, 2000, page 6.

HEALTH EFFECTS

About 180 million women become pregnant each year worldwide. An estimated 30 to 40 percent of them report some kind of pregnancy-related morbidity, and about 15 million have complications that lead to long-term disabilities (Menken and Rahman 2001). As noted above, for each maternal death worldwide, another 16 women are estimated to be injured, disabled, or otherwise unable to continue their daily activities. If this estimate is accurate, in Africa, where 150,000 women die each year during the childbearing period, nearly 2.4 million women incur some morbidity or disability as a result of their pregnancies (NAS 1996). These broad estimates focus on acute morbidities and often omit chronic problems that only become obvious long after childbirth (Koblinsky et al 1993). Hemorrhage, for example, can lead to the need for transfusions, and in Africa, where blood is not carefully screened, this can mean contracting HIV/AIDS. Data from Uganda suggest that women receive 75% of all adult blood transfusions, most of them through hemorrhage associated with childbearing (Zabin and Kiragu 1998: 216). The ten-year Giza Study in Egypt documented life-long health consequences of poorly managed obstetric complications among women who survived them and found higher incidence of problems like uterine infections, uterine prolapse, high blood pressure, and difficulties with later pregnancies and contraceptive use (Khattab 1999:81.82). They also noted that few women sought appropriate treatment for these problems, in part because of lack of awareness of their seriousness and in part because of prevailing attitudes about them being a "normal" condition for poor women.

25

Unsafe abortion is a significant cause of maternal mortality and morbidity. Nineteen million unsafe abortions are estimated to have taken place during the year 2000, 98 percent of them in developing countries (Ahman et al. 2003). Over the period 1995-2000, an estimated 78,000 maternal deaths, approximately 13 percent of all maternal deaths, were attributable to unsafe abortion. AbouZahr and Ahman estimate that the abortion-related mortality risk was at least 15 times higher in developing areas and that in some regions it may be 40-50 times higher than in more developed regions. While unsafe abortion and abortion-related mortality risk are much greater in poor countries, comprehensive data on rich-poor differences in risk are not available. The fact that poor women have higher fertility and lower contraceptive use would imply that they are at much higher risk. There is also evidence, still incomplete, that the incidence of unsafe abortion and resulting mortality may be rising among unmarried adolescent women in urban areas of developing countries.

Post-partum morbidity is so widespread in Africa that people tend to take it for granted and see little way to avoid or prevent it (Zabin and Kiragu 1998; Liskin 1992; Merchant et al 1990). Among the disabilities women suffer as a result of their sexual and reproductive experiences are obstetric fistulae (Hilton 2003). The consequences of VVF are far-reaching and include divorce or abandonment, social isolation and stigmatization (Bello 1995). Pregnant adolescent women are especially likely to experience fistulae, both because their first deliveries are more likely to be obstructed (they're younger, not fully grown, more likely to be delivering at home, may have undergone FGM and therefore be facing obstruction caused by scar tissue, and they are more limited in their access to health services than adult women) and therefore to suffer from VVF (Zabin and Kiragu 1998). FGM is related to various reproductive morbidities including infection (drainage of urine and menstrual blood impeded) and VVF due to obstructed labor. Because these problems are seen as shameful, women do not discuss them with healthcare providers and can become isolated (Bangser 1999).

Children whose mother dies are much more likely to die themselves. Neonatal mortality is considerably higher in areas where maternal mortality is high. Over et al. (1992) report data from 19th century Sweden showing that the death of a mother reduced her infant's probability of surviving its first year of life from 0.97 to 0.50, and the chances of living to age 5 from 0.94 to 0.02. A series of studies on the effects of adult deaths on subsequent health and socioeconomic well-being or rural families in Matlab sample registration area in Bangladesh have shown that an adult death is associated with significantly higher mortality risk of children during the five years following an adult death, that these risks were significantly higher when an adult female died and when the index child was a female and/or aged less than five years old at the time of the adult death (Chen et al, 1974; Koenig et al, 1997; Strong, 1992; Roy et al. 2000). The authors of these studies note that infections (HIV, malaria, anemia) or ill-health may be transmitted from mother to child during pregnancy, and that complications of delivery may endanger the infant as well as its mother.

EDUCATION EFFECTS

The NRC review found little information on the effects of maternal deaths on children's overall welfare, but reported on research has looked at the effects of any parental death on the nutritional status and schooling of children. In research on a region in Tanzania (Kagera) with high HIV/AIDS prevalence, Ainsworth and Semali (1998) reported very high levels of stunting (low height for age) among children under 5 years of age. Their analyses showed that children who lost their mothers were much more likely to be stunted than children who lost their fathers or than children with both parents living, with children whose mothers had no education being the most

adversely affected. The authors also examined the effects that parental deaths had on children's schooling. As the NCR report notes: "Children who had lost their mothers or fathers or both had somewhat lower school enrollment rates overall. However, children who had lost a parent in the poorest households had the lowest enrollment rates; those in relatively better off households had enrollment rates similar to children with both parents living. The most striking result of the study was that the death of a prime-aged female adult whether or not she was a parent resulted in delayed school enrollment of both boys and girls aged 7-11 and early dropouts among children aged 15-19. The death of a prime-aged male did not have any effect on enrollment, suggesting that teenage children are important substitutes for women's time in home production activities." (NRC, 2000)

Case descriptions of experiences of children in five African countries (Kenya, Namibia, Tanzania, Zambia and Zimbabwe) tracked the pathways followed by children whose mothers died (Piraino, 1991). The pathways depended very much on the age of children and the social context and customs of their locality, particularly the existence of family networks. He found that many older children began working for cash or food after their mother's death, while younger, rural children were often at risk of malnutrition. A common coping mechanism was fostering of children. In research on fosterage in Sierra Leone, Bledsoe et al (1988) found that children were more likely to be fostered when a mother was ill or died. While fosterage had potential advantages, foster children could have higher risk of mortality and morbidity than children still living with their mothers. They found that fostered children (particularly girls) were disadvantaged nutritionally, had less access to health care, worked longer hours, and received less schooling and health care. They reported similar findings from research in Ghana, Senegal, Tanzania and Uganda.

Gertler and colleagues (2003) investigated the effect of parental death and disability on investments in child human capital using panel data sets from Indonesia and Mexico. Their results from Indonesia show that the loss of a mother lowers the probability of school enrollment, increases the probably of child death, and increases the probability of being malnourished. Their results from Mexico show a higher probability of school dropout and child mortality for children with a deceased mother. Their analysis suggests that these outcomes result more from behavioral factors (in particular, the loss of the mothers' influence in decisions about household investments in children) than on the economic impact of mothers' deaths.

HOUSEHOLD WELL-BEING EFFECTS

Research on the economic impact of such diseases as malaria, TB and HIV/AIDS have sought to estimate the direct costs to households of prevention and treatment as well as the indirect costs of lost productivity due to mortality and morbidity (Chima, Goodwin and Mills, 2003; Russell, 2004). For example, estimates of household expenditures for malaria treatment include out-of-pocket spending on consultation fees, drugs, transport and subsistence at facilities, and ranged between $1.88 and $26 monthly per household in five countries where cost studies were conducted. Various methods have been used to calculate productivity lost due to illness. For example, the "human capital" approach is based on the discounted value of lost by household members due to death or disability and opportunity costs of other household members in caring for a sick individual multiplied by the average wage of labor in the markets where the households are located. For African countries with malaria, these estimates ranged from less than a dollar to nearly $8 per episode. The combined direct and indirect costs averaged a little over 7 percent of household income, but reached as high as 32 percent for the very poor (Russell, 2004). Malaria thus exacerbated the poverty of poor households because out-of-pocket direct spending and

indirect costs due to productivity lost diverted already scarce household resources from basic consumption needs as well as spending on education and other investments that might have enabled them to escape poverty.

A search by Islam (2004) of eleven electronic databases of published material revealed no cost-of-illness type studies on maternal mortality and morbidity. Among unpublished sources one finds *Reduce*, an advocacy modeling approach that attempts to estimate the societal-level impact of maternal mortality and morbidity in four African countries (Ethiopia, Mauritania, Senegal, and Uganda). It is based on an estimation method originally used to calculate the benefits of government spending on family planning, and suffers from many of the same limitations in that it employs "plausible" rather than data-based assumptions about economic activity, household consumption and labor productivity. In the case of Uganda, the model estimated the lost productivity over the ten-year period 2004-2013 at 1.1 billion dollars (US), and that reducing material mortality and morbidity by 50 percent over that interval would result in a net productivity gain to the Ugandan economy of approximately $250 million.

The *Reduce* approach does not estimate household-level direct and indirect costs of maternal mortality and morbidity. Indeed, there are little or no data on which such estimates could be based. Most of the information on direct costs of deliveries and delivery complications are for the facility level. However, some studies include both provider and consumer costs. Levin and colleagues (2000) studied provider and consumer costs for six maternal health services in facilities in Uganda, Malawi and Ghana. For providers, they found unit costs of antenatal care to be $2.21-$6.43 in Uganda, $3.23-$5.77 in Malawi, and $2.97-$5.45 in Ghana; for vaginal delivery, costs ranged from $2.71-$33.90 in Uganda, $10.22-$24.03 in Malawi, and$7.66-$14.60 in Ghana. They also report that obstetrical complications cost more than routine services and ranged from $29.94-$159.66 in the three countries. Their estimates of the costs of these services to consumers, included fees and medicines, travel costs, and such other costs as food. For antenatal care, consumer costs ranged from $0.97 to $2.79 in Uganda, $0.15 to $8.70 in Malawi, and $0.62 to $3.15 in Ghana. For vaginal delivery, the costs ranged from $2.26 to $22.75 in Uganda, $0.35 to $7.86 in Malawi, and $12.52 to $20.64 in Ghana. For obstetric complications, consumer costs were also higher. In Uganda, client costs were $13.22-$59.24 for cesarean deliveries, while in Ghana they were $68.39-$139.58. All three components of costs were higher than for routine services, and while consumer costs for routine services were low compared to provider costs, this proportion was substantially higher in the case of obstetric complications.

Our literature review turned up no evidence on indirect costs of poor maternal health outcomes at the household level (for example, labor productivity) similar to what was found in the literature on HIV/AIDS, TB and malaria. Reflection on those findings in comparison with what might be done for maternal health is instructive. Russell's (2004) review of data on household costs for these three diseases in ten countries found that indirect costs for malaria ranged from 2-6 percent of household income, while those for TB and HIV/AIDS exceeded ten percent (the threshold he uses to determine whether the cost burden is "catastrophic"). When direct costs are added to the indirect costs, malaria costs remained below the ten percent threshold, but costs for TB and HIV/AIDS exceeded it, and substantially so for poor households.

For all three diseases, the indirect costs exceeded direct costs because of the duration and severity of these diseases over time relative to the mortality impact. While we do not have evidence on the indirect costs to households of poor maternal health outcomes, a comparison of estimates of the burden of disease for maternal conditions with BOD for TB, malaria and HIV/AIDS suggests that it could be substantial. Table 8 shows estimates of years of life lost (YLL) and years lived

with disability (YLD) for the population aged 15 and over for these four conditions for sub-Saharan Africa in 2002.

While the number of years of life lost due to maternal causes is substantially lower than for HIV/AIDS (though about the same as for TB, a cause of death associated with HIV/AIDS, and larger than for malaria, where deaths are concentrated among children), the years lived with disability associated with maternal conditions is nearly as large as for HIV/AIDS. This reflects the fact that most AIDS deaths occur in middle age, while women with maternal conditions live longer, it does suggest that the impact on these conditions on women's productivity could be large. Even if the average market wage for women is lower and the impact of such conditions on time lost is lower compared to other diseases, the fact that women engage in household chores, act as caregivers for other household members, and in many cases work in productive activities (even for little or no pay), more attention to the measurement of these impacts is warranted.

Table 8: Estimates for Burden of Disease for sub-Saharan Africa, 2002

Condition	YLL (1000)	YLD (1000)	Ratio YLD/YLL
TB	6,994	795	.11
Malaria	1,748	528	.30
HIV/AIDS	43,849	5,514	.13
Maternal conditions	6,865	4,884	.71

Source: WHO, GBD Estimates, www3.WHO.int/whosis, accessed 12/04/04.

The NRC report mentioned earlier also addressed the indirect effects on households of an adult death: for example, how a household is managed, especially if the deceased was the primary household manager. As described in the NAS report, a study by Basu described the effects of adult mortality on household management in New Delhi, India. She attempted to determine what the coping mechanisms were in Delhi for a family that lost an adult family member and how long the family could cope with a death without having to drastically change its life-style. She reminded readers that in urban India many people live in nuclear families and often do not have the assistance of extended kin networks, so that coping with an adult death could be more difficult for them than it would be for some rural dwellers. Her results indicated that nuclear families whose income came from the formal wage or salary sector were the worst off following an adult death in the household. Families living with extended kin who were self-employed were best able to cope with the loss. The largest economic effect of a death in the family appeared to occur when women died. It was often difficult for the household to survive, because men were unaccustomed to managing the household budget and affairs. Older children often had to drop out of school in order to work to help support the family; in other cases, they were sent to live with their grandparents (Basu, 1998, as summarized in NRC, 2002).

The NRC workshop also examined the effects of AIDS-related adult deaths on household consumption, again with data from the Kagera region of Tanzania. Over and Dayton (1997) reported that households in which adults had died usually had large expenditures for medical and funeral expenses, but that other nonfood expenditures were lower as households adjusted home food production (e.g., gardening) to compensate for reduced food expenditures. During the workshop discussion, Over reported that the death of an adult woman had the biggest effect on household consumption in the poorest households, at least for the year following the death. He

29

also noted the role of outside sources of assistance: "Family assistance is more important than government aid in helping families to cope with the loss of a family member. The households that did receive public transfers were the poorest households, so some targeted assistance may be occurring." The authors noted that the effects on poverty of the death or ill health of an adult household member may be similar to the effects of such random shocks as bad weather or a crop failure. Borrowing and sale of assets are a typical response of households to such shocks, and the capacity of households to respond to shocks "depends on markets for credit and assets, particularly land, that are specific to a region and may in turn depend on the overall economy of that area (NRC, 2000).

The Tanzanian studies (Ainsworth and Semali, 1998; Over et al, 1997) were based on a longitudinal panel dataset that enabled the researchers to track the impact of AIDS-related mortality over time and address some of the methodological issues (identifying the direction of causality) that affect research based on a one-time sample. Further research on the Kagera data found that differences in the capacity of households to cope with an adult death were related to wealth status, with less poor households more able to rely on private assistance through their financial and social capital (networks) to weather the crisis while poorer ones had to rely more on public assistance and credit, when they could get it (Lundberg et al, 2000). Contrary to expectation that AIDs mortality would reduce household labor supply, Beegle's (2003) of the impact of an adult death on household time allocation found small and insignificant changes in labor supply and that while some farm activities were scaled back temporarily, households did not shift toward subsistence food production nor reduce their diversification of income sources.

Research by Yamano and Jayne (2003) on the impact of AIDS mortality for working-age adults in western Kenya also employed panel data to assess effects on household composition, farm production, asset holdings, and off-farm income. These impacts were multi-faceted and sensitive to the gender and position of the deceased family member in the household and the household's initial asset levels. The death of a male household head reduced crop production, assets and off-farm income for poor households. Adult female deaths reduced production of grain crops, while male deaths affected cash crops such as coffee, tea and sugar—reflecting gender-related specialization in crop production. Households often sold off small animals to raise cash for care and funeral expenses, exacerbating their capacity to restore former production levels. If they could be focused on maternal deaths from causes other than AIDS, panel data such as those employed in the Tanzania and Kenya studies might be able help to answer similar questions about the household-level effects of maternal mortality, though they also suggest that such effects may turn out to be limited or of short duration.

Table 9 summarizes some of the main finding on the effects of maternal mortality and morbidity on the health and education of mothers and children and on the well-being of their households.

30

Table 9: Summary of findings on the effects of maternal mortality and morbidity on health, education and household well-being

Region, Country, Type of Study	Citation	Finding
The prevalence of obstetric complications and their consequences.		
Global Review	WHO, 1993	WHO estimates that 42% of the nearly 130 million women who give birth each year experience some complication during pregnancy. It is estimated that 15 million women each year develop long-term disabilities as a result of these pregnancy related complications. These health consequences are difficult to measure, so maternal morbidities are not well documented.
Global Review	NAS 1996 Koblinsky et al., 1993	For each maternal death worldwide, another 16 women are estimated to be injured, disabled, or otherwise unable to continue their daily activities. If this estimate is accurate, in Africa, where 150,000 women die each year during the childbearing period, nearly 2.4 million women in cur some morbidity or disability as a result of their pregnancies.
Africa Review	Hilton, 2003	Obstetric fistulae are among the serious disabilities that women suffer as a result of poorly managed obstetric complications.
Egypt Giza epidemic-ological study	Khattab et al., 1999	High prevalence of reproductive morbidities among poor rural women (56 percent with prolapse, 51 percent with reproductive tract infections), many of which were associated with poorly managed obstetric complications.
Global review	AbouZahr and Ahman, 1998	The abortion-related mortality risk is estimated to be at least 15 times higher in developing areas and in some regions may be 40-50 times higher than in more developed regions.
Health effects		
Bangladesh Surveillance data from Matlab	Strong, 1998	Children whose mothers died were much more likely to die than children whose fathers died, and both groups were more likely to die than children whose households did not experience an adult death. Most deaths were to children less than 1 year of age. After the first month of life, girls much more likely to die than boys.
Tanzania LSMS panel study	Ainsworth and Semali, 1998	Following children to see effects of parental death on children's nutritional status showed that children who lost their mothers were much more likely to be stunted than children who lost their fathers or had both parents living. Children who were most affected were those who lost their mothers when their mothers had no education, suggesting low SES of household.
Indonesia and Mexico Progresa and Indonesia Family Life Surveys (IFLS)	Gertler, Martinez, Levine and Bertozzi, 2003	The death of a mother resulted in higher child morality and malnutrition.

Effects on schooling.		
Tanzania LSMS panel study	Ainsworth and Semali, 1998	Children who lost their mothers or fathers had lower rates of school enrollment rates. The death of *any* prime-aged female adult in the household led to delayed school enrollment of both boys and girls aged 7-11 and early dropouts among children ages 15-19. A death of a male adult did not have any effect on schooling, suggesting that teenage children substitute for women's time in production activities in the home.
Former Zaire & Rwanda Household survey data	D'Souza,1994	Education was often postponed for children who lost a parent. Death of an adult breadwinner contributes to economic insecurity and poverty, and poor families are more vulnerable to disease and lack of education.
Indonesia and Mexico Progresa and Indonesia IFLS	Gertler, Martinez, Levine and Bertozzi, 2003	The death of a mother resulted in lower school enrollment and higher dropout rates.
Household effects.		
Tanzania LSMS panel survey	Over and Dayton, 1997	Households where adults die have large expenditures for medical and funeral expenses. Nonfood expenditures were lower, due in part to compensation through home production. Death of an adult woman had biggest effect on household consumption in the poorest households for at least a year following death. Poorest households suffer the most with regard to reduced consumption. Extended family important for mitigating effects, as are public transfers.
India Household survey data, single round	Basu, 1998	Nuclear families with income from formal wage or salary sector the worst off after an adult death in household. Largest economic effect occurred because of difficulties for men to manage household budget and affairs. Older children often had to leave school to work to help support the family, or they were sent to live with their grandparents.
Africa Review	Zabin and Kiragu 1998	As age at marriage increases, the period between menarche and marriage is longer, with all of the additional social costs of sexual activity added to the strictly biological costs.
Nigeria Review	Okonofua et al, 1992	Unmarried, pregnant adolescents are less likely to receive prenatal care than their counterparts. Thus social factors play an important role in determining the seriousness of malaria in these young women.
Induced abortion.		
Global review	Ahman et al 2003	An estimated nineteen million unsafe abortions took place in the year 2000, 98 percent of them in developing countries. Over the period 1995-2000, an estimated 78,000 maternal deaths, approximately 13 percent of all maternal deaths, were attributable to unsafe abortion.

Africa Review	Ladipo 1989; Ahman & Shah 2000	Because of what is at stake for young women, especially unmarried women, and especially schoolgirls, who become pregnant, pregnancy termination is common in most African countries despite legislation that prohibits it.
Africa Review	Zabin & Kiragu 1998	The routine expulsion of young women from school when they become pregnant encourages the practice of induced abortion.
Nigeria	Murray et al, 2003	Early sexual activity and high abortion rates among girls in Edo State, Nigeria. Difficulty in looking at abortion's relationship with schooling because directionality of effects can be quite misleading.
Morbidity effects on work and earnings.		
Global Review	Schultz 2001	The socially predictable component (in observed variation in height and possibly on other health indicators) exerts a stronger influence on wages and adult health than the genetic component of measured health.
Africa Review	Setel et al 2004	"… maternal mortality and illness substantially influence total female DALYs lost. This suggests even more strongly the need to provide services for the management of chronic conditions in health systems in Africa."
Africa Review	Zabin & Kiragu 1998	FGM is related to various reproductive morbidities including infection (drainage of urine and menstrual blood impeded) and VVF due to obstructed labor. "Because the conditions are seen as shameful, women so affected become marginalized from the community and the health system" (219).

KNOWLEDGE GAPS

The evidence base on linkages between maternal health outcomes (mortality as well as morbidity) and household well-being is weaker than for health and education, but needs to be strengthened on all three fronts. We found no studies that examined the household-level impact of a pregnancy-related maternal death along the lines of work that has been done for AIDS-related deaths. Also, given the high ratio reported in Table 8 of years lived with disabilities associated with poor maternal health outcomes vis-à-vis years of life lost through mortality compared to lower ratios of TB malaria and HIV/AIDS, the evidence base on maternal morbidities and their impacts on household well-being needs to be strengthened.

7. UNINTENDED, UNWANTED, AND MISTIMED PREGNANCY (AS MEASURED IN DHS AND OTHER SURVEYS), LARGE FAMILY SIZE, AND POVERTY

Economists and other social scientists have had a long-standing interest in the trade-off between what has been characterized as the "quantity-quality" tradeoff between the number of children and household investments in their health, education, and well-being (Blake, 1981; Schultz, 2005). Yet the point made nearly a decade ago by Lloyd and Montgomery (1996a) that "remarkably little research has addressed the consequences of unwanted or unintended childbearing for developing-country mothers and children" is still true. They note two exceptions: research on the effects of childbearing on the health of mothers and children and on the links between overall family size and children's health and schooling, and attribute the dearth

of research to difficulties in measurement of key concepts and to differences between economists and sociologists about interpretation of those concepts, particularly "unwantedness."[1] Among the more robust approaches to the analysis of consequences of unwantedness are studies based on follow-up of children whose mothers sought and were denied abortion; these children had poorer educational outcomes, and higher incidence of emotional and development problems (David et al 1988).

The richest sources of information about fertility preferences are the Demographic and Health Surveys, but these surveys have severe constraints on measurement of their economic consequences. An important positive step has been the effort to re-tabulate DHS data by wealth quintiles, which provides evidence that poor women generally have higher fertility and lower rates of contraceptive use than non-poor women. Table 10 shows regional averages in poor/rich differentials in the total fertility rate (rates for the poorest and richest quintiles and the difference between the two) from these tabulations. Overall, women in the poorest quintiles average nearly 3 more children than women in the richest quintile, with the largest difference occurring in Latin America/the Caribbean and the lowest in the Europe/Central Asian region.

Table 10: Total Fertility Rates by Wealth Quintile and Region

Region	No. of countries	Regional average	Poorest quintile	Richest quintile	Poor/rich difference
East Asia	4	3.2	4.4	2.0	2.4
Europe/Central Asia	6	2.7	3.7	1.8	1.9
L. America, Caribbean	9	3.7	6.1	2.2	3.9
Middle East, N. Africa	4	4.6	6.7	3.9	2.8
South Asia	4	3.8	4.6	2.6	2.0
Sub-Saharan Africa	29	5.4	6.7	3.9	2.8
All country average	56	4.6	6.0	3.2	2.8

Source: Gwatkin et al, 2004.

Poor/rich differences in fertility reflect similar patterns of differential use of modern contraception. Table 11 shows average rates of contraceptive prevalence for women in the poorest and richest quintiles for the same regional groupings, along with the percentage point difference between those quintiles. The average difference between the contraceptive use rates for rich and poor women is 18.6 percentage points for the 56 countries, with the largest differential occurring in Latin America/Caribbean, South Asia, and the Middle East, while the smallest are in Europe/Central Asia and East Asia. Africa has the lowest overall prevalence and lower rates for most quintiles than the lowest quintile in other regions.

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[1] At issue is the validity of retrospective questions about whether a given child was wanted or intended vis-a-vis what the respondent said about her intentions about spacing or limiting of births when she became pregnant. See Bongaarts (1990).

Table 11: Contraceptive Prevalence by Wealth Quintile and Region

Region	No. of countries	Regional average	Poorest quintile	Richest quintile	Rich/poor difference
East Asia	4	39.4	31.3	41.8	10.5
Europe/Central Asia	4	44.3	38.2	48.1	9.9
L. America, Caribbean	9	47.1	33.1	56.8	23.7
Middle East, N. Africa	4	34.2	22.4	45.0	22.7
South Asia	4	32.8	22.9	45.8	22.9
Sub-Saharan Africa	29	13.0	6.5	25.1	18.6
All country average	56	26.7	18.3	36.9	18.6

Source: Gwatkin et al, 2004.

Contraceptive prevalence rates have been used in combination with information on fertility preferences to estimate unmet need for contraception. Methodological problems prevent use of the wealth quintile data to derive combined measures such as unmet need. A very simple way of looking at the question of fertility rates that exceed desired fertility is to compare actual fertility rates with the "wanted" fertility rate that would have been attained had women achieved their stated fertility preferences. Data from DHS surveys carried out between 2000 and 2002 show that this gap runs from 0.4 to nearly 2 births per woman. Estimates of overall unmet need for contraception suggest that approximately 105 million married women and an added 8 million unmarried women were at risk of unwanted pregnancy as a result of not using family planning methods to space or limit births in accord with the intentions they expressed in survey responses. The large gaps in contraceptive use between rich and poor income quintiles in Table 12 suggest that this unmet need is probably greatest for poor women.

Table 12: Estimates of Wanted and Total Fertility Rates from DHS Surveys, 2000-2002

Country	Wanted Fertility	Total Fertility	Excess Fertility
Benin	4.6	5.6	1.0
Ethiopia	4.7	5.5	0.8
Gabon	3.5	4.2	0.7
Malawi	5.2	6.3	1.1
Mali	6.1	6.8	0.7
Mauritania	4.1	4.5	0.4
Rwanda	4.7	5.8	1.1
Uganda	4.9	5.9	1.0
Egypt	2.9	3.5	0.6
Bangladesh	2.2	3.3	1.1
Cambodia	3.0	3.8	0.8
Nepal	2.5	4.1	1.6
Colombia	1.8	2.6	0.8
Haiti	2.8	4.7	1.9
Peru	1.8	2.8	1.0
Source: Demographic and Health Surveys, www.measuredhs.com/statcompiler accessed 9 December 2004.			

As with other linkages between reproductive health and household-level investments in health and education or household well-being, correlations between these variables may be the result of forces inside and outside the household that may be affecting both. The number of children a woman or couple has, in addition to the timing and wantedness of those children, may depend on the availability and effectiveness of family planning information and services, on factors such as education that affect the demand for children, on gender systems, as well as other variables.

Many of the effects of wantedness and large family size on health and education are a result of the pressures on household resources and household demographic composition. Divergent approaches reflect the contrast between those that treat the size of the family resource "pie" as fixed regardless of number of children, and those that regard the "pie" and number of children as jointly determined. Research on household-level consequences of large family size and excess fertility has looked at the effects on health and education of mothers and their children. Lloyd's (1994) paper on investing in the next generation reviews evidence on the relationship between large family size and investments in children, with strong emphasis on the point that effects are context specific and not gender neutral. The studies cited in her review suggest that the level of development, the level of social expenditures by the state, the culture of the family, and the phase of the demographic transition are critical determinants of the relationship between fertility and the level of child investment:

- Some level of development appears to be required before family size has an impact on child investment; in environments without schools and health clinics, parents have few ways to impact materially on their children's health or schooling, whether their resources are spread among few or many. Similarly, at a given level of development, the greater the extent to which child services are subsidized by the state, the less important parental resource constraints are for child investments.

- Cultural and institutional factors affect the process in a variety of ways. While mothers may be more child-oriented in their expenditures than fathers, their capacity to act on this will depend on their access to resources and their autonomy in using household resources. In cultures where responsibilities for child support extend beyond children's own parents to grandparents, aunts and uncles, and others, the number of siblings may be a less important determinant. Where child fostering is common, the impact of additional children is spread across a wider kin network.

- The phase of the demographic transition also conditions these effects. The linkage between child mortality and fertility has long been recognized, including the possibility of excess fertility as a result of the expectation that more children would die than actually did when infant mortality was declining. As parents gain confidence that both they and their children will survive long enough to reap the returns on investments in child quality, investments in children may rise.

In the review of the literature on the effects of unwanted and excess fertility and large family size that follows, we use a similar framework to our discussions above, grouping research findings into (1) the health effects for mothers and children, (2) the effects on the schooling of children, and (3) household economic effects, including consumption, productivity and savings.

Mothers

One set of health-related effects link to the reproductive health morbidities that arise from numerous or closely spaced births. Births that are too closely spaced are associated with higher perinatal mortality, and may be a risk factor for maternal mortality (Miller, 1991). Infants whose births were spaced more than two years are less likely to be premature or suffer from low birth weights. Analysis of DHS data for 18 countries (and encompassing more than 430,000 pregnancies) showed that children born three to five years after a previous birth are more likely to survive (Venugopal and Upadhyay, 2002). A cross-national study of 18 Latin American countries found that women with inter-pregnancy intervals of less than six months had higher risk for maternal death and complications of delivery than those conceiving at 18 to 23 months, and also that intervals greater than 59 months were associated with higher risks of pre-eclampsia and eclampsia (Condé-Agudelo and Belizán, 2000).

The association between short birth intervals and poor maternal and neonatal health has been ascribed to the so-called "maternal depletion syndrome," in which maternal nutrition plays a critical role (Winkvist, Rasmussen and Habicht, 1992; King, 2003). As the biological competition for nutrients increases during pregnancy, an inadequate supply contributes to poor fetal development and may also be factor in higher maternal mortality. King found that "maternal depletion of energy and protein resulting from short inter-pregnancy intervals or early pregnancies leads to a reduction in maternal nutritional status at conception and altered pregnancy outcomes" (King, 2003: 1735s).

While there is a biological basis for the close associations between early or too closely spaced pregnancies and poor maternal and neonatal health, causal explanations need to address the possibility that other factors may be influencing both at the population level. In a study of evidence from rural Bangladesh on the relationship between childbearing and maternal survival, Menken and colleagues found no significant effects of early or closely spaced pregnancies on these outcomes once other factors (education, height) were controlled. But while there were no significant differences in the risk of dying during delivery between births that were early, closely spaced, or numerous, their findings do suggest that lifetime childbearing does affect a woman's survival chances, and higher fertility increases her "extended maternal risk." "Each time a woman has a child, she faces an increased risk of dying during the relatively short period (2-3 years) after that birth. Thus, a woman who bears seven children has seven chances of succumbing to this risk, whereas a woman who bears two children has only two chances" (Menken et al., 2003: 419). These findings contrast with earlier work by Ronsmans and Campbell (1998) who found no evidence that short birth-to-conception intervals affected the risk of maternal mortality.

Sen (1999) and Anand and Morduch (1998) note the lower life expectancy of women and the demographic deficit of women on South Asia and link it to high fertility: "High fertility not only increases the risk of maternal mortality, it also reduces the resources that go to girls. This has contributed to the high rates of excess female mortality in Bangladesh and other parts of South Asia. While we have argued that higher fertility can be an important way that households cope with poverty, we also note that it is mothers and their daughters who often end up paying the highest price" (Anand and Morduch 1998: 24).

Children

Jensen and Ahlburg (1999) employed data from Demographic and Health Surveys for eleven countries and one Indian state to assess the links between wantedness of children and health

outcomes for women and children. They found large effects: for example, that unwanted children were between 10 percent and 50 percent more likely to become ill than wanted children and that having one more sibling decreased the likelihood of receiving treatment from 2 percent to 8 percent of the average level of treatment.

Early pregnancies, particularly those that occur outside of marriage, are especially likely to be unplanned and/or unwanted. Unwanted or ill-timed pregnancies tend to suffer from a lack of care without this being the intent of the mother or family (Marston and Cleland 2003). Because these pregnancies tend to be recognized at a later stage, antenatal care begins later, as do attention to nutrition, cessation of alcohol, tobacco and other drug use. Acharya (2004) notes in a review that the effect of unwantedness on children's well being reflects an "ambiguous" relationship between child well being and unwanted fertility in developing countries. While unintended pregnancies are less likely to receive good antenatal care, less education, poorer nutrition, and these children are less likely to be fully immunized, precisely what happens to children after they are born depends on a country's stage of development and where they are in the demographic transition (Acharya 2004: 10).

Wantedness is often closely related to the mother's marital status, and the access of women in the developing world to social resources can be jeopardized by premarital pregnancies. Meekers (1994) finds that children born out of wedlock to adolescent mothers are often sharply disadvantaged. "Despite legal provisions in most countries to ensure that there is no discrimination against children born out of wedlock, there is no guarantee that these so-called 'illegitimate' children have the same resources as those born within wedlock" (Meekers 1994: 61).

A comparative review of DHS data from several countries in each of the world's regions finds that the negative effects of unwantedness on measures of child growth were greater among families which had exceeded their desired size than among families that were planned, but were statistically significant in both cases (Desai 1995). The analysis assumes that resources available for consumption in the family are fixed and do not depend on the total number of children, *and* she excludes siblings ages 15 and over from her analysis. Both of these assumptions may be questioned in light of Gomes's (1984) finding that remittances from much older children may in fact significantly increase money available for the youngest children in high-fertility households.

High fertility in the parental generation may also affect the health and well being of children through crowding. Having multiple children in close quarters contributes to the spread of infectious disease, including measles, chicken pox, or diarrhea (Aaby et al 1984). It is difficult, however, to separate the effects of "crowding" from competition for resources when looking at the health of young children (Desai 1995). She finds that "children born within 18 months or less of the previous birth are likely to be less tall than children born after longer intervals, although the effect is not always statistically significant" (Desai 1995: 203). The decline in height associated with having an additional sibling under age 5 varies substantially, "and ranges from a decrement of 24 points in the Dominican Republic to a positive (but not significant) increase of seven points in Senegal" (Desai 1995: 203).

EDUCATION EFFECTS

In the early phases of the demographic transition, many countries have experienced rises in unwanted fertility as desired family size increases faster than fertility regulation. Montgomery and Lloyd (1997) examined the effects of departures from family-size goals in four countries and

found evidence suggesting that unwanted and excess births reduced educational attainment in the Dominican Republic and the Philippines but had no such effect in Kenya and Egypt. Both contextual and family-level factors may explain this: The authors argue that the benefits of reductions in unwanted fertility are more likely to show up in countries in mid- to late stages of the transition to lower fertility (total fertility rates were around 4 in the Dominican Republic and the Philippines). In Kenya (where the TFR was above 5), the capacity of families to spread the costs of unanticipated childbearing among relatives may explain why the effect of unwanted fertility on education was more limited. In their study of the adverse effects of unwanted fertility on investments in child health, Jensen and Ahlburg (1997) show similar negative effects in the Philippines but little impact in Korea, suggesting that the effect is transitory and may not continue in post-transition settings. This is consistent with understandings of the transitory effects of favorable demographics at the macro-economic level in East Asia.

Knodel and colleagues (1990) report that Thailand's rapid fertility decline contributed to increased school enrollments. Using simulations based on findings from survey data, they estimated that proportions going on to lower and upper secondary school would almost double as a result of the compositional change in family size associated with the decline in fertility. They caution that the findings depended on the socio-cultural context of Thailand, where most of the burden of education for children falls on parents.

Montgomery and Lloyd's (1999) research on the schooling of children who were unwanted but carried to full term is somewhat inconsistent. In the Dominican Republic and the Philippines, unwanted children, followed by mistimed children have lower education than wanted children. In Kenya and Egypt there are no such effects, perhaps because these two countries are early in their fertility transitions (so more educated women want to reduce their fertility, creating a positive association between their higher education and excess fertility). "Our empirical results suggest that in the middle to latter phases of a fertility transition, the positive effects of mother's education on children's education are likely to be reinforced by reductions in the incidence of unintended or excess fertility… The children of women who are able to avoid unintended fertility benefit in terms of their schooling; one assumes that as adults, they will be better equipped to manage their own fertility and to make appropriate provision for the children of the next generation" (Montgomery and Lloyd 1999: 249).

Maralani's (2004) analysis of links between family size and educational attainment of children in Indonesia also reveals variation in the strength and direction of the relationship over time and place. Using data from the Indonesia Family Life Survey, she found that the relationship between family size shifts from positive for older cohorts of mothers to negative for the youngest, suggesting a changing relationship over time. In urban areas the relationship is neutral for older cohorts increasingly negative for younger ones, with larger family size associated with lower levels of enrollment and/or schooling. She notes a number of structural changes, including increased availability of education and a narrowing of the gender gap in enrollments, which may be influencing these relationships.

A longitudinal study in Finland of women who said they did not want to be pregnant or did not want to be pregnant at this time similarly shows that *unwanted* children are less likely than their wanted counterparts in the cohort to progress beyond 9 years of schooling (Myhrman et al 1995). *Mistimed* children did no worse than planned children with regard to education. Interaction between large family size and unwantedness showed an increased risk of low educational attainment among the children, even after adjusting for family background. A review of the literature suggests that the unwantedness effects for a specific child may be masked by the fact

that *average* education is pulled down by unwantedness in low-income households (Acharya 2004).

Unwanted pregnancies carried to full term result in less education for the unwanted children in mid to higher income countries (Gruber, Levine and Staiger 1999). In the U.S. these children are less educated even when all other factors such as income and education of parents are taken into account. The authors find that,

> "The average living circumstances of cohorts of children born immediately after abortion became legalized improved substantially to preceding cohorts, and relative to places where the legal status of abortion was not changing. Our results suggest that the marginal children who were not born as a result of abortion legalization would have systematically been born into less favorable circumstances if the pregnancies had not been terminated: they would have been 60 percent more likely to live in a single-parent household, 50 percent more likely to live in poverty, 45 percent more likely to be in a household collecting welfare, and 40 percent more likely to die during the first year of life" (1999: 265).

Research approaches and methodological issues in assessing the household-level impact of large family size and excess fertility are similar to those encountered in work on adolescent childbearing (particularly what economists refer to as the "endogeneity" or mutual causality problem in analyses of household-level decisions). Research on links between fertility and investments in children has explored the so-called "quality-quantity" tradeoff that parents make between the number of children and investments in the health and education of those children. Unwantedness effects for a specific child may be masked by the fact that *average* education is pulled down by unwantedness in low-income households (Acharya 2004). Rosenzweig and Wolpin (1980) tested the quantity-quality tradeoff concept using data on twins from India to create a natural experiment and confirmed that exogenous increases in fertility decreased child quality as measured by investments in schooling. An extra birth due to twins reduces schooling of siblings by 17 percent if the extra birth occurs at first pregnancy, and by 34 percent if it occurs at the third or fourth pregnancy (Rosenzweig 1990). Schultz and Mwabu (2003) replicated the twin experiment and found that unanticipated extra births reduced children's health as measured by a weight/height index.

Large families in the developing world tend to be poorer. But even poor households face economies of size. While research on developed countries generally indicates that family size has a negative impact on child well being, research in developing countries is less conclusive. Some argue that high fertility has strongly negative effects on some children (Desai 1995; Lloyd and Gage-Brandon 1994; Knodel, Havanon and Sittitrai 1990; Lanjouw and Ravallion 1995), and others finding *positive* effects on child well being (Gomes 1984; Chernichovsky 1985). As Merrick (2001) has summarized it in a review, individual children in larger families may receive "less health and education, an intergenerational externality through which parents pass some of the costs of their high fertility along to their children and, in cases where there is a gender bias to this process, more of these costs fall on daughters" (2001: 201-202). The circularity of these relationships makes it difficult to untangle causality, particularly if one is looking beyond these variables to linkages between fertility, employment and earnings, and the education of children in poor households (see Schultz, 2005)

Hausmann and Székely (2001) have examined the relationship between fertility, labor force participation, and the amount of investment in children using household survey data for 15 Latin American countries. The premise that they investigate is that child rearing requires resources that have opportunity costs related to the mother's earnings potential in the labor market. Hausmann and Székely argue that this potential depends on her own education and on the labor market conditions. They find that the number of children a mother has, her husbands earnings and her own earnings potential are key determinants of where she will work—at home, in the informal economy, or in the formal labor market, and that these relationships, in turn, affect the educational attainment of the next generation. Recognizing the circularity of these linkages, they then ask whether rich-poor differences in the capacity to invest in the next generation is likely to perpetuate inequality from generation to generation.

Modeling these relationships for 14 Latin American countries, Hausmann and Székely get different answers depending on the country. Low educational attainment of poor parents explains about a quarter of rich-poor differentials in education of children; taking account of different prices paid for different kinds of education raises the percent of variation explained to 60 percent in some of the countries and 80 percent in others. They conclude that personal differences between one person and another matter, but that the magnitude of the differential impact depends on the economic environments where they live. The result can be a virtuous circle, with improvements from generation to generation, or the reverse, where the poor move along a path that diverges from that of the rich. They also argue that the micro perspective needs to be linked to macro changes, including where countries stand in their demographic transitions, development of labor markets, and the accumulation of physical and human capital. Adult and child market wage rates help determine the extent to which work competes with schooling for children's time. Poverty also makes child labor more attractive, reducing children's chances of being sent to school (Skoufias 1994).

Other explorations of the macro context of household decision-making include Montgomery and Lloyd (1999) who show that the effects of wantedness are influenced by a country's stage of development and fertility transition. Desai's (1995) work, in which she notes that for number of siblings to lead to competition, there has to be something attainable to compete over. The example she provides is of a community with no school where number of siblings will presumably have little effect on school attendance, since sending a child away may be so expensive. One of Desai's points is that state emphasis on privatization and cost recovery (for services once provided free of charge) has in making parents increasingly responsible for the welfare of their children. State reductions in support for food, education and health increasingly place the burden of children's welfare more heavily on their parents. As parents experience this burden, so do their children, which may lead to a decline in fertility in the long run. In the meantime, we should be able to measure empirically the effects on children of fertility-related household resource constraints.

In the short-term, parents of numerous children could be less willing or able to send older children to school when younger siblings are present; in the longer-term, families with more children are likely to provide them with less schooling because of the costs. Foster and Roy (1997) show that a family planning program can influence education by reducing fertility in a low-income rural environment. They found the family planning effect accounted for a 15 percent increase in mean schooling for girls, and a 12 percent increase for boys.

High fertility has strong negative effects on specific children in the household. This is mediated in part by household demographic composition, which can be important in determining demand for and supply of labor for home production, and therefore school attendance. More pre-school children in the household can be a barrier to the education of older siblings, and has a significant negative effect on schooling provided to school-aged children in the household (Foster and Roy 1997).

Chernichovsky's work in Botswana (1985) finds that the number of children in a household is *positively* related to the chance a child is enrolled in school, in part because of reduced demand for the labor of a given individual child. The presence of a baby had a negative effect on school enrollment, especially among girls, because of expectations that they would care for a young child. Here, having younger siblings jeopardizes older children's school attendance.

Gomes's (1984) research in Kenya suggests positive effects for schooling of being from a very large family. Indeed, "family size, as measured by the number of siblings, has a significant positive influence on educational attainment" (Gomes 1984: 652). She finds a u-shaped distribution of investment and resources in children, with the eldest and youngest being the most advantaged. Parents who have many children are able to "properly educate a high proportion of them, as long as they pay for the educational costs of the eldest children from their own income and later induce the advantaged children to finance the education of their younger siblings" (Gomes 1984: 648). Key to Gomes's argument is the link between rises in education and rising rates of return to educational investments. If returns to education are the lowest in primary school and increase in secondary school and university, then parents maximize their investments in children by investing in the children most likely to succeed, while neglecting others (Gomes 1984: 649). This was the case in Kenya where the government historically invested heavily in secondary schooling, but allowed parents informally to shoulder most costs for primary school. Positive effects on overall educational attainment thus seem to arise in very large families (over 7 children) in which both oldest *and* youngest children are invested in generously.

In contrast with the situation Gomes describes in Kenya, research from Thailand indicate that rural Thai parents are most likely to send their *youngest* children to school (Williams, Archavanitkul & Havanon 2000). Further, increasing numbers of siblings of either sex in that setting reduce the proportions of children sent to secondary school. Parents' perceptions of children's earning potential, opportunity costs, parents' poverty status all figure in decision making, though access to schools and children's/girls' safety were very important. These authors find that parents continue to send more sons than daughters to secondary school, though this is less true in low fertility households, suggesting that declines in fertility may contribute to reductions in gender differences in schooling over time.

Shapiro and Tambashe's work in Congo (2001) finds that household composition as measured by number of children is a statistically significant negative determinant of educational attainment, especially the presence of preschool age children. The limitation of their study is that cross-sectional data leave out older siblings who may have left the household. But analysis of educational attainment of women in sample found greater numbers of siblings associated with greater educational attainment. "There is a clear adverse impact on educational attainment associated with the presence of preschool-age children in the household. Consistent with a resource-dilution story, educational attainment of youth aged 6-14 is for the most part influenced negatively by the presence of other school-age youth in the household. In contrast, and consistent with the notion of a sibling chain of educational assistance, schooling of older males is positively related to the presence of younger school-age children" (372).

Shapiro and Tambashe's finding on the negative effect of pre-school children in the household on educational attainment is found is confirmed in numerous other studies. In Bangladesh, for example, the number of pre-school children in household is an important barrier to the education of older siblings, and has a significant negative effect on schooling for other children in the household (Foster and Roy 1997).

Several studies have made nuanced arguments that take into account not only the number of siblings, but sex and birth order and how they shape differential investments in children's educations when resources are scarce (Parish and Willis 1993). This research suggests that large family size tends to lower educational attainment for all children, and additionally for specific children. But there are interactions between family economic well being and household composition, with the latter influencing specifically who in the family enrolls in school in low-income families. Lloyd (1994) also finds considerable empirical evidence for differentials in educational investments among siblings according to sex and birth order. Lloyd and Gage-Brandon (1994) conducted a detailed analysis in Ghana of the size of same-mother sibling groups and same-father sibling groups and the influence of sibling numbers on schooling. They began their analysis by noting two potential opposing forces:

"The greater the number of younger siblings a child has, the greater are its opportunity costs of school enrollment given the growing burden of domestic and agricultural tasks. On the other hand, the potential benefits of a child's schooling to mothers and fathers are likely to grow with increasing sib-size given the increased need for cash income to support the family now and in the future… Thus, siblings of school age will compete with each other directly for parental resources" (Lloyd and Gage-Brandon 1994: 298).

High fertility had a negative effect on girls' education, mediated importantly by residence with father or mother, sex, and birth order. On average, fewer than half of Ghanaian schoolchildren live with both parents, each of whom has very different "implicit contracts" with their children. When children do not live with their fathers, fathers can easily play a peripheral role in supporting children, providing them with significantly less support. Mothers are more likely than fathers to discriminate against girls and in favor of boys and firstborn children in anticipation of their labor market returns. When parents need to choose the children most likely to succeed to invest in, the effect of increased sib-size on schooling depends on sex and birth order, "with more siblings leading to increased investment in boys, reduced investment in girls, increased investment in first-born children, and reduced investment in middle children who are not yet in a position to benefit from the support of older siblings (e.g., boys and first-born children)" (Lloyd and Gage-Brandon 1994: 299).

Their argument is that because fathers are expected to take greater responsibility in paying for children's education, additional same-*father* younger siblings will have a more negative impact on a child's school enrollment than same-*mother* younger siblings among whom there is little effect. The more older siblings a child has, the greater his or her chances that they will be out of school and able to contribute to the child's schooling, and this is true for both boys and girls in both mother- and father- sib-ships. But "in the context of high fertility, the time [girls] spend in school represents an opportunity cost, particularly for mothers. Parents may set a ceiling on the educational attainment of girls, withdrawing them from school in order to meet labor demands for household activities and child care when they become teenagers" (Lloyd and Gage-Brandon 1994: 303).

The study described above is one of many that highlight the negative consequences of large family size and the presence of young children on girls and women generally, and particularly on girls' schooling. As one review describes the process, individual children in larger families may receive "less health and education, an intergenerational externality through which parents pass some of the costs of their high fertility along to their children and, in cases where there is a gender bias to this process, more of these costs fall on daughters" (Merrick 2001: 201-202).

HOUSEHOLD WELL-BEING

Inequality *within* the household seems to be greater in larger households. Indeed, "High fertility may be one of the mechanisms which deny the benefits of economic development to some social groups and to some members within the family" (Desai 1995: 209). Unintended pregnancy can undermine investments in schooling by disrupting parents' plans for investing in children already born. In settings where older siblings share child-care responsibilities, girls are more likely than boys to carry such responsibility, and are more likely to drop out of school for this reason. This point is buttressed by in a review of a range of studies and data sources on the experiences of adolescent girls in the developing world (Mensch et al., 1998).

The negative effects of high fertility on children are also stronger for girls because parental desire for old-age support (therefore boys) means that girls are more likely to have younger siblings in the household, impeding their educational prospects (Foster and Roy 1997). Older sisters are pulled out of school to cope with unwanted pregnancies. In this case, there may not necessarily be an impact on the unwanted child but there may be an effect on lower order siblings who happen to be female.

Gender differences in human capital investments vary with household standard of living and household composition, and greater household wealth translates into reduced gender differences in educational attainment (Shapiro and Tambashe 2001). Schultz (1993a,b) finds larger gender differentials in schooling in poor households than in wealthier ones, to the disadvantage of girls. Gender differences in human capital investments vary with household standard of living and household composition, but as we have seen, there is no consistent evidence that greater household wealth translates into reduced gender differences in educational attainment (Shapiro and Tambashe 2001). Gender differences (in favor of boys) appear to widen between poorest and next richer households, and then a gender difference in favor of females emerges in best-off households.

Across generations, lower parental fertility reduces the budget constraints that lead to discrimination against girls (Lloyd 1994). Lloyd and Gage-Brandon state that, "The greatest costs for children in Ghana of sustained high fertility are likely to be the reinforcement of traditional sex roles, largely a product of high fertility in the past….girls continue to withdraw from school to help rear their younger siblings" (1994: 306).

One family strategy mediating the effects of high fertility on children is fosterage. As Lloyd and Gage-Brandon eloquently put it, "Fostering – the practice of delegating to other relatives the partial or full responsibility for a child's rearing – allows parents to adjust, at least partially, their family size after the birth of their children" (1994: 294). An important effect of fosterage is that it spreads the costs and benefits of childrearing beyond the parents to a larger group of people. Government subsidies, whether for food, health or education, also reduce the burden children place on their parents and potentially mitigate the effects of number of siblings on the resources available to a child.

Fostered children tend to have lower enrollment rates and attainment than biological children in the same households (Shapiro and Tambashe 2001: 363; Shapiro et al 1995). Exceptions are seen in the older age group for brothers and nephews of the household head, "suggestive of fostering aimed at securing better educational opportunities for these older youth" (Shapiro and Tambashe 2001: 372). Fostering helps reduce the pressure on households in ways that show up in child well being, "with the negative impact of sib-size being greater in countries with a low level of fostering" (Desai 1995: 205). Fosterage and government subsidies can mitigate the burdens children place on the household economy. As children become productive, they themselves can also contribute to the household economy and mitigate the costs of having younger siblings for their parents.

Having fewer children and completing childbearing at an earlier age makes it easier for women to work. Women in India, for example, are achieving their desired (low) fertility early and are ending their childbearing through the decision to be sterilized (Padmadas et al. 2004). While the reproductive span of women married during the 1960s was about 22 years, this span has declined to about five years in the most recent cohort (2004: 15). "The compression of reproductive spans suggests that women could increasingly allocate time for their careers once they reach their desired family size" (Padmadas et al 1994: 18).

Very low fertility in China where there is little other social support can contribute to poverty (Schultz 2003). Rural elderly have smaller incomes than their urban peers, receive fewer public transfers, and depend more on their children. "The birth quota since 1980 has particularly restricted the childbearing of rural less educated women, who now face retirement with fewer children for support" (1). Better-educated women who are able to earn a higher wage in the labor market tend to have fewer children. "… her education may reduce her cost of using effective birth control and thereby reduce her unwanted fertility. A mother's education may also reduce the amount of her time required to educate her children, and this would enhance her expected rate of return in investing in the education of her children, and lower her reproductive goals (Schultz 1997: 8)."

As noted earlier, Eastwood and Lipton's concept of "conversion efficiency" addresses the effect of high fertility on poor households' capacities to translate a given level of consumption or income per person (or adult equivalent) into welfare or capabilities (e.g., health or schooling). They argue that "high fertility reduces conversion efficiency for the poor and near-poor, that is, sib crowding effects outweigh economies of scale in consumption" for poor households (2001: 214). This is an empirical question that warrants research at the "micro" level to complement the macro-level demographic bonus work, for example the work by Hausmann and Székely (2001) on the relationships between fertility, labor force participation, and the amount of investment in children discussed earlier in this section.

Rosenzweig's (1993) work in India suggests that the effect of inter-household financial transfers in smoothing consumption may accentuate the potential advantages of having more children. The study assesses the traditional migration of women to other households through marriage in India, which, by contributing to consumption smoothing, augments the returns to women as human capital. Inter-household financial transfers "appear to be more responsive to a household's fluctuations in earnings than are loans, and this responsiveness is significantly augmented in households with more informal connections to other households that arise due to the marriage of sons, who stay in the parental household, and daughters who migrate" (Rosenzweig 1993: 757).

Research in Thailand offers another line of thinking in finding that smaller families are far more likely to have savings than larger families, making them less vulnerable to fluctuations in income (Knodel, Havanon and Sittitrai 1990). While larger families are more likely to live in poverty, larger rural families have greater lifetime accumulation of wealth because older children work and contribute to the household (Bauer et al 1992). The effect of the number of children on wealth is affected by the age profile of production in a given country and the flows of wealth between parents and children, another argument that refers to effects at both the macro and micro levels.

Table 13 summarizes the findings from the literature on unintended, unwanted, and mistimed pregnancy and large family size.

Table 13: Summary of findings on effects of unintended, unwanted, and mistimed pregnancy and large family size on poverty

Region, country, type of study	Citation	Finding
Overview/general issues		
Global review	Ahlberg, 1994	Effect of family size on poverty is affected by country's level of economic development, position of family in life cycle, living arrangements of household's children, whether family receives income from non-resident family members, spacing of children and whether children are premature, and government contributions to education and health
Close birth spacing and maternal/child mortality/morbidity.		
Hungary, Sweden, United States Review	Miller, 1991	No effect of interpregnancy interval on maternal anemia, puerperal fever, postpartum hemorrhage, and mortality, though number of maternal deaths was small. Infants born live who were conceived less than six months after the preceding birth are approximately 50-80 percent more likely to die during the neo-natal period.
Latin America & Caribbean Administrative records	Conde-Agudelo and Belizán, 2000	Controlling for a large number of confounding factors, women with interpregnancy intervals less than six months have significantly higher odds of death, third trimester bleeding, premature rupture of membranes, puerperal endometritis, and anemia.
India Maternal death records	Ananda-lakshmy et al, 1993	Increased risk of maternal death among Hindu women with interpregnancy intervals less than 24 months compared with their counterparts (matched by age, parity, booking status) who had longer birth intervals. But there was a strong association between both age and parity and maternal death, making the results of this study more difficult to interpret.
Bangladesh Maternal death records	Ronsmans and Campbell, 1998	Interpregnancy intervals shorter than 9 months did not increase risk of maternal death compared with interpregnancy intervals of 15-26 months, after controlling for maternal age, area of residence, maternal education, religion, year of birth.

Unwantedness and well-being of mothers and children		
DHS data for Bolivia, Egypt, Kenya, Peru, the Philippines	Marston and Cleland, 2003b	Early pregnancies, particularly those that occur outside of marriage, are especially likely to be unplanned and/or unwanted. Unwanted or ill-timed pregnancies tend to suffer from an often unintended lack of care.
Review of DHS data for seven African countries	Meekers, 1994	Children born outside of marriage are unlikely to have the same resources as those born within wedlock and are generally severely disadvantaged.
Review of DHS data for 16 countries	Desai, 1995	The negative impact of family size is greater in families who have exceeded desired family size, but the total number of children remains the statistically significant negative main effect, planned and unplanned.
Global review	Acharya, 2004	There is an "ambiguous" relationship between child well being and unwanted fertility in developing countries. An unintended pregnancy is less likely to receive good antenatal care and to face other disadvantages, though precisely what happens to children after they are born depends on a country's stage of development and where they are in the demographic transition.
DHS for Dominican Republic, Philippines, Kenya, Egypt	Montgomery and Lloyd, 1999	The effects of wantedness are influenced by a country's stage of development and fertility transition. Later in a fertility transition, positive effects of mother's education on children's education are reinforced by reductions in unintended or excess fertility.
India, Malaysia, Indonesia	Rosenzweig, 1990	An extra birth due to twins reduces schooling of siblings by 17 percent if extra birth occurs at first pregnancy, and by 34 percent if it occurs at third or fourth pregnancy.
India	Rosenzweig and Wolpin, 1980	The unwantedness effects of unintended family size brought about through the birth of twins is negative but small. Suggests that exogenous improvements in contraceptive technology, for example, could increase schooling levels of Indian children by reducing unwantedness.
United States

5% Public Use Micro Sample, 1980 Census | Gruber, Levine and Staiger, 1999 | Unwanted pregnancies carried to term result in less education for the unwanted children in mid to higher income countries even when income and education of parents are controlled. Children *not* born as a result of abortion legalization would have systematically been born into much worse circumstances. |
| Finland

Longitudinal study | Myhrman et al., 1995 | *Unwanted* children are less likely than their wanted counterparts in the cohort to progress beyond the 9 years of compulsory schooling. *Mistimed* children did no worse than planned children with regard to education. |

Large family size and the way children are cared for and invested in.		
Review of DHS data for 16 countries	Desai, 1995	The negative effect of large family size was greater among families that exceeded their desired size than among families that were planned, but the difference was statistically significant in both cases.
Bangladesh Census and surveillance data from Matlab	Foster and Roy, 1997	In the short-term, parents of numerous children could be less willing or able to send older children to school; in the longer-term, families with more children are likely to provide them with less schooling because of the costs. Family planning can influence education by reducing fertility.
Ghana Two waves of Ghana LSMS	Lloyd and Gage-Brandon, 1994	High fertility has strong negative effects on some children, especially girls. While having more younger siblings increase opportunity costs of school enrollment given domestic and agricultural tasks, the potential benefits of a child's schooling to parents increases with increased need for cash income.
Kenya Survey data for institutions and households	Gomes, 1984	A u-shaped distribution of investment and resources in children exists, with the eldest and youngest being the most advantaged. There are positive effects on overall educational attainment of coming from very large families in which both oldest *and* youngest children are invested in generously.
Kinshasa, Congo Survey data	Shapiro & Tambashe, 2001	Number of children is a statistically significant negative determinant of educational attainment, especially the presence of preschool age children. Yet greater numbers of siblings is associated with greater attainment.
Household demographics, fertility and investment in children.		
Bangladesh Census and surveillance data from Matlab	Foster and Roy, 1997	Number of pre-school children in household is an important barrier to the education of older siblings, and has a significant negative effect on schooling provided to school-aged children in the household.
Taiwan	Parish and Willis, 1993	Number of siblings, sex, and birth order shape differential investments in education when resources are scarce. Large family size lowers educational attainment for all children.
Africa, selected countries.	Aaby et al., 1984	High fertility in the parental generation may affect the health and well being of children through crowding. The basic argument is that having multiple children in close quarters contributes to the spread of infectious disease, including measles, chicken pox, or diarrhea.
Review.	Desai, 1995	It's difficult to separate the effects of "crowding" from competition for resources when looking at the health of young children.
Large family size, girls' schooling, and gender discrimination.		
Kinshasa, Congo Two round panel survey	Shapiro and Tambashe, 2001	Greater household wealth does not necessarily translate into reduced gender differences in educational attainment. Gender differences in favor of boys widen between poorest and next richer households, and a difference in favor of girls emerges in best-off households.

Global review	Schultz, 1993a,b	There are larger gender differentials in schooling in poor households than in wealthier ones, to the disadvantage of girls.
Ghana Two waves of Ghana LSMS	Lloyd and Gage-Brandon, 1994	"The greatest costs for children in Ghana of sustained high fertility are likely to be the reinforcement of traditional sex roles, largely a product of high fertility in the past… Girls continue to withdraw from school to help rear their younger siblings" (306).
Bangladesh Census and surveillance data from Matlab	Foster and Roy, 1997	The negative effects of high fertility on children are also stronger for girls because parental desire for old-age support (therefore boys) means that girls are more likely to have younger siblings in the household, impeding their educational prospects.
Thailand Rural survey on old age security and fertility	Williams, Archa-vanitkul & Havanon, 2000	"Unlike the situation Gomes (1984) describes in Kenya, where parents generally opt to educate first-born children first, our data indicate that rural Thai parents are more likely to send their last-borns. In addition, we have found that parents continue to elect to send higher percentages of sons than daughters to secondary school, even when other factors are controlled. This is less true in low fertility households and suggests that, given recent declines in fertility, gender differences may abate over time" (6: 4).
Indonesia, IFLS	Maralani, 2004	The strength and direction of the relationship between family size and educational attainment of children vary over time and place, with a stronger negative relationship in urban areas and an emerging one in rural areas.
Large family size and women's ability to work for pay.		
India	Padmadas, Hutter and Willekens, 2004	Women could increasingly allocate time for their careers once they reach their desired family size, which is occurring earlier.
Latin America DHS data for 14 countries.	Hausmann and Székely, 2001	Critical to fertility levels is not only education of parents, but *returns* to women's education in the labor market. Labor market conditions as well as individual characteristics matter.
Large family size and families ability to save and protect itself from unexpected dips in income.		
India Panel data for rural households	Rosenzweig, 1993	Assesses how traditional migration of women to other households through marriage, by contributing to consumption smoothing. Responsiveness "is significantly augmented in households with more informal connections to other households that arise due to the marriage of sons, who stay in the parental household, and daughters who migrate" (757).
Thailand	Knodel, Havanon and Sittitrai, 1990	High fertility has strong negative effects on some children. Smaller families are far more likely to have savings than larger families, making them less vulnerable to fluctuations in income.

Philippines	Bauer et al.,1992	Larger families are more likely to live in poverty, but larger rural families have greater lifetime accumulation of wealth because older children work and contribute to the household. The effect of the number of children on wealth is affected by the age profile of production in a given country and wealth flows between parents and children.

The circularity of the relationships between poverty, family size and investment in children makes it hard to closely determine causality. The evidence base on the impacts of unintended/unwanted pregnancies and family size is strongest for health and weakest for household well-being. There is also a substantial body of evidence on education effects, some of which overlaps with the work reported earlier in the discussion of early childbearing. One question that requires additional analysis is whether the potential benefits of scale economies in large families are outweighed by unequal distribution of any benefits within the household, placing the costs of unintended or unwanted pregnancies and large family size disproportionately on women and girls. Existing research suggests that answers to this question may vary by socio-economic context and changing demographic and labor market conditions. There is also room for additional research on the effects of close spacing on the educational prospects of children whose parents might otherwise be better able to cope with the costs were their children born farther apart.

8. CONCLUSIONS: WHERE TO GO WITH FURTHER RESEARCH

Table 14 provides a summary of the principal finding about the effects of reproductive health outcomes on household-level health, education and wellbeing, and gaps in the evidence base about them. Generally speaking, the evidence base on health effects is strongest, with household well-being weakest, and education in between the other two.

There is general agreement across the numerous studies we have reviewed that more microanalysis is needed, and that relationships of interest are more complex at the household than the fertility/age structure/investment/economic growth channel at the macro level. Causal relationships are difficult to establish because reproductive health outcomes and other household-level explanatory variables are themselves influenced by each other. One of the important themes that occur repeatedly in our review is that the relationships tend to be context specific and that one cannot look at individual characteristics without reference to contextual variables.

For example, numerous studies suggest that the level and pace of economic and social development, the level of health and education expenditures by the state, the culture of the family, the phase of the demographic transition, and returns to women's and children's labor are critical determinants of the relationship between fertility and the level of investment in children. Among the researchers upon whose work we have drawn, Hausmann and Székely (2001) have argued particularly effectively that the relationships between fertility, labor force participation, and the amount of investment in children at the household level needs to be linked to macro changes, including where countries stand in their demographic transitions, development of labor markets, and the accumulation of physical and human capital.

	Health	**Education**	**Household well-being**
Early childbearing	Fairly strong evidence on adverse health effects of very early pregnancy, including life-long morbidities.	Some evidence on dropping out, but reasons other than pregnancy (poor performance, cost) often a more important factor.	There is more evidence for Latin America, where marriage age is later, than Africa and Asia, where early marriage and childbearing are linked.
Maternal mortality and morbidity	Some evidence about impacts on health of children; very limited evidence about longer-term pregnancy-related morbidities.	Limited evidence of adverse impact on education of children, but mediated by fosterage, contextual factors.	Little or no evidence on impacts of mortality & morbidity on well-being of households.
Unintended, mistimed pregnancy, large family size	Short birth intervals affect child survival, but number of births impacts more on maternal mortality; unsafe abortion a health risk associated with unwanted pregnancy.	In some contexts, large family size reduces investment in children's education.	Some evidence that large family size creates competition in household spending on children, possibly with adverse effects on girls.

The contextual factors to bear in mind as we move ahead include these primary dimensions:

- Some level of economic development appears to be required before family size has an impact on the health and education of children investment and other poverty-related indicators. In environments without schools and health clinics, parents have few ways to directly improve their children's health or schooling, whether their resources are spread among few or many. The reproductive health consequences of early marriage and childbearing depend in part on the structure and cost of schooling. Returns to education are an important reflection and consequence of a country's level of development. The link between increased education and rising rates of return to educational investments is key to the argument that some parents may subsidize the cost of younger children by relying on the labor and inputs of older children. In short, the precise investments in children depend in part on a country's stage of development and state investments.

- The phase of the demographic transition also conditions these effects. The links between child mortality and fertility has long been recognized, including the possibility of excess fertility resulting from the expectation that more children would die than actually did when infant mortality was declining. As parents gain confidence that they and their children will survive and reap the returns on investments in child quality, investments in children may rise.

- As countries move through the transition from high to low fertility, they experience changes in the age structure at both the societal and household levels, moving from high child dependency through periods of rapid growth in the young adult and mature adult populations

and eventually to rising old-age dependency. Much of the recent discussion of macro-level economic-demographic linkages has focused on the temporary windows of opportunity afforded by these age shifts for the accumulation of physical and human capital. There are parallels at the household level. Those groups in society at the leading edges of such change and able to take advantage of change by educating their children and finding good jobs will benefit in income and asset accumulation.

- In the early phases of the demographic transition, many countries have experienced rises in unwanted fertility as desired family size increases faster than fertility regulation. Montgomery and Lloyd (1997) examined the effects of departures from family-size goals in four countries and found evidence suggesting that unwanted and excess births reduced educational attainment in two countries (the Dominican Republic and the Philippines) but found no such effect in two others (Kenya and Egypt). They offer both contextual and family-level factors as explanations of this divergence. They argue that the positive benefits of reductions in unwanted fertility are more likely to show up in countries in mid- to late stages of the transition to lower fertility (total fertility rates were around 4 in the Dominican Republic and the Philippines). In Kenya (where the TFR was above 5), the capacity of families to spread the costs of unanticipated childbearing among relatives may explain why the effect of unwanted fertility on education was more limited. Other research suggests that the effect is transitory and may not continue after the transition. This is consistent with the transitory effects of favorable demographics at the macro-economic level in East Asia.

- Returns to labor for children and women also appear to be important in mediating the fertility-investments-in-children relationship. Hausmann and Székely (2001), for example, investigate the premise that child rearing requires resources that have opportunity costs related to the mother's earnings potential in the labor market. They find that the number of children a mother has, her husband's earnings, her own earnings potential and labor market conditions are key determinants of where she will work—at home, in the informal economy, or in the formal labor market, and that these relationships, in turn, affect the educational attainment of the next generation. Adult and child market wage rates help determine extent to which work competes with schooling for children's time (i.e., poverty makes child labor more attractive, so children don't attend school) (Skoufias 1994).

- Cultural and institutional factors also affect the process in a variety of ways. While mothers may be more child-oriented in their expenditures than fathers, their capacity to act on this will depend on their access to resources and their autonomy in using household resources. In cultures where responsibilities for child support extend beyond children's own parents to grandparents, aunts and uncles, and others, the number of siblings may be a less important determinant. Where child fostering is common, the impact of additional children is spread across a wider kin network.

- Another aspect of variation in household dynamics relates to gender roles, and the child-rearing responsibilities assumed or not assumed by men and women. Hobcraft (1997) examines the difficulties that women face in balancing child-rearing roles with those of provider under a range of household structural conditions. There are negative consequences for children from partnership breakdown and extra-partnership childbearing as well as added benefits for girls in more gender-equitable contexts.

POSSIBLE SOURCES OF DATA

There is a strong consensus that additional research is needed to strengthen the evidence base on linkages between reproductive health and poverty reduction in developing countries, and that this research needs to better address the data and methodological problems that challenge the effort to measure causal relationships (Lloyd and Montgomery 1996, Frankenberg et al. 2005, Schultz 2005). One reason why much existing research has not effectively addressed the effects of poor reproductive health on poverty is that studies have relied on survey data for a single point in time. Research on these relationships in the US and on other health issues (HIV/AIDS and nutrition) in developing countries have demonstrated that longitudinal (or panel) data, or repeated surveys that can provide an approximation of such data, offer greater promise for assessing both the consequences of poor reproductive health outcomes on well being, consumption and economic productivity of households at different income/wealth levels *and* the impact on those outcomes of interventions inside (e.g., increase in skilled attendance) and outside (credit programs, community mobilization) the health system.

Rather than propose new survey research, initial research could work with existing data resources. Frankenberg and colleagues (2005) have identified and catalogued 40 survey programs that are potentially useful for this purpose. Six of the more promising ones are described in Table 15. Gertler and colleagues' analyses of the impact of a maternal death on households (2003) using the Indonesian and Mexican panel surveys demonstrates how this could be done. A more ambitious agenda would be to add questions relating to the consequences of reproductive health outcomes in further rounds of on-going panel surveys.

The three African panel surveys may offer the possibility of analyzing the impact of maternal deaths on the health, education, and well being of the deceased mothers' households, though the task may prove to be difficult because there may be too few cases for meaningful statistical analysis. Another possibility would be to follow the example of Hausmann and Székely in pooling Demographic and Health Surveys and/or Living Standards Measurement Surveys to study these linkages.

Research should focus on a country or countries where (1) there has been social and economic change over time, (2) rich-poor differences in reproductive health outcomes persist, and (3) obtaining and working with promising datasets is feasible. Of the countries in Table 15, Mexico appears to be a good candidate for further analysis. Mexico is also interesting because the country has initiated a program (Progresa, recently renamed Oportunidades) of demand-side subsidies for health and education investments by poor families and is evaluating the impact of the program. If data can be obtained and there are a sufficient number of cases of early childbearing in the panel survey being used to evaluate the program, it might be possible to assess the impact of early childbearing on the health and schooling of teen mothers and their children and the possible mitigating impact for mothers enrolled in Progresa compared to those not enrolled.

Pursuit of causal relationships between poor reproductive health outcomes and poverty should not paralyze efforts to make better use of existing country-level evidence in Poverty Reduction Strategies and other documents that guide resource allocation. While caution is required when contextual factors may be influencing local responses, policy decisions may not require replication of "gold-standard" causal analysis in every case. When available country-level data are consistent with more robust findings that do meet such standards, policy makers should not ignore them, though they should recognize that the strength of the relationships may not be

estimated with complete accuracy. Nor should we have to wait for a full and complete understanding of these relationships to make the kinds of investments that will ensure that poor women have the information and access to services that will enable them to achieve the better reproductive health outcomes that their better-off sisters already enjoy.

Table 15: Longitudinal Survey Data

Country	Data set	Description
Mexico	PROGRESA evaluation www.ifpri.org	PROGRESA program focuses on population in extreme poverty in rural areas. Program addresses poverty through monetary and in-kind benefits, and encouraging investments in education, health and nutrition.
Philippines	Cebu Longitudinal Health and Nutrition Survey www.cpc.unc.edu/projects/cebu/	The Cebu Longitudinal Health and Nutrition Survey is part of an ongoing study of a cohort of Filipino women who gave birth between May 1, 1983 and April 30, 1984. The cohort of children born during that period, their mothers, other caretakers, and selected siblings have been followed through subsequent surveys conducted in 1991-2, 1994, and 1999.
Indonesia	Indonesian Family Life Survey www.rand.org/FLS/IFLS	The Indonesian Family Life Survey (IFLS) is an on-going longitudinal survey in Indonesia. The first wave of the IFLS (IFLS1) was conducted in 1993/94. IFLS2 and IFLS2+ were conducted in 1997 and 1998, respectively. IFLS2+ covered a 25% sub-sample of the IFLS households. IFLS3 was conducted in 2000 and covered the full sample.
Kenya	www.ssc.upenn.edu/Social_Networks/Level%203/Kenya/level3_kenya_data.htm	The first survey of the Kenya Diffusion and Ideational Change Project (KDICP-1) was carried out in 1994-5, and interviewed 925 ever-married women of childbearing age and 859 men (of which 672 were husbands of the currently married women). In 1996-7 and in 2000, respectively, the second and third round of the survey (KDICP-2 and KDICP-3) followed-up the same respondents (if eligible), and also interviewed any new spouse.
Malawi	http://www.ssc.upenn.edu/Social_Networks/Level%203/Malawi/level3_malawi_data.htm	The MDICP is a sister project of the Kenya project above also focuses on the role of social networks in changing attitudes and behavior regarding family size, family planning, and HIV/AIDS in Malawi.
Tanzania	http://www.worldbank.org/html/prdph/lsms/research/wp/a81_100.html#wp90	The survey measures the impact of fatal adult illness on individuals, households and communities; the questionnaire adapted from World Bank's Living Standards Measurement Survey (LSMS); 759 households completed all four waves.

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57

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