



Minn-LInK Child Welfare Special Topic Report No. 4

Educational Outcomes and Family Well-Being of Teen Parents:

**A Description of the High School Graduation,
School Attendance, Subsequent Births, and Child
Welfare Contacts of Teen Parents Served in Ramsey
County, Minnesota**

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Minn-LInK

The Minn-LInK project at the Center for Advanced Studies in Child Welfare at the University of Minnesota School of Social Work relies on secondary administrative data obtained from state-wide public programs. Minn-LInK provides a unique collaborative, university-based research environment with the express purpose of studying child and family well-being in Minnesota. The administrative data sets used in this descriptive analysis originate in the Minnesota Department of Human Services (utilizing the Social Services Information System, or SSIS) which oversees the state child protection system in Minnesota and student public school education records from the Minnesota Department of Education. Wage and hour data was obtained with permission from the Department of Employment and Economic Development. Public Assistance program use data was obtained with permission from the Minnesota Department of Human Services. All data use has been within the guidelines set by strict legal agreements between these agencies and the University of Minnesota that protect personal privacy.

Human service programs collect data for multiple purposes: program administration, compliance with federal and state reporting, fiscal management, and local outcome measures. Policy and practice research has rarely been the focus of either automated system development or data collection. While these realities do not prohibit the successful design, implementation, and completion of research, it does present researchers with unique challenges related to study design and time-frames for study group selection that do not occur when collecting and working with primary data. Instances in which data system conditions drove the structure of this study have been noted in this report.

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Executive Summary

Teen parents and their children face numerous challenges and the multiple public programs that support them are costly. Teens who become parents have poor educational and adult earnings outcomes and their children face numerous disadvantages in childhood as well as adulthood. While there is emerging research regarding the relationships between poverty and teen parenthood and what motivates young people to become parents, how to best serve poor teen parents continues to be a focus of policymakers, direct service providers, and researchers.

In 2002, Ramsey County, Minnesota Human Services, Workforce Solutions, and Public Health Departments consolidated funding to integrate Minnesota Family Investment Program (MFIP) program monitoring requirements into the traditional Public Health visiting home nurse model for teen parents. This change was prompted in part by the discontinuation of a previous case management model for teen parents that was administered by the Center for Employment and Training (CET) through the Saint Paul Public Schools. Under CET, teen parents could participate in Public Health services voluntarily and this participation was not linked to their receipt of MFIP. In July, 2002, participation in Public Health nursing became mandatory for teen parents receiving MFIP. To teens, this represented a consolidation of services that they may have received previously from multiple entities, now provided by one provider (the Public Health nurse). To nurses, this meant incorporating additional tasks into their health and wellness-oriented home visitation practice. In particular, nurses would now proactively connect a disconnected teen parent with school, monitor school attendance and high school graduation, and mete out sanctions when teen parents failed to cooperate. The nurse became the point-person for case management and in monitoring sanctions, contacted the economic assistance worker when the MFIP case needed to be updated with cooperation information.

Because this change represented significant shifts in funding and multiple agencies committed to a new process, it was important for Ramsey to have a sense of how teens fared who were served under this model. Because Public Health nursing services became mandatory for all teens on MFIP as of July, 2002, it was not possible to create a randomized comparison group when examining outcomes. What served as contrast were the outcomes for teens who had been served under the previous (CET) model. The outcome measures examined were school attendance patterns, high school graduation, occurrence of subsequent births, and child protection system contacts in the years immediately following intervention and beyond, as data was available.

Statewide administrative program data was used for linking to Ramsey's program participant data from the Minnesota Departments of Health, Education, and Human Services over the period of roughly 2000 through mid-2006. Study groups were comprised of those teen parents who received services from the county during 2001-2002 (the period during which teens on MFIP received services from CET and could access Public Health nursing on a voluntary basis), 2003-2004 (essentially the first full year of the mandatory Public Health nursing/MFIP model, and 2004-2005 (the year during which Public Health program staff feel the new practices were most fully integrated into their home visiting services). Teens, age 18 or younger, were selected by the calendar year during which they applied for MFIP and after they received at least four months of MFIP in Ramsey County to minimize the possibility of services received in other counties influencing results. To determine whether teens received sufficient services to warrant attributing results to Public Health, records were divided up into two broad groups: those who received at

least four Public Health visits over the study period (Public Health teens) and those who received three or fewer visits (non-Public Health teens). Teens in both groups could also receive MFIP or employment services from another community agency. In this way, it was possible to examine differential outcomes by group and over time, which allowed for consideration of the maturation of Public Health practices.

Educational outcomes are particularly encouraging for those teens served under the new model. Over all study years, the average annual high school graduation rate was highest for teens who received any Public Health services (29.5% for those receiving MFIP and Public Health, and 32.0% for those receiving only Public Health) compared to those who received none (23.9% for MFIP only). Cumulative graduation rates (which unduplicate students who were in 12th grade more than once over the study period) were highest for teens who received MFIP and (voluntary) Public Health services during 2001-2002, slightly higher than non-Public Health groups during 2003-2004, and much higher in 2004-2005, as the service model became more routine.

Stabilized or improved school attendance was examined for any immediate effect of services (within a year of intervention) and changes in trajectory of attendance. One year after intervention, attendance stabilization and improvement results are mixed for the 2001-2002 group, higher for all groups and highest for teens who received any Public Health during 2003-2004, and by 2004-2005, the highest proportion of stable or improved attendance is observed for those who received both MFIP Public Health. Attendance patterns prior to intervention could be examined for those served during 2003-2004 and 2004-2005 due to the availability of data. Where all groups show about an equal proportion of teens whose attendance stabilizes or improves after intervention for those served during 2003-2004, the attendance improvement trajectory is significantly increased one year after services for those who received services during 2004-2005.

Statewide birth data availability allowed for an analysis of subsequent births for those teens served during 2001-2002 and 2003-2004. Although a somewhat limited view of this important outcome, there is evidence that there is an influence of the MFIP and Public Health model on reducing subsequent births, with mean birth rates for these teens significantly lower than those who received only MFIP or only Public Health during the same year (2004-2005).

Finally, child protection reports and investigation data were examined to determine whether there were any significant differences between the groups over the study years. While the number of reports to child protection were only slightly (but not significantly) higher for teens served by MFIP and Public Health, there were no differences between groups in terms of rates of substantiation (investigation and determination of harm). This lack of significant differences between groups may be due in large part to the fact that families involved in both MFIP and Public Health services have an equally high likelihood of becoming involved in child protection due to surveillance.

While the study is subject to a number of limitations, it provides an encouraging review of the potential positive influence of the pairing of Public Health and MFIP services upon outcomes to teens. It is highly likely that the mandatory nature of Public Health services (tying it to the receipt of welfare benefits) helped to motivate teens who may have opted out of Public Health

services under the old voluntary model. Further, the single service provider model likely appealed to teens whose lives are complex and who benefit especially from a home-based delivery system and the relationship basis of the traditional Public Health nursing model.

Introduction

Young people who become parents before they are able to provide for their children (and while they are still children themselves) face many more challenges than adults who become parents when they are in stable relationships with another adult, have employment, housing, and the ability to expend the emotional and physical energy to meet the needs of their children. The following study was conducted in partnership with Ramsey County Human Services, Ramsey County Workforce Solutions, Ramsey County Public Health Departments, and the University of Minnesota Center for Advanced Studies in Child Welfare. The purpose of the study was to investigate and describe the outcomes of families who had been involved with teen parent intervention programs over a period of three years. Findings are intended to provide data to Ramsey County on these programs and build a base for future analyses of teen parent program interventions in Minnesota.

Background

Prevalence, Costs, and Outcomes of Teen Parenthood

The Extent of Teen Parenthood

There were nearly 7 million births to teens nationally between 1991 and 2004 (Hoffman, 2006). According to a report from the Campaign to Prevent Teen Pregnancy (2002), while only three out of ten out-of-wedlock births in the United States are to teenagers, 48% of all non-marital first births occur to teens, the largest single group. Minnesota's teen pregnancy trends have been similar to national rates in that both declined through the 1990s after reaching a peak in the late 1980s. Compared to other states, Minnesota has a relatively low teen pregnancy rate. States with the highest teen birth rates, such as Texas, Arkansas, Mississippi, and New Mexico, had 1996 teen birth rates of 70 per 1,000 compared to Minnesota's 32 births per 1,000. According to the Guttmacher Institute, in 2000 Minnesota continued to rank relatively low among the 50 states (declining 28% over the period of 1991 to 2004), ranking 47th among state teen birth rates. These decreases are estimated to result in \$72 million in public savings for the Minnesota (Guttmacher Institute, 2006). However, teens of color in Minnesota have disproportionate numbers of births compared to white teens. In 2005, rates by racial sub-group were 101.3 for Hispanic/Latina, 99.5 for Native American, 66.4 for African American, 45.7 for Asian/Pacific Islanders, and 17.2 for White (MOAPPP, 2007).

Teen pregnancy rates began declining nationwide in the 1950's and in recent years the decline has begun to materialize in teens of all races. Declines have been attributed to increasing numbers of teens who are choosing to abstain from sex and increased use of contraception among teens who have sex. Abstinence accounts for one-quarter of the declines over the period

of 1988 to 1995 while the balance is considered to be the result of more effective contraception use (Guttmacher Institute, 2002). In spite of these declines, the United States continues to have significantly higher teen pregnancy rates than other western industrialized nations (Darroch, 2001). Over the period of 2002-2004, Ramsey County experienced the highest rate of pregnancy for 15-17 year-olds of all Minnesota counties - with 33.3 pregnancies per 1,000 teens in this age group (MOAPPP, 2006). Racial and ethnic patterns in Ramsey county show that teens of color comprised a disproportionate share of teen births in 2005 with over half of all teen births to mothers who were Black (27.2%) or Asian (28.2%) with a balance made up of White (23.5%), Hispanic/Latino (16.8%), American Indian (2.8%), and other or more than one race (1.3%) (Ramsey County, 2007).

Costs

Teens who become parents require services from family and community systems, many of which are funded by taxpayers. A report from the Campaign to Prevent Teen Pregnancy estimated that national teen childbearing costs taxpayers over \$7 billion each year in direct social service costs related to health care, foster care, criminal justice, and public assistance. The same report found that in estimating the cost-effectiveness of one school-based program intended to prevent teen pregnancy, for every dollar invested in the program, there was a \$2.65 savings in medical and social costs (2002). The costs of teen pregnancy extend beyond social services and compound as families headed by teen mothers grow in size.

Economic assistance (“welfare”) expenditures to support families headed by teen parents are substantial. This is in part due to the low average incomes earned by teen mothers resulting from their age and lack of work experience. According to a 1996 report on teen pregnancy by the Robin Hood Foundation, the wages of teen mothers represent a relatively small portion of their total income during their first 13 years of parenthood with a significant portion (20%) of their annual income coming from public assistance and food stamps. Additional income tends to come from family and relatives or the child’s father. The report also notes that the gross annual cost to society of adolescent childbearing and the entire web of social problems that confront teen moms and ultimately lead to poorer outcomes for their children is calculated at \$29 billion (Maynard, 1996).

The economic impacts of Minnesota’s teen pregnancies are demonstrated by an analysis completed by the Minnesota Department of Human Services which examined the child-bearing histories of mothers who participated in the Minnesota Family Investment Program (MFIP) longitudinal study. This study revealed that 21% of new applications and 30% of ongoing MFIP recipients were minors when they gave birth to their first child. In one county (Hennepin), 76% of the 200 families receiving the most MFIP dollars began program use as a teen parent (Crichton, 2003). The Campaign to Prevent Teen Pregnancy has calculated the average annual cost to taxpayers associated with a child born to a teen mother in Minnesota at \$5,506, the 9th highest average cost estimate of all states. Furthermore, in 2004 the state of Minnesota spent \$38 million in health care costs, \$56 million in child welfare costs, and \$18 million in incarceration costs, associated directly with children born to teen parents (Hoffman, 2006).

Adult Outcomes – Teen Mothers

Education and Economics

Teen pregnancy disrupts education. Less than half (41%) of women who have children before the age of 18 complete high school, compared to 61% of women who complete high school after delaying childbearing until at least age 20 (The Campaign to Prevent Teen Pregnancy, 2002). The same report notes that in the last 25 years, the median income earned by college graduates increased 13%, while the median income earned by high school dropouts decreased by 30%. Those who fail to graduate earn and work less than those who do (Rouse, 2005; Baker et al., 2001). In the global job market, the potential disadvantages of not graduating from high school are greater than ever with the relative earnings of non-high school graduates falling from .9 times to .7 times that of high school graduates when comparing data from thirty western industrialized nations (Donahoe et. al, 2000).

Both national and local research on the effects of teen pregnancy repeatedly establish links between teen pregnancy and poverty. One common causal pathway asserts that teen pregnancy leads to poverty. The Campaign to Prevent Teen Pregnancy (2002) found that 52% of all mothers on welfare had their first child as a teenager. Almost half of all teen mothers and over three quarters of unmarried teen mothers began receiving welfare within five years of the birth of their first child. A General Accounting Office report issued on outcomes for teen mothers found that women who gave birth as teenagers are more likely to have total family incomes below 50% of the federal poverty line (1995).

Another perspective posits that young women who are already poor are more likely to become teen mothers than those who are not, implying that poverty may lead to teen parenthood. A study of teen pregnancy in West Virginia found that the incidence of teen pregnancy was strongly correlated with contextual rather than individual factors. In particular, teens whose communities lacked employment opportunities or cohesion and sense of membership were more likely to become teen parents (Bickel et. al, 1997). Similarly, a meta-analysis of the literature on Canadian teen childbearing notes the correlation between socio-economically disadvantaged teens and the increased likelihood of becoming parents than those who are not. This research on poverty suggests that economic disadvantage is not necessarily a consequence of teen child birth but may produce it (Bissell, 2000) and Maynard notes that "...early childbearing doesn't make young women poor; rather, poverty makes women bear children at an early age" (1996, p. 192). There is also evidence that the future prospects of teens who are multiply disadvantaged are not necessarily adversely affected by teen parenthood. A study of the outcomes of teens whose pregnancies resulted in miscarriage revealed that they were not necessarily better off than their peers who had carried their children to full term (Hotz et. al., 1997).

Adult Outcomes - Teen Fathers

There is scant but growing literature on teenage fatherhood (Burant, 1997) and much of the previous work has consisted of longitudinal studies of teen father involvement from specific cultural groups, such as African-Americans (Cochran, 1997). Cochran notes that much of the literature on African-American teen fathers bases evaluation on marriage to or co-habitation with the mother, based upon the cultural assumption that this is always most appropriate. Few studies have examined other types of support arrangements that may be as or more desirable to the teen mother but are less valued by other cultures or classes. Efforts to predict the factors that

lead to teen fatherhood have been limited, but analyses of characteristics most often associated with teen fatherhood revealed high aggression, low family socio-economic status, poor school performance, and old age for grade (Dearden, 1995; Xie et al., 2001). There is also recognition that while there are often significant age differences between the fathers of the children of teen mothers, over the past thirty years fathers have become younger which has implications for the adult outcomes of both teen parents and their children (Elo, 1999).

Adult Outcomes of Children of Teen Parents

The children of teen mothers are at higher risk of several negative outcomes. These include their own early pregnancies, poor academic achievement, delinquency, substance abuse, and incarceration (Jaffee et al., 2002). A longitudinal study of adult children of teen mothers found them to be 2-3 times more likely to suffer from adverse outcomes as other young adults. Adverse outcomes included dropping out of school, unemployment, their own teen parenthood, and committing violent offenses. Many factors common in teen parent families contribute to negative outcomes such as abuse or neglect of their own children, poor parenting, and poor school achievement. A longitudinal study conducted in the United Kingdom on the children of teen mothers found that large family size, maternal unemployment, low household income, single motherhood, and poor maternal education attainment all contributed to these problems to varying degrees (Stevenson & Barratt, 1991). Children of teen parents who have larger than average families have increased likelihood of engaging in criminal activity early (Nagin, 1997) and British researchers have identified the degree to which teen parenthood decreases the likelihood of post-secondary (college) schooling at 12-24%. This produces an adult wage differential of 5-22% compared to those who complete schooling (Chevalier et al., 2003).

Child abuse and neglect is commonly associated with teen parent households. The Center for Prevention and Early Intervention Policy at Florida State University found that the living situation of the teen mother is the single most predictive variable for occurrences of maltreatment. Teen mothers who live with a related adult are much less likely to abuse or neglect their children than those living apart from related adults (2005). Neglect and abuse can have profound negative consequences on the developing brain. Young children without proper nurturing, stimulation and affection can experience delayed or abnormal brain development. Not only can disease produce neurotoxins that can alter normal brain development, but so do environmental and parenting factors such as inadequate sensory stimulation, activity, or poor social interaction (Shonkoff and Phillips, 2000).

According to the Campaign to Prevent Teen Pregnancy (2002), the daughters of teen parents are 22 percent more likely to become teen mothers themselves. However, both the children of teen parents and the teens themselves can become victims of abuse or neglect. As legal children themselves, teen parents may still rely upon other adults to provide their basic needs, or they have contact with a partner who is abusive. A large longitudinal study of pregnant teens showed that 86% of teen mothers had experienced physical assault by the fathers of their babies and among them, a high proportion had also experienced abuse by other family members, other teens, or witnessed violence (Wiemann et al., 2000). As is the case with the relationship between disadvantage and the occurrence of teen parenthood, the outcomes of the children of teen parents are also likely influenced by the conditions in which they grow up. The fact that teen parenthood is so intertwined with poverty makes the unique negative contribution of teen parenthood to future poverty and child outcomes difficult to disentangle.

Why Teens Become Parents

Several factors have been found to increase a girl's likelihood of experiencing teen pregnancy. The most significant factors relate to family characteristics, such as being born to a teenage mother, being born to a single parent, physical or sexual abuse in the family, low maternal education level at birth, and low Socio Economic Status (SES) of the family at time of birth. Many of the factors that are associated with teen fatherhood (poverty, poor school performance, etc.) also relate to young women. How adolescents make decisions about their reproduction is complex, and they often take into account multiple factors including their relationship to school, their sense of academic achievement potential, and the jobs that they feel are available to them. A young woman who sees few other prospects for herself beyond motherhood may feel that having a baby gives her life purpose (Gordon, 1996).

Some qualitative studies reveal that young women in some communities feel that although early pregnancy is not desired, it is a common occurrence and that it can be managed (Crump et al., 1999). Similarly, studies of decision-making and contraception use among teen parents show a desire by some to become pregnant or an indifference about pregnancy, sexuality, and sexual activity (Spear, 2004). Culturally-specific examinations of teen pregnancy show variable responses. In Hmong communities, for example, marriage traditionally occurs during adolescence with less negative impact than in non-Hmong communities. Swartz's study of Hmong families in Minnesota showed that Hmong girls who marry in high school are more likely to graduate and pursue higher education than girls from other ethnic groups who experience teenage pregnancy. In the Hmong community, teenage pregnancy is more normalized, intentional, and supported, with fewer negative outcomes (2003). Similarly, teenage Latina mothers are less likely to live in poverty because they are assisted by extended family, informal networks, and community agencies staffed by local community leaders (Denner et al., 2001).

Recent work using in-depth interviews examining the experiences of single mothers shows that the personal importance of having children outweighs the desire for having a husband to have them with (although marriage is highly valued in the communities that were studied). Poor women felt that if they waited for a marriageable man to enter their lives, they risked never having children. And, since they felt that their economic opportunities were not greatly jeopardized by having children (because they did not view middle-class career paths as accessible or realistic for themselves), the opportunity cost of having children as a single parent was perceived as low, and acceptable. Sometimes, with environments that are awash with crime, drugs, or prostitution, an un-prevented pregnancy for a teen can be a turning point at which they decide to discontinue illegal activities or stop skipping school so that they can be good parents and role models for their young children. Indeed, many women interviewed felt that having children (as opposed to terminating pregnancies) and being responsible by "being there" for them, are virtues (Edin, 2005). The subtleties embedded within the choices that young mothers make bear consideration and are often not reflected in more quantitative large-scale studies of teen pregnancy and parenting. While becoming a parent is a strong precursor to dropping out of high school, there is some evidence that the degree to which the teen felt connected to school before the pregnancy has a great deal to do with whether or not they leave once becoming a mother. Furthermore, how the teen values education in relation to providing for their child influences how they feel about it after becoming a parent (Zachry, 2005).

And, while poor outcomes are associated with teen parenthood, it is important to keep in mind that the influences of other environmental factors such as poverty and poor economic prospects may be as powerful or more powerful than the influence of teen parenthood alone. A multivariate analysis of direct and indirect effects of background characteristics of youth in poverty illustrates the complex nature of these relationships. Specifically, teen parenthood was found to have strong indirect effects on poverty via reduced educational attainment, increased welfare use, decreased work experience, and increased family size. The same study showed that the early economic conditions of families were quite powerful, independent of welfare use, and that the condition of poverty was more influential overall (Israel, 1998).

Effective Strategies

Given the range of negative outcomes likely for families headed by teens who become parents too soon, a number of strategies have been employed to attempt to meet the needs of these young families and prevent or reduce negative generational effects. Services often focus on improving economic well-being and health of the parents and children of teen households while maintaining connections to schools to continue education and prepare teens for the work world as they approach adulthood. Programs differ in their methods of delivery and the thrusts of their programmatic emphases.

Home Visiting

Home visiting programs have been recognized as effective strategies for serving teen parents. These programs generally involve regular visits to the teen parent's home by professional nurses to review basic care and health maintenance as well as reinforce other goals such as maintaining school attendance (GAO, 1990). Successful home visiting programs are characterized by clear program goals, trained home visitors, adequate linkages to other community services, systematic evaluation to document outcomes, a well-defined target population, and sustainable funding (GAO, 1995). Some investigators have found that the most effective home visiting programs are built upon direct services administered by professional nurses rather than paraprofessionals or those trained in other disciplines (Olds, 2002). Immediate positive program impacts are often observed, such as decreased behavioral problems in young children that are sustained into adolescence with reduced risk-taking behaviors, such as alcohol use, smoking, and running away (Olds, 1998). Although communities have invested heavily in home visiting programs in recent decades and in recognition of the importance of the first years of life, some of the literature cautions that evaluations should maintain realistic expectations. Although results are quite positive overall, home visiting programs are characterized as "fragile interventions" whereby teens are visited 20-50 hours over the course of two years, and it may not be realistic to expect them to dramatically alter the course of troubled lives (Gomby, 2000; Daro, 2006). A meta-analysis of 13 home visiting program evaluations illustrated the importance of drawing clear theoretical connections between program activities, goals, and outcomes: only half of the programs evaluated successfully met their program goals (McNaughton, 2004). Home visiting services, in combination with other supports, such as parenting classes and school supports, have been shown to reduce repeat pregnancies and school drop-out rates (Solomon, 1998) and direct practitioners note that effective interventions for teen parents are less about structure than intensity of services.

School-Based Services

Another avenue for service delivery takes advantage of the teen's connection to school and the program's intent to maintain this connection. School-based parent programs may be built upon a school-based child care program in which children will be cared for once born, so that teens can continue school attendance. These programs may also offer parenting programming, evening events, mentors, dinner, or other activities to engage parents and their children (Klaw et. al, 1995). Others are based in schools but emphasize school attendance, educational goals, and health and wellness or may be a combination of school and community-agency based (Tabi, 2002). Effective school-based programs combine several key elements: an educational piece, child care, and access to other social services. They are most successful when they are comprehensive and fill gaps that are otherwise present in service delivery for teen parents. While school-based programs can help teen mothers to achieve graduation from high school, they may be unable to address the social barriers that could hold teens back financially and occupationally post-graduation, and outcomes may be quite mixed depending upon the services offered (Amin et. al, 2006; M'endez-Negrete, 2006).

Ramsey County

This study examined two general types of intervention services for teen parents that were differently anchored in their approaches: school-based and home visiting. Use of both intervention programs was usually accompanied by receipt of the Minnesota Family Investment Program (MFIP), or economic assistance. The school-based intervention program was administered by a division of the Saint Paul Public Schools by the Center for Employment and Training, or CET. CET operated in high schools until 2002 and was focused on education completion and youth enrichment. Case managers were on site at school locations and in other county offices in partnership with other services such as financial workers, and through the completion of an assessment a case plan was crafted that provided holistic case management. School-based case managers were in a position to communicate with school staff and provide referrals to other resources as needed. A typical case plan would include services to support high school completion, transition to post-secondary education, develop parenting skills, and connect with economic supports such as MFIP or child care assistance. Teens who participated in CET services typically received services until they graduated, left the program, or obtained employment. Out-of-school teens who were pregnant or new parents were encouraged to return to school to earn their diploma or GED and seek post-secondary training.

The visiting home nurse model, still operating, is administered by the Saint Paul-Ramsey County Department of Public Health. The Public Health Teen Parent Program serves teens from a public health framework, establishing interventions based upon needs that are identified in assessment. For example, while some of the program goals include educational continuation and graduation, many others focus upon parent and child wellness such as pregnancy and post-partum care, age-appropriate child growth and development, child abuse and neglect prevention, and mental health and home safety monitoring. Home visits are performed by registered nurses and the range of visits performed are 1 – 45 over a period of six to 13 months. The public health programs partner with other service providers such as county economic assistance programs, child care, schools or other community providers, depending upon the teen's needs.

For this study, nearly all teens required economic assistance, and receipt of MFIP was contingent upon maintaining school attendance or work. During the period of time when CET was in place, CET was mandatory for those who were also receiving MFIP. Teens could receive CET and choose to voluntarily participate in public health services simultaneously. If teens were served by MFIP only (meaning that they had refused Public Health services), they were receiving job counseling and training services to support employment like all other MFIP participants. In order to maintain MFIP eligibility, all teen parents were required to maintain their school participation. (For details on the study groupings, see Table 1 and Figure A1, Appendix A.) As of July, 2003 Public Health Teen Program services became mandatory for teens receiving MFIP and participating in the school option. It was at this time that MFIP sanction policy changed – as of July, 2003 MFIP sanctions became time-limited and progressive and Public Health services became engaged in the work of monitoring the participation and cooperation of teen parents on MFIP in terms of their education and employment activities, in addition to their traditional public health nurse duties for teens.

Study Data and Design

Ramsey County approached the Minn-LInK Project at the University of Minnesota School of Social Work's Center for Advanced Studies in Child Welfare in 2006 to request assistance in conducting an exploratory analysis of select outcomes for teen parent families related to public health services. Although teen parents received health, education, and employment counseling, outcomes identified were oriented around public health goals, as opposed to employment goals. Minn-LInK research focuses on child well-being and the project had recently conducted studies related to adolescents. Teen parenthood is recognized as a critical focus of intervention and public policy. The University agreed to conduct the study free-of-charge in order to build upon previous research and to investigate the feasibility of conducting a broader, future study of teen parents in Minnesota.

Gathering data for analysis for this study was a cooperative effort between Ramsey County Human Services and Public Health agencies. The separate program areas first identified the teen parents to be studied and then identified the programs from their two areas that those teens received. Some specific criteria needed to be established to select appropriate teens while minimizing possible service impacts from other counties. Low-income populations are highly mobile and it is common for economic assistance clients (served by the Human Services department) to move from one county to another but continue to access public programs. To minimize the effects of case management practices in other counties, Ramsey selected only those teen parents who began receiving MFIP within one of three 12-month time periods in Ramsey County. These clients may have received some MFIP at another time in another county, but they were filing a new application for MFIP in Ramsey County. Next, only those recipients who were age 18 or younger, were heads of MFIP households, and were coded as not yet having graduated from high school were selected. Finally, to establish some minimum for county-specific program impact, only those teens who had received four or more months of MFIP in Ramsey County were retained for study. This study sample contains all teen parents who were served in Ramsey County over this time period, meeting these criteria. Group identification was complex as teens frequently moved between programs and participated in multiple services over more than one

year. In addition, teens participated in teen parent program services on a voluntary or mandatory basis during some points in time and in keeping with MFIP policy changes. Because differential outcomes were anticipated depending upon program receipt, details on which programs(s) were received as well as when those programs were accessed were recorded.

The fiscal year (July through June) time periods for program participation were related to when programs were in place (in the case of the CET program, only those teens enrolled during 2001-2002 could have accessed it). Because CET ended in 2002, county agency staff wanted to limit the impact of this program on results as much as possible by creating a one-year gap (2002-2003), which allows for the change in services produced by the end of the CET program (ending in 2002) and the start of Public Health programming changes in 2003. MFIP receipt was recorded, resulting in the following groups:

Table 1. Study Groups and Programs Received over Study Periods

Program	Teen Parent/ Family Count
CET (2001-2002)	502
Public Health HVN, Years 1 and 2 (2003-2005)	
PH (voluntary) and MFIP, Year 1 (2003-2004)	443
MFIP Only, Year 1 (2003-2004)	79
Year 1 Total	522
PH and MFIP, Year 2 (2004-2005)	287
MFIP Only, Year 2 (2004-2005)	117
Year 2 Total	404
Grand Total	1,428

The differentiation between years 1 and 2 for public health services was made because of changes in service delivery. Specifically, during 2003 Public Health services became responsible for connecting and maintaining teens to schools in compliance with MFIP rules. Prior to 2003, Public Health nursing was provided to pregnant and parenting teens by a variety of agencies including physicians, school nurses, Women Infants and Children (WIC), Child Protection Services (CPS), and other community agencies. The focus of the services provided were related to pregnancy assessment and teaching, preparation for labor and delivery, breastfeeding, preparing for the baby and promoting maternal attachment, as well as addressing to basic economic needs, prevention of violence, assessment of chemical use, referral to other community agencies, and discussion related to the benefits of school. For postpartum teens the focus was on postpartum recovery, newborn and well childcare and immunizations, positive maternal infant relationship building, child spacing, and normal child growth and development assessment and teaching, chemical health, and violence assessment. Prior to 2003 referrals to Public Health Nursing (PHN) were not automatic which meant that many teens, particularly those 18 and older, were not referred to PHN by other providers, and never received PHN services. Participation at this time was voluntary. Teens who were served by neither Public Health (voluntary) nor CET were receiving employment services through a traditional employment services provider.

At the end of the CET program, Public Health took over public assistance components (July, 2003) and new program practices were put in place to meet MFIP requirements. Specifically, an MFIP program overview was offered, school attendance was assessed, networking with county financial and childcare workers was facilitated, and the MFIP sanction process was addressed. The focus on school attendance and graduation shifted from supporting teens to attend school to getting them into school if they were not enrolled, monitoring their attendance, sanctioning them if they did not attend, and developing interventions that focused on teens graduating from high school or completing their GED and working with new partners to improve systems that influenced school attendance. A goal of this change was to reduce the number of individuals that teens had to interact with in order to receive services. Public Health services in this context are more accurately understood as case management-based, as opposed to employment service-based. One of the keys to getting teens connected and maintaining engagement with these various systems was through relationship-building, a traditional cornerstone of public health visiting nurse practice.

There may also be some potential influence of the voluntary or mandatory nature of public health services participation driven by MFIP eligibility that could relate to program intensity (with more motivated clients more likely to welcome home visits). A 1988 meta-analysis of early intervention services revealed that the range of home visits in a number of evaluations were from 4 to 50 visits over intervention periods of one to two and a half years (Heinicke et al.). Some programs increase the average number of visits from the pregnancy period (six to nine) to post-natal period (16-23) (Olds et al, 1999; Olds et al., 2002), while others measure effects on visits that range anywhere from one to 71 visits over a given program period (McNaughton, 2004). Ramsey County determined that teen parents who had received fewer than four home visits would be considered to have received no public health services while those who received four or more would become “Public Health” teen parent recipients for the purpose of the study.

The broad evaluation goal was to determine whether teens who received public health visiting home nurse services (four or more) had different outcomes than those who did not. To also account for the influence of MFIP receipt, four study groups were created. To see details of the composition of these four groups, by MFIP receipt, public health receipt, and by years of participation, see figure A1, Appendix A. All data analyses were conducted using SPSS for Windows, version 12.

Figure 1. Study Groupings for Teen Parent Participants

Public Health Home Visiting Status
(Four Groups)

4+ visits = PH Services

<3 visits = No PH Services

	N
1. MFIP, no Public Health	486
2. No MFIP, no Public Health	110
3. MFIP and Public Health	412
4. Public Health, no MFIP	420
Total	1,428

Study Group Comparison

Study groups were not equivalent in all respects. First, all members of the No MFIP, no Public Health services group (N=110) were voluntary participants (Figure 1, Group 2 and Figure A1, Group 2). Voluntary participation may have had an important influence on outcomes and some results look very different for this group. The mean age at Public Health program start was 17 for all groups but those in the No MFIP, no Public Health group (Group 2) were again different from the others in that they were 16.4 years old on average. Those in the MFIP, no Public Health group were oldest, at 17.3 years with the remaining groups average starting age of 16.7 and 16.8 for MFIP and Public Health and Public Health, no MFIP groups, respectively (F.05 (3)= 27.997, $p<.001$). Although the start of teen parent program participation will vary by the occurrence of the pregnancy and parenthood, a significantly different age at start of program contact could be a factor for some outcomes.

When comparing the racial and ethnic makeup of the four study groups, some additional differences emerge: the No MFIP, no Public Health group is disproportionately white; African Americans disproportionately comprise the MFIP and Public Health group; and Hispanic teens and the Other Asian grouping make up a significant portion of the Public Health and no MFIP group.

Table 2. Racial and Ethnic Composition of Study Groups

	1. MFIP No Public Health, N=486	2. No MFIP, No Public Health, N=110	3. MFIP and Public Health, N= 412	4. Public Health, no MFIP, N= 420
African American	31.9%	31.8%	37.1%	29.0%
American Indian	5.3%	6.4%	4.1%	2.6%
Hispanic	8.4%	15.5%	14.1%	22.4%
Hmong	17.1%	-	11.9%	-
Other Asian	10.5%	12.7%	8.0%	27.1%
Other Black Immigrant	3.5%	-	1.2%	-
Somali	1.9%	-	.7%	-
White	18.9%	23.6%	19.7%	15.5%
Other	2.5%	10.0%	2.7%	3.3%
Total	100%	100%	100%	100%

Study advisory group members from Ramsey County offered some possible explanations for these racial and ethnic differences. High rates of Hispanics in some groups (group 4 in particular) are a likely reflection of the fact that many of these teens are undocumented immigrants which renders them ineligible for MFIP. Higher proportions of “other Asians” in group 4 may reflect miscoding in records for Hmong teens occurring in particular programs. Group 2, receiving no MFIP and no public health services, was comparatively small, members were younger at program start than the other three groups, all participants were voluntary, and a high proportion of them (24%) were Caucasian. The teens in this group were sufficiently different

to remove them from subsequent comparative analyses. Specific outcomes examined for the remaining three groups were: high school graduation (during the year of intervention and in post-intervention years), school attendance stability, child protection reports and maltreatment findings, and subsequent births.

Record Matching

Education

Locating the education records of teen parents was primarily accomplished by the use of first name, last name, and birth date and using frequent passes through the education data for a given academic year. The first task was to obtain the MARSS number associated with student records, the unique identifier used in Minnesota's public education system. Match rates varied by academic school year as students left school for various reasons, including graduation or reaching a compulsory attendance age limit. The highest match rates for all study groups combined were obtained during the earliest academic years: 74% for 2000-2001, 74% for 2001-2002, 67% for 2002-2003, 47% for 2003-2004, 37% for 2004-2005, and 25% for 2005-2006. Education data for students who attended charter schools was not available in the public school data records used.

Births

To identify whether teen parents participating in the Ramsey programs experienced births subsequent to their year of intervention, statewide public health vital statistics data were queried for 2003, 2004, and 2005. Births were identified as preceding the year of intervention, occurring in the year of intervention, or occurring after the year of intervention. For example, if the teen participated during the school year 2003-2004 and a birth occurred in either 2003 or 2004 year, this was assumed to be a birth that triggered program participation and was not counted as a subsequent birth. In contrast, a birth occurring in 2005 for this teen would count as a subsequent birth.

Minnesota births were identified by parent name and a combination of parent first and last name, with the birth date used to identify birth records of children. This was performed for both mothers and fathers in the teen parent group, matching to corresponding name and birth date fields in the birth record. Using this method, 158 mothers and 41 fathers for a total of 199 teen parents were matched for all time periods (before, during, and after intervention). Additional demographic variables were chosen from the birth records including APGAR scores and low birth weight status. Only births that occurred in the state of Minnesota were identified.

Child Protection

For this study, statewide electronic child protection data were available for calendar years 2000 through mid-2006. As is the case with the education and birth outcomes, a child protection maltreatment report or substantiation is considered subsequent to the teen parent intervention if it occurred in the calendar year after intervention. Records were matched using parent social security numbers, and child protection events were examined in relation to the parent since not all child information was available on all children.

Child protection events were anticipated to occur for both parents and children of teens, but locating the parent record allowed for the identification of either a child or teen parent victim. It was an intention of the study to identify whether the child or the parent was the victim, but this identification became problematic due to limitations of the child protection data. There were a total of 26 reports of maltreatment, 15 investigations, and eight substantiated maltreatment events associated with study families.

Results

Graduation

High school graduation is considered a cornerstone achievement for economic success and self-sufficiency in adulthood. Not all teen parent students were eligible to graduate during each academic year of study. The decision was made to define eligibility to graduate by whether or not the student was in 12th grade during a given school year. (This is imperfect, as school districts frequently assign grade levels by age, not by academic progress.)

Table 3. Distribution of Teen Parents by Grade: Counts and Average Age of Students at the Start of Each Academic Year

Grade	2000-2001	*	2001-2002	*	2002-2003	*	2003-2004	*	2004-2005	*	2005-2006	*
4	9	11	1	11								
5	42	11	11	12	1	12						
6	61	12	41	12	10	13	1	13				
7	191	13	87	13	37	13	14	13	1	14		
8	232	14	193	14	106	14	48	14	17	14	2	15
9	217	15	213	15	176	15	84	15	40	15	14	16
10	159	16	233	16	218	16	166	16	76	16	39	16
11	111	16	157	17	224	17	210	17	147	17	83	17
12	36	17	120	18	192	18	311	18	248	18	223	18
Total	1058		1056		964		834		529		361	

*Average age of students in each grade level

Table 3 illustrates the distribution of teen parents (served in any intervention year and any study group) by grade, by academic years. The average age of students in each grade level was calculated to get a sense of whether or not students were age-appropriate for grade levels. (These data do include the 110 students in the No MFIP, No Public Health group.) Note that the total students matched to each school year reduces over time as students graduate, age out of school, or drop out.

For each year education data was available, the graduation rate of only a sub-set of each teen parent group was calculated in Table 4. The number of teen parents who were in 12th grade

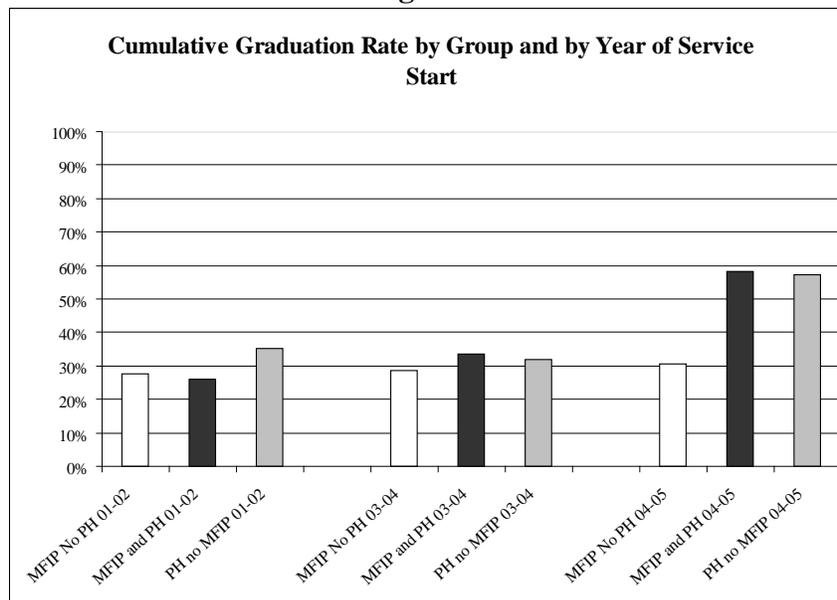
constituted the denominator of the graduation rate ratio, with the numerator constituting of those teen parents who graduated.

Table 4. Proportion of Graduates for Each Academic Year by Eligibility to Graduate and Study Group (Duplicated)

Education Year	MFIP, no Public Health		MFIP and Public Health		Public Health, no MFIP	
	# Seniors	% Grad	# Seniors	% Grad	# Seniors	% Grad
2001-2002	59	16.9%	19	26.3%	120	25.0%
2002-2003	62	30.6%	53	18.9%	68	30.9%
2003-2004	94	26.6%	113	22.1%	91	31.9%
2004-2005	66	15.2%	106	34.9%	63	30.2%
2005-2006	62	30.6%	77	45.5%	57	42.1%
Average overall Grad Rate	23.9%		29.5%		32.0%	

On average and overall, teens who received any public health services tended to have higher high school graduation rates than those who did not (Table 4). (Although not included in most analyses in this report, the average overall graduation rates of the No MFIP, no Public Health group (N=110) was 24.0%, very similar to the first group, MFIP, No Public Health at 23.9%.) The data depicted in Table 4 contains duplication of students as it is possible that a student who was in 12th grade for more than one academic year could be included in more than one year's calculation. This duplication of students would actually result in a suppression of the net average graduation rate. Graduation is examined in more than one way to account for this.

A cumulative graduation rate for each intervention group was calculated and examined for a period of at least two years or more, post-intervention, depending upon the availability of data. For example, the cumulative graduation rates of students who began services during 2004-2005 were reviewed for graduation during the 2004-2005 and 2005-2006 school years. This can be compared to those starting in 2001-2002, whose rates were examined over 2001-2002 through 2003-2004. (Later years were not examined since most students would have been older than 17 by 2004-2005). This cumulative rate unduplicates students (each is counted only once).

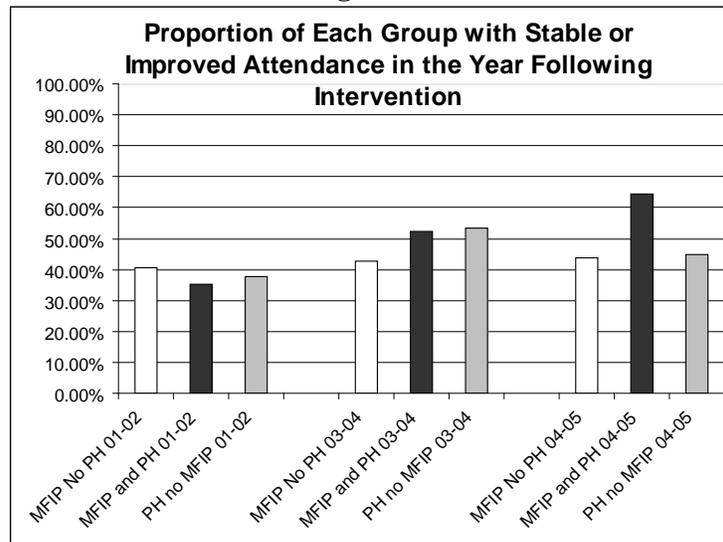
Figure 2.

Teens who received any public health services during 2003-2004 and 2004-2005 tended to have higher cumulative graduation rates than those who did not and those who received both MFIP and public health had the highest proportion of graduates. Differences between groups during 2001-2002 are mixed.

School Attendance

School attendance is an indicator of school engagement, an important foundation for school success for all students and for adolescents in particular. School attendance is also a requirement for MFIP program participation. School attendance is calculated from education records as a ratio of the average daily attendance (ADA) over average daily membership (ADM). For example, an attendance ratio of 97% results from an ADA of .86 over ADM .89. Changes in school attendance may be calculated as the difference between one year's attendance ratio to another. In this study, school attendance changes were calculated from the year prior to intervention compared to the year of intervention. This time frame was driven by the availability of data as well as the desire to learn whether there was an immediate impact of the intervention on the teen's connection to school. For instance, the attendance ratio for a teen parent participating in 2001-2002 would compare attendance from 2000-2001 with 2001-2002. Year-to-year attendance change was calculated for each student in the study and because school attendance typically drops for all adolescents as they approach their senior year, both stable (unchanged) as well as improved attendance was considered a positive outcome. The attendance outcome also allows for a fuller picture of all students served, not just those who are near graduation.

Figure 3.



In Figure 3, the immediate effects of intervention on attendance are mixed but there is greater variation in improved attendance for those teens who received some public health services compared to those who did not (MFIP only rates are more similar over time).

Attendance was then reviewed historically by examining the change trajectory (or pattern) for each student in order to explore whether or not program intervention had an effect on attendance trend direction. (This historical analysis could not be conducted for those served in 2001-2002 due to limited data availability.) Figure 4 is for the 2003-2004 attendance year.

Figure 4. Teens who began services in 2003-2004

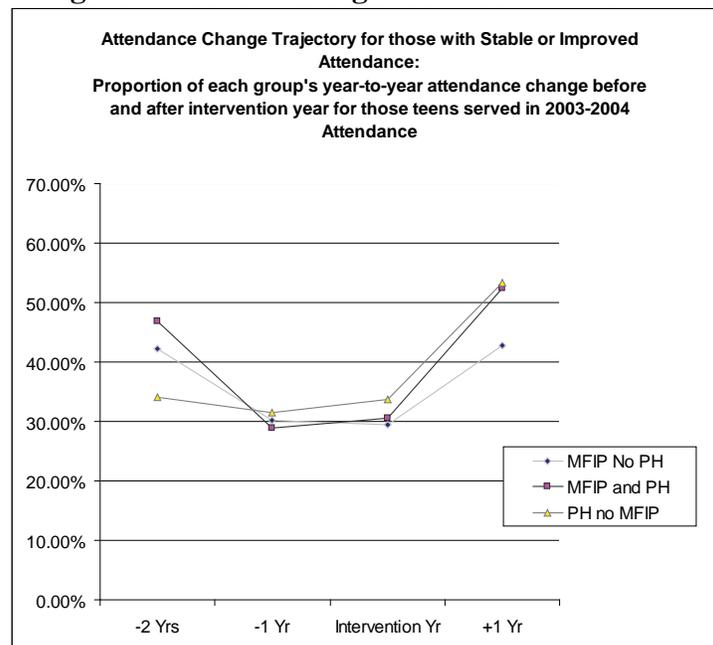
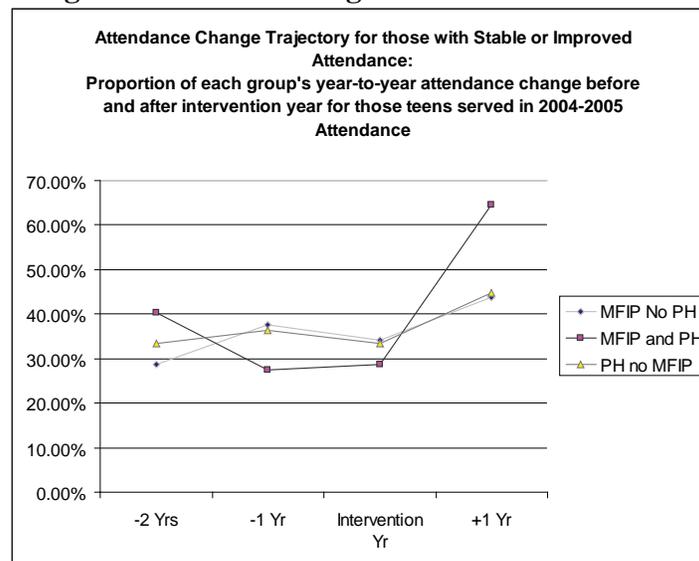


Figure 5. Teens who began services in 2004-2005



There is evidence that regardless of type of services received, school attendance improves immediately following intervention for roughly 40-50% of each group. A sizeable portion of all groups exhibit decreased historical attendance (as evidenced by falling proportions of those with stable or improved attendance) over the one to two years prior to intervention. By one year after intervention, over 50% of the groups who began any public health services during 2003-2004 have displayed stable or improved attendance and over 60% of those who began MFIP and Public Health services in 2004-2005 had similarly stable or improving attendance.

Demographic data from education records describe these students as relatively poor (with 76.2% eligible for free or reduced-price lunches) and about 25% of whom are English language learners. Rates of special education receipt were similar to statewide averages at 11.9%, with “learning disabilities” the most common disability indicated. Five percent were designated as gifted and talented.

Subsequent Births

Additional children born to a teen parent will adversely affect their ability to obtain and retain employment or complete training and will increase the likelihood that they will continue to rely upon public assistance. Statewide birth data was used to identify the subsequent birth rates for each of the study groups. There were 79 children born subsequent to the year of intervention to 14 fathers and 47 mothers. Births occurred one to three years after intervention, depending upon the year in which the intervention occurred. Births were examined for calendar years 2003, 2004, and 2005, making the subsequent births analysis only possible for those teen parents served during 2001-2002 and 2003-2004. Because program intervention strategies are likely to influence mothers more than fathers, analyses focus on the subsequent birth outcomes of the mothers only.

Examining subsequent births by year of intervention allows for the examination of equal post-intervention time periods. While the majority of teen parents (over 90-95%) did not have additional children, there was a small number who did.

Table 5. Mean Number of Subsequent Births, by Group, 2001-2002 (three years, post-intervention)

	2001-2002
	Mean number of subsequent births
MFIP, no Public Health	.078
MFIP and Public Health (voluntary)	.108
Public Health, no MFIP	.037
Total	.070

Table 6. Mean Number of Subsequent Births, by Group, 2003-2004 (one year, post-intervention)

	2003-2004
	Mean number of subsequent births
MFIP, no Public Health	.055*
MFIP and Public Health	.001*
Public Health, no MFIP	.040*
Total	.031

*F.05(1)= 2.92, p<.05

Although subsequent birth results are mixed with regard to public health influence in 2001-2002, there are significant differences between groups during the 2003-2004 year. During this year, those who received public health services had proportionally fewer subsequent births than those who did not. When examining all public health (N=751) or non-public health (N=273) teen parents served between 2001-2002 and 2003-2004, significantly fewer babies were born to those served by any public health services, post-intervention, compared to those who did not receive any public health services (F.05(1) =8.66, p<.001). The fact that Public Health teen parents from 2001-2002 were voluntary participants may have had a bearing on these results.

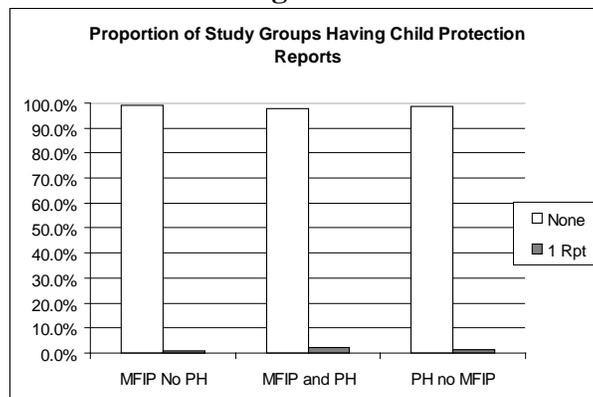
Birth Outcomes

It is worthwhile to investigate the outcomes of subsequent births, and vital statistics data provided some indicators of pregnancy and birth status. Overall, the subsequent babies born to these young mothers were quite healthy with 44 of 54 (81%) having five minute APGAR scores of nine or higher and 32 (59%) mothers having no medical risk factors (such as anemia or lung disease). Only three babies (6%) were born with low birth weight – lower than low birth weight rates for teens under age 20 in Ramsey County in 2005 (9.0%) and in line with statewide averages for all births. This is lower than what would be expected from a pool comprised of teen parents only, since low birth weight is one of the most common risk factors for children born to teens (Children, Youth and Families report, 2007).

Child Protection

In this study, both teen parents and their children were considered at risk for abuse or neglect. Data on the teen parent were used as the primary means of identifying whether there was a child protection record (of any type) associated with the teen or their children, since a report on a child will also identify a parent as part of the record. The review period was up to two years after the year of intervention. Because the child protection data was available until mid-year 2006, this analysis was able to include data for teen parents served during all intervention years. During the post-intervention periods, 25 teen parents (1.8% of all study teens) had contact (reports) with child protection. These families constituted 26 total reports. All but nine of these 25 families received Public Health services. (Figure 6)

Figure 6.



Because not all child protection reports result in substantiated maltreatment events, these outcomes are examined separately. A substantiated maltreatment is one that is investigated and maltreatment (abuse or neglect) has been determined to have occurred. Among these 26 reports, fifteen investigations resulted, involving 14 families.

While both the proportion of reports and investigations were slightly (but not statistically) different between the three groups, the proportions of substantiated maltreatment findings were very similar. There were six substantiated maltreatment findings involving six families.

Table 7. Substantiated Maltreatment Findings, by Group

	No substantiated maltreatment		Substantiated Maltreatment	
	N	%	N	%
MFIP, no Public Health	485	99.8%	1	.2%
MFIP and Public Health	407	99.3%	3	.7%
Public Health, no MFIP	418	99.5%	2	.5%

Limitations

Although all study groups were comprised of all teen parents meeting selection criteria who were served by similar programs over similar time periods in Ramsey County, there are differences between the teens that may or may not have a bearing on outcomes. Some ethnic and racial groups were more likely to be in one study group rather than another and group membership may be a function of other unknown factors that might influence results: for example, personal motivation in the case of students who voluntarily participated in services versus those who were mandated participants; geographic patterns (where participants lived) that may have affected the services received; or individual characteristics of the agency staff or programs that served teens. Although a minimum of four public health nursing visits was identified as a threshold for measurable outcomes, the time period over which these visits occurred might have varied by as much as two years. With replication and expansion, future study can correct for these limits. The following specific considerations are recommended for use of these results and when planning for future research:

School data variability.

Statewide data entry and assignment of a student's grade level is sometimes based upon the student's chronological age, while in other districts, it is based upon academic progress. In Saint Paul public schools, the practice is to assign by age, which is an important consideration when trying to determine whether teen students are at grade levels that are appropriate to their age and academic progress. School attendance data entry is also subject to variation depending upon the practice in individual schools. In some schools, attendance is entered by administrative staff who do not have direct daily contact with students whereas in others, teachers enter attendance updates from their classrooms. Future research that relies upon the state education data to support performance measures related to grade progression, graduation, and attendance status will need to consider the practices in the schools or districts under study.

Extend subsequent birth evaluation beyond one year.

This study could not examine subsequent births for all study groups for uniform periods of time. Examining subsequent births occurring only within one year after intervention may not provide the fullest picture of family expansion and program effects. Future research should examine this important outcome for longer periods of time after teens participate in services.

Careful interpretation of child protection data.

While child protection data helps convey a sense of whether or not family stress reaches a crisis point and comes to the attention of county authorities in the form of reports, investigations, or substantiated maltreatment findings, there are a number of important caveats to bear in mind when interpreting these data. In particular, not all actual reports to a child protection agency are accepted. This means that there are always reports that come to the agency that the agency determines to be insufficiently serious to warrant a review. Those reports that move on to assessment are those that are entered into data systems as reports. There are practice changes that can also affect how and which reports are processed in particular ways that affect the ability of the researcher to detect effects. For instance, the state of Minnesota has implemented two different processes for triaging child protection reports over the past seven years; first, Alternative Response, and later, Family Assessment Response – both of which affected the

paths that reports take through the child protection agency. In addition, there may be differing thresholds for investigation by county depending upon practice, budgetary constraints, or caseload size. Finally, child protection involvement as an outcome is inherently deficit-based and thus offers only a partial picture of how families are faring under certain conditions.

Without child care data, the picture of child well-being is incomplete.

Given the importance of early experience and quality early care and education for children of teen parents, the picture of child well-being in the present study is quite incomplete without information on where these young children are being cared for while their parents are engaged in school or training activities. Future study should incorporate information on the types, number, and stability of care settings the children of teen parents are involved in while their parents are finishing school and cooperating with MFIP requirements.

Lack of GED data provides incomplete assessment of educational outcomes.

General Equivalency Degree data was not available for study and previous research on teen parents shows that this is often an option for completing education. In this respect, high school completion is underestimated here.

Models, multiple programs, implementation, and programmatic variation.

This evaluation encompasses a “real world snapshot” of teens being served in one community in Minnesota with a focus on those who received one type of services. As such, results also likely reflect the wide array of services these teens received over the study period. Overlap between the three specific programs under study (public health, MFIP, and CET) were noted in the creation of the study groups, but surely these teens participated in a number of other programs available to them such as counseling services, Women, Infants and Children (WIC), traditional employment services, or other school-based support programs, just to name a few. In addition, within the public health program model there were variations in how services were delivered to teens over the study time period with non-mandatory services (2001-2002) becoming mandatory later (2003-2005) with the simultaneous change in responsibilities of nurses to include MFIP sanction monitoring tasks. Finally, as with any service, there were likely to be individual service delivery variance between programs as well as individuals providing services that may affect results. All of these factors are intertwined and were not disentangled in this study.

Discussion

Teen Parent Outcomes

There is little debate that there are considerable (tangible and intangible) costs to communities, families, and children when teens bear children before they are emotionally and economically prepared. However, there are important discussions taking place about what comes first: poverty or teen parenthood. The literature indicates that teen parenthood reinforces poverty in the lives of young people who are already economically disadvantaged and, those who live in poverty are more likely to become teen parents. In one study attempting to disentangle the specific effects of poverty and teen parenthood, teen parenthood did not have a direct effect upon poverty but was an important factor only in relation to other indirect effects (Israel, 1998). This descriptive study of the outcomes of low-income teen parents served by a select combination of programs in Ramsey County, Minnesota, with particular focus on Public Health-run, visiting home nursing services shows differential educational outcomes for those teens who received these services compared to those who did not.

Specifically, for each of the academic years studied, teens eligible to graduate were on average more likely to do so if they received any Public Health case management services within a year before graduation. The average annual proportion of graduates among those who received public health services was 3-8% higher than for those who did not. Further, to account for students who were eligible to graduate during more than one academic year (i.e., in 12th grade multiple years), the unduplicated cumulative graduate proportions of each study group were highest for those who received Public Health and MFIP services together, and in particular for those who began services in 2004-2005 in which almost 60% had graduated. This is well above the 30% graduation rates others have calculated for teen parent populations (Maynard, 1996) and is consistent with results of meta analyses completed by Chapin Hall in which one of the outcomes observed for home visitation programs is higher rates of high school completion than would otherwise be expected of teen parents (Daro, 2006).

All programs required school attendance of teen participants. Even if required to continue receiving benefits, regular attendance influences engagement and engagement determines whether or not an adolescent will stay in school. Attendance patterns were examined to get a sense of whether or not intervention services had an immediate effect. With the exception of the earliest years (2001-2002), teens who received some Public Health services generally experienced immediate improvements in school attendance in the year after intervention compared to those who did not receive Public Health services and particularly for those who began both MFIP and Public Health services during 2004-2005. The proportion of students with stable or improved attendance was mixed for those who received only Public Health services.

Attendance change patterns were also examined historically for the 2001-2002 and 2003-2004 groups to get a sense of whether participating in intervention services had an effect on the student's pattern of school engagement (i.e. attendance). The proportion of students with improved attendance was greatest for those who received both MFIP and Public Health. This was also the case for high school graduation rates, particularly for those who began receiving services during 2004-2005. This was also the second full year in which public health nurses were actively

responsible for reinforcing MFIP education and training requirements and sanctions. Given these results, it appears that the pairing of MFIP with Public Health services may be particularly effective in promoting educational completion and has relevance to the effects of Welfare Reform on teen parents. In some cases, some adolescent mothers on welfare are inappropriately diverted to work programs at the expense of ongoing education and high school completion and these diversions sometimes occur because teen mothers display poor school attendance or have already dropped out of school (Duffy and Levin-Epstein, 2002). Such women are encouraged to work instead of completing their education, guided by the notion that immediate employment will address short-term economic efficiency and by the importance of states to meet higher federal employment participation rates. The findings of the present study imply that education is an attainable goal for a significant number of teen parents, particularly when school attendance is part of the requirements of another important public program (MFIP) and becomes an important part of the goals set forth within the Public Health nurse-teen parent relationship.

Those who have been studying the relationship between teen parenthood and education have drawn a number of new conclusions. In a meta-analysis of the literature on the timing of leaving school and adolescent pregnancy, Zachry notes that “despite claims that pregnancy is the leading cause of teen mothers’ educational difficulties, researchers have begun critiquing this argument, positing instead that teen mothers’ decisions to leave school have more to do with school policy or their previous experiences in school than with their pregnancies” (2005). Others have found that once a teen becomes a parent, they are often more motivated to be a better student and to finish school to better provide for their child (Edin, 2006). In a small descriptive study of former high school seniors who used MFIP after leaving high school, women who did not graduate from high school were more likely to have left school before becoming pregnant (Larson, 2007, forthcoming). How young women feel about their educational prospects and how connected they feel to school are important areas that merit additional study. Recent qualitative work has shown that some teens are ambivalent about school and that this may precede pregnancy. Programs that fail to adequately make a clear policy connection between higher education and economic self-sufficiency may contribute to a devaluing of education in the eyes of not only adolescent mothers, but adolescents generally.

The focus of this study was on whether or not teen parents who participated in Public Health visiting home nursing case management services had differential outcomes compared to teen parents who only participated in MFIP, or MFIP and another program no longer in place (CET). The outcomes reviewed here satisfy the traditional health and well-being goals of the Public Health nursing model as well as support the achievement of the education attainment goals of Welfare Reform. Some early evaluations on the effects of traditional welfare programming on teens show very mixed results, reinforcing the notion that Welfare Reform policies are generally geared towards adults and do not take into account the unique needs of teens (Lerner & Noh, 2000; Duncan & Brooks-Gunn, 1997). Evaluations of three welfare-oriented programs aimed at teen parents (New Chance, a national program serving AFDC teen parents; The Teenage Parent Demonstration in Chicago; and Ohio’s Learning, Earning and Parenting program) revealed universally increased school attendance among participants, insignificant increases in high school graduation, and no effects on pregnancy rates or subsequent births (Reichman & McLanahan, 2001). Another more recent review of Welfare Reform effects on teens showed no positive outcomes, and even some negative outcomes that are particularly associated with teen and parental employment (Trzcinski & Brandell, 2002). That the results of the present study are

comparatively more positive is encouraging and warrants further study of effective interventions for teens.

The Children of Teen Parents

Data limitations prevented a full picture of the subsequent birth outcomes of all teen parents in this study, but the results from those who began intervention services during 2003-2004 in particular indicate that those who received Public Health services were, at least in the short term, less likely to have subsequent births than those who did not receive Public Health services. This finding deserves replication. While well over 90% of all teens did not have additional children after their intervention year, those who did had relatively healthy babies. Many of the negative medical outcomes that are associated with adolescent childbearing begin at birth, with the children of adolescent mothers 50% more likely to be born with low-birth weight (Maynard, 1996). As a result, the children of adolescent mothers often incur greater health care expenses than the children of mothers who delayed childbearing past the age of 20. The health complications of low birth weight are expensive. A report from the Robin Hood Foundation notes that the mothers who gave birth as adolescents spent over 20% more on health care for their children than mothers who had healthy-weight babies. A significant percentage of these costs are paid for by U.S. taxpayers, with an estimated \$1.5 billion spent each year on health coverage and costs for the children of adolescent mothers (Maynard, 1996). Teens who did give birth to additional children in this study had high APGAR scores and the rate for low birth weight was no different than the statewide average (6%) and lower than the Ramsey County average for mothers under age 20 (9%).

Children of teen parents are at increased risk for child abuse and neglect. Maynard (1996) found that the state of Illinois logged 109 reports of child abuse per 1,000 children born to adolescent mothers, compared to 50 reports of child abuse per 1,000 children born to mothers who first gave birth at age 20 or 21. Other states have similar trends, with a clear pattern of higher rates of child maltreatment and neglect found among families that began with an adolescent birth (Dukewich et al, 1996). Bolton (1990) found that between 36-51% of all children who suffer physical abuse were raised by adolescent mothers. Very few children in this study had child protection interaction and no significant patterns emerged. The final report counts were arrived at only after reducing numerous duplicate reports for each family for similar dates – something much more likely if the family had been served by Public Health. Public Health nursing staff fully expected these results and noted that this is a likely outcome of their practices. By the nature of the work that they do, visiting home nurses are in a position to view the family in a way that increases surveillance. Surveillance effects have been noted in the medical literature as well as child welfare studies and relate to the relationship between participants in services having an increased likelihood of additional scrutiny by other public systems. For instance, children whose families are connected to a public system such as Public Health nursing may be more likely to be reported to child welfare due to the greater scrutiny of the home visiting process than similar families who are not receiving home visiting services. Although surveillance bias is a frequent reason given for mixed results in studies where child protection outcomes are under consideration, there is evidence that this bias is only in effect during times of active surveillance. In particular, surveillance bias seems highest during times when participants are actively participating, in

contrast to follow-up or post-intervention periods (Chaffin & Bard, 2006). In these data, the slight differences in reporting proportions between Public Health and non-Public Health-served teens disappear almost entirely upon investigation with the proportion of teens with substantiated maltreatment findings within 1% difference among the three study groups. Future study should incorporate measures of participation intensity and the timing of active program connection when investigating evidence of post-intervention child maltreatment to help eliminate possible surveillance bias. In this study, families who were not connected to Public Health services were involved with economic assistance (another system associated with child protection surveillance) which may in part explain why rates of report were not significantly different between groups. It has also been noted that child protective services generally only become aware of a small proportion of actual maltreatment occurring in communities, with some estimates of actual abuse and neglect up to 18 times what comes to the attention of child protection agencies in the United States (Gallup, 1995). Visiting home nurse services continue to be seen as critical in identifying potential child maltreatment. Although researchers are cautioned against making judgments about the effectiveness of child maltreatment prevention efforts simply by evaluating substantiated maltreatment trends (because maltreatment rates are only part of the picture), these data are important and should not be abandoned (Olds et. al, 2005).

Recommendations

Research

The Need to Control for Confounding Factors

Human service evaluation is ideally conducted using random assignment and controls to isolate the specific effects of practices or programs and these conditions are challenging to create. In instances where circumstances do not support the ideal, rigorous quasi-experimental designs may suffice. Based on our review of the literature, future efforts at evaluating the impacts of public health nursing services should make an attempt to control for participant attributes that may have influence on results, such as whether or not teens participate voluntarily, where they live, whether or not they have certain support networks in place through family, friends, and church groups, the type of employment or training services received, their immigration status, their attitudes towards school, other programs they are participating in, and their goals for the future. One indication of the possible importance of other factors was provided by the group that was excluded from study, the “no MFIP, no Public Health services” group. This group was more Caucasian, was comprised of teens who became parents nearly a year earlier than the other groups, and their participation in the services they did receive (although they eventually dropped out of them) was voluntary. Their outcomes, although not included here, were quite different on some measures when compared to the other three groups. One strength of this research is that it included the majority of all teens who participated in services in a county during similar periods of time and findings should have a degree of generalizeability.

Measure Intensity, Nature and Duration of Services

The nature of the study data prevented an analysis of the duration of service connection (although a start date was identified), nor was there a clear indication of exactly how many hours of home nursing services were received by program recipients. These factors have been shown to be critical to a fair assessment of program impact. In particular, home visiting programs are recommended to comprise, at a minimum, at least two visits per month, regular visits that last more than a year, well-trained home visitors, low-turnover rates among home visitors, and clearly specified program goals (Brooks-Gunn, 2001). Future research should incorporate these measures along with a detailed accounting of exactly what services were received, including assessments, counseling, and referrals to other agencies (McNaughton, 2004).

Establish Clear Theory-to-practice Links and Cost-Effectiveness Measures

Those who have evaluated public health nursing programs have suggested that evaluations can improve their rigor if the theoretical underpinnings of practice linked to specific outcomes are thoroughly explicated. This is related to the debate about how many visits are sufficient for measurable program impact as well as the importance of clearly identifying which problems those services are intended to prevent or ameliorate. For example, although nurse-participant relationships are frequently cited as a critical component to the success of visiting home nurse services, few programs or evaluations of programs specify what steps are needed to facilitate such relationships, nor seldom are nurse-client relationship theoretical models used to develop services (McNaughton, 2004).

Cost-effectiveness measures are strongly encouraged in any assessment of intervention programming and particularly in the case of visiting home nurse services, which are considered

some of the more expensive services provided to disadvantaged families. A 2004 cost-effectiveness analysis by the Washington State Institute for Public Policy showed a net \$6,077 benefit to home visiting programs for at-risk mothers and children (Aos, et al., 2004). Examining the program components of the Ramsey County visiting home nurse model alongside the other programs evaluated could guide similar future cost-effectiveness analysis which could be of benefit to policy-makers.

Teen Fatherhood and Multiple Children

Matching the birth records of children born to the few male teen parents who were included in program data proved to be particularly challenging because the matching process primarily involved the use of names and birthdates. One interesting, although inconclusive finding was that some young men appeared to have fathered multiple children born to multiple women. In instances where the names of young men were very common, these multiple-child matches were disregarded as possible errors. In instances in which names were uncommon and social security numbers matched, there appeared to be evidence that the fathering of multiple children was a potential avenue for study of the teen parenthood phenomenon, particularly since the mothers of these multiple children tended to also be teens. Also called “multiple-partner fertility”, this is an emerging area of research related to welfare, child support, and child outcomes (Logan, 2006; Meyer, 2005). Since the vast majority of current teen parent programs are designed for teen mothers, identifying services to male teens may provide an effective, dual-pronged approach at reducing rates of teen pregnancy.

Multiple Service Receipt and Outcomes

Future research in Minnesota could explore the efficacy of teen parent programming more broadly, taking into account that current services (and funding streams) are fragmented and that teens receive different services from more than one source. The fact that the combination of MFIP and Public Health nursing services produced consistently positive results in this study for educational outcomes over a period of years deserves more consideration. Future research could explore the most effective combinations of services for teens, perhaps depending upon other assets they possess or areas of the state in which they reside.

Qualitative Data can help Answer Questions that Administrative Data Cannot

There will always be important aspects to teen decision-making and actions that cannot be illuminated by administrative data. As is illustrated by the work of Zachary, and Edin & Kefalas, the chain of events in a teen’s personal life and their perspectives on the value of education, parenthood and prospects for the future cannot be captured unless information is gathered in-person through individual interaction. To develop the best understanding of the lives of teens in poverty, perhaps the relationship-based nature of the visiting home nurse model can be utilized to gather more insights into the day-to-day decisions teen parents face and the gaps they see in the supportive services offered to them.

Practice and Policy

Education Data Coding Practices – Ways to improve Uniform Practice

Minnesota schools and districts should explore whether it is possible to encourage increased uniformity in recording attendance in schools. The variation in practice between schools currently

complicates the ability of researchers to have confidence in the reliability of the attendance data.

Explore ways to Identify Pregnant Teens, Particularly those who are often ineligible for services

If teens are not eligible for services because of immigration status, there is an increased likelihood of invisibility to other systems that could provide important assistance. Worse off are teens who are not only ineligible for MFIP, but who also drop out of high school upon becoming pregnant. Undocumented students who become pregnant are at increased risk for not being able to access needed services. If multiple community members, from educators to social service staff, to advocacy groups, could take a proactive role in identifying and connecting undocumented pregnant teens to services, there may be ways to meet the needs of both the unborn child and the student at risk of school failure. The composition of Study Group 4 (Public Health, no MFIP) may offer an opportunity to explore how the Hispanic teens served were able to effectively connect to and participate in services.

Explore Ways to Track Outcomes of Teens who Leave to Attend Non-Public Schools

Anecdotal information from advisory group members indicate that there may be a trend of movement of some teen parents and other poor and disadvantaged students to non-public schools such as private religious schools or charter schools. While a relatively small proportion of study teens made such a move over the study period (11 students), it is not possible to track the progress of these students using public school data. It would be helpful to conduct a review of particular populations of students enrolled in Minnesota's public schools and assess to what degree some sub-populations may be enrolling in non-public schools. If these students constitute a significant proportion of all students at risk of school failure, this changing landscape has implications for practice, policy, and research. It may also be important to study and quantify the degree to which these students are moving between public schools.

Funding and Service Consolidation

Teen parents are typically served by multiple individuals who represent multiple agencies. Programs are often separately funded and may have requirements and paperwork rules that are duplicative or even contradictory in relation to other programs. In addition, the amount and availability of services is likely to vary by county or school district. Despite the critical attention teen parenthood has received in the scholarly literature, the service delivery system that provides help to this population has received little concentrated policy or funding attention. If, as the literature indicates and as the findings of this preliminary study suggests, the relationship between a teen and a service provider is one of the more critical components to successful programming, it seems unlikely that a teen can form a meaningful relationship with multiple service providers. Those who have evaluated welfare-to-work programs aimed at teens recommend that states thinking about incorporating other teen-specific components (such as parenting) be prepared to invest in these strategies because they are expensive (Reichman & McLanahan, 2001).

Invest in the Early Childhood Infrastructure of Minnesota for all Young Children and Especially the Children of Teen Parents

Repeatedly, research shows that investing in young children has long-term pay-offs and there are a number of initiatives under way in Minnesota to explore the best ways to cultivate the school readiness of young children in poverty. Given the persistent link between poverty and

teen child-bearing and poor outcomes for the children of teen parents, this population provides the perfect opportunity to address multiple family needs and to improve long-term child outcomes. Such a strategy requires investment, but while most home visiting programs do not necessarily alter children's developmental trajectories, high quality early education programs do, particularly if children attend these programs for several years (Brooks-Gunn, 2001). A multi-pronged approach that combines intensive home-based services for teen parents along with intensive, high quality early care for children may have particularly positive long-term benefits.

Consider Allowing Baccalaureate Education Activities for MFIP Eligibility

Given the much greater lifetime earnings pay-offs to individuals who have at least some college, and particularly a four-year degree, it seems wise to reconsider the long-term poverty amelioration potential of allowing teen parents on MFIP to continue onto technical or four-year college as an allowable activity. A high school diploma no longer necessarily has the strength to lift a young parent out of poverty – something that seems essential to the future well-being of the next generation and perhaps one of the causal factors behind teen parenthood in the first place.

Appendix A

Figure A1. Study Groupings for Teen Parent Participants

STUDY GROUPS (Detail)				
Public Health Home Visiting Status (Four Groups) 4+ visits = PH Services <3 visits = No PH Services	Public Health Status and Year		Program and Mandatory/ Voluntary Participation	
	N	N		N
1. MFIP, no Public Health	486	<ul style="list-style-type: none"> • < 4 PH Visits 0102 4 • No PH 0102 175 • < 4 PH Visits 0304 60 • No PH Services 0304 79 • < 4 PH Visits 0405 51 • No PH Services 0405 117 	<ul style="list-style-type: none"> • Mandatory CET 175 • Mandatory CET plus Vol PH 4 • Mandatory PH 0304 27 • Voluntary PH 0304 33 • MFIP Only 0304 79 • Mandatory PH 0405 51 • MFIP Only 0405 117 	
2. No MFIP, no Public Health	110	<ul style="list-style-type: none"> • < 4 PH Visits 0102 16 • < 4 PH Visits 0304 23 • < 4 PH Visits 0405 71 	<ul style="list-style-type: none"> • Voluntary PH during CET period 19 • Voluntary PH 0304 23 • Voluntary PH 0405 71 	
3. MFIP and Public Health	412	<ul style="list-style-type: none"> • PH Services 0102 101 • No PH Services 0102 19 • PH Services 0304 210 • PH Services 0405 82 	<ul style="list-style-type: none"> • Mandatory CET 16 • Mandatory CET plus Voluntary PH 87 • Voluntary PH during CET period 14 • Mandatory PH 0304 181 • Voluntary PH 0304 29 • Mandatory PH in 0405 82 	
4. Public Health, no MFIP	420	<ul style="list-style-type: none"> • PH Services 0102 187 • PH Services 0304 150 • PH Services 0405 83 	<ul style="list-style-type: none"> • Voluntary PH during CET period 187 • Voluntary PH 0304 150 • Voluntary PH in 0405 83 	
Total: 1,428		1,428		1,428

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