

SCIENTIFIC ARTICLE

Teen Mothers, Unintended Pregnancies, and Costs Across Delaware

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Abstract

The present study used data from several sources to 1) present information on mothers and births in a single state (Delaware); 2) present cost data to estimate health-related birth real costs; and 3) use the data to estimate the costs and impact on mothers, health care providers, and taxpayers. In addition, this study explicitly examined costs of births through the lens of unplanned/unintended teen and young adult births. Concomitantly, the medical cost of these pregnancies for most of these young mothers who had not wanted to be pregnant at the time, was paid for through the state's Medicaid program. The percentage of Medicaid funded births was much higher for young mothers than for older mothers. Ultimately, it was estimated that young teen (age 17 and under) births cost about \$4.0 million each year, older teens (18-20) births \$14.0 million, and young adults (21-24) over \$26 million. The State funded almost 75 percent of the health care costs of young teen pregnancy prenatal care, deliveries, and newborn care, through Medicaid. And over 75 percent of these Medicaid costs are for births that were unintended at the time. The cost of unintended teen and young adult births funded through Medicaid in Delaware was approximately \$25 million annually.

Key Words: teen pregnancy, unintended pregnancy, pregnancy costs, Medicaid

INTRODUCTION

Unintended pregnancy is an important public health issue in the United States, where half of all pregnancies are unplanned.¹ This rate is higher than that of most other developed western countries, and the highest rates are seen among teens and young

adults. Historically, it has been the availability of effective methods of contraception that has successfully reduced fertility rates.² More recently a new emphasis on reduction of unplanned pregnancies has been taken by the Centers for Disease Control and Prevention (CDC) and advocacy organizations as a strategy to reduce adverse birth outcomes.³ However, there is little evidence yet to support the effectiveness of this strategy.⁴

Several studies have investigated the link between unplanned pregnancies and access to contraception. For example, two studies addressed the need for increased contraception access for minority populations, arguing that those populations are at the most risk for unintended pregnancies. One suggested that increasing access to Medicaid for underprivileged populations may increase the availability of contraception, while the other argued that women in co-habiting relationships should also be a focus for intervention as they

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are more likely to be regularly sexually active yet not desiring pregnancy.^{1,5} Still others focused on the cost of contraception care when compared to the cost of unintended pregnancies and suggested that paying for accessible contraception is considerably less expensive than pregnancy related costs for unplanned pregnancies.⁶ Another study compared the costs of accessible contraception, unplanned pregnancies, and sexually transmitted diseases within the private and public sectors for adolescents, concluding that the use of contraceptives by teenagers decreases the number of sexually transmitted diseases and also reduces the health care dollars spent on unintended pregnancies.⁷

In addition to research on the link between unintended teen pregnancies and contraception, several studies have investigated the true costs of maternity care and newborn care in an effort to show the amount of health care dollars being spent. The March of Dimes reports the total provider cost of maternity care, including nine months of pregnancy and three months post-delivery, at a median cost of \$12,843 for a vaginal delivery and a median cost of \$19,329 for cesarean delivery. The March of Dimes data, however, only report costs for privately insured live births excluding any Medicaid funded or uninsured births.⁸ A study using data from the National Survey of Family Growth estimates there are 1.4 million unintended pregnancies resulting in live births in the U.S. each year, resulting in pregnancy care costs of \$2,877 per birth or approximately \$3.9 billion total. These estimates, however, make no distinctions between age of mother, insurance type, or health of the newborn and assume the average cost of an unintended birth is equal to that of a planned pregnancy.⁶

Extant literature has shown the extent of unintended pregnancy among adolescents and teenagers with associated suggestions for harm reduction, such as greater access to contraception and increased availability of insurance or Medicaid support. Other studies have shown the medical care costs needed to support pregnancies and maternity care costs. However, few studies have considered the two together in an effort to show the true maternity and newborn care costs associated with actual numbers of teen and young adult pregnancies and, particularly, the cost of unintended pregnancies.

The present study seeks to provide a picture of the incidence of teen and young adult births across

a single state, including a cost analysis of prenatal, delivery, and newborn care. Using the data from the CDC's Pregnancy Risk Assessment Monitoring System (PRAMS), vital statistics data, and the Health Care Cost and Utilization Project (HCUP), this study estimates the total maternity care costs by insurance type within the context of unintended pregnancies in order to evaluate the potential cost savings for state Medicaid programs if unplanned pregnancies are targeted for intervention.

METHODS

Three sources of data for 2008 are combined to conduct these analyses: 1) demographic characteristics of the birth cohort were obtained from data from the National Center for Health Statistics; 2) information about pregnancy intentions was derived from the Delaware PRAMS; and 3) cost data were derived from HCUP. CDC PRAMS data were provided by the Delaware Office of Vital Statistics through a request for data application. The use of these data for purposes of this study was approved by the Christiana Care Health System Institutional Review Board.

The data used for prevalence estimates include all live births to Delaware residents in 2008 (n = 12,016). The teen birth rate was defined as the number of live births per 1,000 girls between the ages of 15 and 19 during the year, overall and by county. The number of teen births allows consideration of the absolute number of individuals affected in an area, which can be difficult to grasp when examining only rates. Because these data are derived from vital statistics records of live-births provided by the National Center for Health Statistics (NCHS), this study focuses only on those pregnancies resulting in a live-birth.

Data from PRAMS are used to investigate pregnancy intention by age group. PRAMS is a CDC surveillance project that provides population based data that are used to study maternal experiences and behaviors before, during, and directly after pregnancy. PRAMS data have recently been used to study topics such as contraceptive use among teens resulting in unintended pregnancies, the prevalence of self-reported post-partum depressive symptoms, influenza vaccination coverage among pregnant women, as well as many others.^{9,10}

The PRAMS survey is based on a sample of Delaware mothers who had a live birth two to six months prior to the 2008 survey (n = 1,238). Because some subpopulations were over- or under-sampled, such as underweight newborns being over-sampled, the data were weighted to ensure representativeness. Some of the statistics presented here may differ from those in other published reports. The Delaware PRAMS Analysis 2008, for example, presents different numbers because non-responses for questions are assumed to be a negative response in that analysis. Like the statistics presented directly from the CDC, non-responses (as well as “don’t know” responses for phone interviews) are treated as non-valid data and are excluded pair-wise in the analyses presented here. For the purposes of this study, “unintended” births were defined as pregnancies that have been reported as unwanted (pregnancy occurred when no children or no additional children were desired) or mistimed (pregnancy occurred earlier than desired).¹¹

Cost estimates applied to births were based on those available from the Health Care Cost and Utilization Project (HCUP) cost estimates from the following categories: cesarean section with complications; cesarean section without complications; vaginal delivery with complicating diagnoses; vaginal delivery without complicating diagnoses; extreme immaturity or respiratory distress syndrome, neonate; prematurity with major problems; prematurity without major problems; full term neonate with major problems; and normal newborn. The national averages for cost were used. Because the HCUP and Delaware data are not always coded in a fully compatible manner, some adjustments were made. First, distinctions between complicated and non-complicated births were not available in these Delaware data. Thus, when the HCUP estimates were divided between complicated and non-complicated, the estimates used for this study were based on an average of the two HCUP estimates, weighted based on the proportion of cases that were complicated according to HCUP. This resulted in general estimate for births of a specific kind regardless of complications. Second, because the HCUP estimates are age-specific or payer-specific, while Delaware data are age-specific and payer-specific, separate cost estimates were used for each distinction and then averaged within the Delaware data. In cases where payer type or delivery method was unknown, a weighted average was used

to represent the overall average cost.

Regardless of other factors, all cases in this study were assigned an average prenatal cost of \$2,000. This estimate is based on a study by the Kaiser Family Foundation that reported approximately \$2,000 as the average cost for prenatal care.¹²

In estimating costs for newborns, two variables were used to determine the newborn’s status: the birthweight and gestational age. Specifically, those with a gestational age <32 completed weeks were considered very premature; those between 32 and 36 weeks, premature; and those 37+ weeks, full-term. For weight, the categories used were < 1499 grams, 1500 - 2499 grams, and 2500+ grams. In cases where these two indicators did not result in the same category, the more severe category is used (e.g., if a newborn scored as premature by age and full term by weight, the category of premature is used).

RESULTS

Characteristics of the 2008-2009 Delaware Birth Cohort

Of all live births, 3.3 percent were by mothers under the age of 18; 32.1 percent were age 18-24; 50.8 percent were age 25-34; 13.6 percent were age 35-44; and .1 percent (n = 18) were age 45 or older. Forty-eight percent of births were to unmarried mothers. Though a large proportion of mothers (45.6 percent) used private medical insurance, the most common method of payment (47.8 percent) was Medicaid. About two-third of mothers (66.4 percent) had a vaginal delivery.

Pregnancy Intention

Only 12 percent of early teens (17 or younger) said that they wanted to be pregnant at the time they conceived the current pregnancy. By their late teens (18-20), this increased to 27 percent. In comparison, 37 percent of mothers in their early twenties (21-24) wanted to become pregnant, while 65 percent of young adults (25-34) and 69 percent of older mothers (35-44) did. Younger mothers were significantly more likely to report they had not wanted to get pregnant at this time.

Among those who did not want to become pregnant and were not using contraceptives, early-teen (<17) mothers commonly reported two factors: thinking that they could not become pregnant (46 percent)

Reasons for Not Using Birth Control Among Women Not Trying to Conceive, Delaware PRAMS 2008

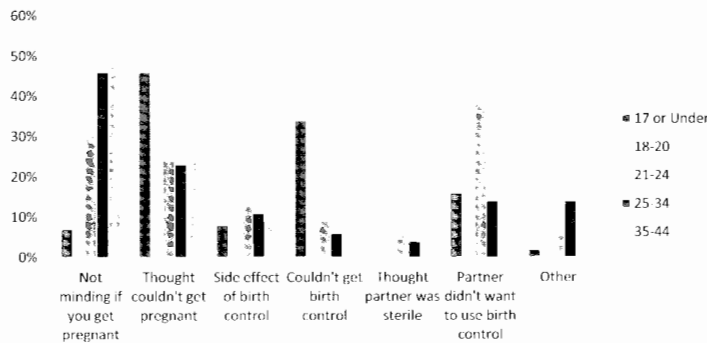


Figure 1. Reasons reported for not using contraception among women not trying to conceive. Includes only mothers not using birth control and who did not want to become pregnant at the time. Data source: Delaware PRAMS 2008.

and not being able to get birth control (34 percent). Among late-teen (18-20) mothers, thinking that they could not become pregnant remained the most common response (32 percent), but not having access to birth control dropped substantially (6 percent). Instead, increases were seen for other responses, such as not minding if they became pregnant (26 percent) and partners unwilling to use birth control (18 percent). And among the young adult mothers (21-24), the modal category was partner not wanting to use birth control. The full responses for all age categories are displayed in Figure 1.

Medical Cost of Perinatal Care

Labor and Delivery Cost:

The estimated annual costs of deliveries in Delaware are presented in Table 1. These costs are calculated from HCUP and are presented by each unique, observed combination of mother's age, type of insurance, and method of delivery. The individual costs varied little by age. It is also worth noting that the Medicaid, private insurance, and self-pay charges were quite comparable across insurance type. As expected, costs varied substantially by method of delivery. Vaginal deliveries with Medicaid, private insurance or self-pay for all age

Table 1. Costs for delivery by mother's age, insurance, and method of delivery.

Age	Insurance Type	Method of Delivery	Number	Average Cost	Total Cost
17 or Younger	Medicaid	Vaginal	246	\$3,067	\$754,512
		C-Section	68	\$5,490	\$373,297
		Unknown	2	\$4,384	\$8,768
	Private Insure	Vaginal	57	\$3,100	\$176,709
		C-Section	11	\$5,502	\$60,520
	Self-Pay	Vaginal	1	\$2,967	\$2,967
		C-Section	1	\$5,279	\$5,279
Other	Vaginal	2	\$3,036	\$6,072	
	Unknown	Vaginal	3	\$3,081	\$9,243
18 to 44	Medicaid	Vaginal	3,653	\$2,991	\$10,927,511
		C-Section	1,759	\$5,319	\$9,355,716
		Unknown	10	\$4,384	\$43,841
	Private Insure	Vaginal	3,465	\$3,026	\$10,485,506
		C-Section	1,913	\$5,331	\$10,198,930
		Unknown	105	\$4,384	\$65,761
		Self-Pay	Vaginal	136	\$2,891
	C-Section	C-Section	26	\$5,110	\$132,857
		Other	Vaginal	209	\$2,960
	C-Section	C-Section	73	\$5,315	\$388,024
		Unknown	1	\$4,384	\$4,384
		Unknown	Vaginal	197	\$3,006
C-Section	C-Section	109	\$5,324	\$580,295	
	Unknown	39	\$4,384	\$170,978	
	45 or Older	Medicaid	Vaginal	2	\$3,212
Private Insure			Vaginal	8	\$3,242
C-Section		C-Section	8	\$6,169	\$49,348

groups were about \$3,000; while cesarean section births averaged around \$5,500.

The total costs for delivery are also presented in the far left column of Table 1. These values represent the estimated cost when accounting for the total number of individuals who met the unique, observed combination of mother's age, type of insurance, and method of delivery.

Newborn Care Cost: The estimated annual costs from HCUP of newborn care, by each unique, observed combination of mother's age, type of insurance, and length of pregnancy, are presented in Table 2. The individual costs varied little by age or insurance type, but did vary dramatically by whether the newborn is full term or premature and the severity of prematurity. A young teen (<17) mother using Medicaid, for example, would average \$1,234 in newborn care costs for a full term baby. The same mother with a very premature baby would average \$55,903 in newborn care costs. In Delaware in 2008, there were 246 full term newborns, 57 premature newborns, and 13 very premature newborns covered by Medicaid. Despite the descending frequency by prematurity severity, the total spending for newborn care actually increases by gestational age group, and more funds were spent on

the 13 very premature newborns than the entire 246 full term newborns.

It can be inferred from Tables 2 and 3 that a high percentage of Delaware births are paid for with Medicaid funding, and there is some suggestion that the percentage is particularly high for younger mothers. This relationship is presented more clearly and by age of the mother in years in the graph shown in Figure 2. The percentage of Medicaid paid births is very high for young mothers, but begins declining quickly after age 20, though the percentage of births paid for by Medicaid remains above 50 percent until about age 26. Also shown in Figure 2 is the decline

Table 2. Costs for newborn care by mothers' age, insurance, and length of pregnancy.

Age	Insurance Type	Method of Delivery	Number	Average Cost	Total Cost
17 or Younger	Medicaid	Very Premature	13	\$55,903	\$726,739
		Premature	57	\$9,763	\$556,501
		Full Term	246	\$1,234	\$303,552
	Private Insure	Very Premature	3	\$49,759	\$149,277
		Premature	10	\$9,594	\$95,940
		Full Term	55	\$1,220	\$67,092
	Self-Pay	Premature	1	\$6,279	\$6,279
		Full Term	1	\$981	\$981
	Other	Full Term	2	\$1,199	\$2,397
			3	\$1,217	\$3,651
18 to 44	Medicaid	Very Premature	174	\$55,903	\$9,727,122
		Premature	802	\$9,763	\$7,830,070
		Full Term	4,446	\$1,234	\$5,486,142
	Private Insure	Very Premature	124	\$49,759	\$6,170,116
		Premature	565	\$9,594	\$5,420,621
		Full Term	4,704	\$1,220	\$5,738,174
	Self-Pay	Very Premature	3	\$25,867	\$77,601
		Premature	14	\$6,279	\$87,912
		Full Term	145	\$981	\$142,173
	Other	Very Premature	3	\$47,355	\$142,065
		Premature	27	\$9,313	\$251,463
		Full Term	253	\$1,199	\$303,221
	Unknown	Very Premature	13	\$51,972	\$675,636
		Premature	42	\$9,528	\$400,184
		Full Term	290	\$1,217	\$352,930
45 or Older	Medicaid	Full Term	2	\$1,234	\$2,468
	Private Insure	Very Premature	1	\$49,759	\$49,759
		Premature	4	\$9,594	\$38,376
		Full Term	11	\$1,220	\$13,418

by age of mother in the percentage of pregnancies that were unintended, as well as the expected increase in unintended for mothers in their 40s and older. Finally there was a decline with age of mother in the percentage of births that were both Medicaid funded and unintended.

Table 3 puts all of the information together, showing by age group: total costs, Medicaid costs, unintended pregnancy costs, and costs for pregnancies that are both unintended and paid for by Medicaid. Total estimated costs, including prenatal care for young teen pregnancies (<17) were over \$4 million per year, with about 81 percent covered by Medicaid. The percentage of Medicaid births declines slightly for mothers 18-20 (to 78 percent) and then faster for those 21-24 (70 percent). Total costs of course rise with many more births among older mothers, but the percentage of Medicaid births drops precipitously, to 36 percent for the 25-34 year-olds and to 23 percent for mothers aged 35-44, and to just 11 percent for the small number of mothers 45 or older.

Cost of unintended births: To estimate the cost of unintended births, a combination of data sources needed to be used. The statistics in four leftmost columns in Table 3 are a combination of findings from the HCUP cost estimates, Delaware live birth data, and data from PRAMS. Specifically, the costs and proportion using Medicaid are based on data from live births, while the percent unwanted and the percent unintended and using Medicaid are based on estimates from the PRAMS data. Using these procedures, it is estimated that more than two-thirds of the costs of unintended pregnancies is borne by Medicaid

(over \$38 million) and 65 percent of this Medicaid costs are for those unintended pregnancies of mothers 24 and younger.

DISCUSSION

This study focused on pregnancy intention as a factor for intervention. For the purposes of this research, “unintended” births were defined as pregnancies that have been reported as unwanted (pregnancy occurred when no children or no additional children were desired) or mistimed (pregnancy occurred earlier than desired).¹¹ Not all teen pregnancies are by any means unintended. For teen pregnancies that were unintended, however, there was a missed opportunity for education and/or intervention. Among the important findings in this analysis are that nearly \$3 million in costs are

Medicaid Coverage by Mothers' Ages at Delivery, Delaware 2008

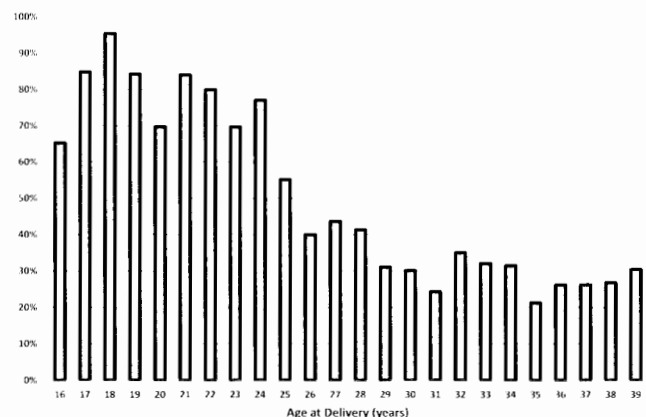


Figure 2. Medicaid coverage for the pregnancy by maternal age at delivery. Ages 14, 15, and 40+ could not be included due to insufficient sample sizes (< 10). Data source: Delaware Office of Vital Statistics, 2008.

Table 3. Costs by age, insurance type and whether pregnancy was planned.

Age	Number	Total Costs	Percent Medicaid	Medicaid Cost	Percent Unintended	Unintended Cost	Percent Unintended & Medicaid	Total Unintended & Medicaid
≥17	391	\$4,091,775	81%	\$3,314,338	88%	\$3,600,762	72%	\$2,946,078
18-20	1463	\$14,018,994	78%	\$10,934,815	73%	\$10,233,866	59%	\$8,271,206
21-24	2396	\$26,463,273	70%	\$18,524,291	63%	\$16,671,862	52%	\$13,760,902
25-34	6108	\$56,281,014	36%	\$20,261,165	35%	\$19,698,355	20%	\$11,256,203
35-44	1638	\$16,294,170	23%	\$3,747,659	31%	\$5,051,193	14%	\$2,281,184
≤45	18	\$221,731	11%	\$24,390	50%	\$110,865	0%	\$0
TOTAL	12,014	\$117,370,857		\$56,806,658		\$55,366,903		\$38,515,573

covered by Medicaid for unintended pregnancies among young teens, and an additional \$8.2 million among late-teens, in this small state.

Our estimates suggest a total cost of approximately \$117 million per year for pregnancies in the state of Delaware. Of this cost, nearly half (\$57 million) was funded through Medicaid, with two-thirds of that going toward unintended pregnancies. This suggests that investment in strategies to reduce unwanted pregnancies could save significant Medicaid expenses from the \$39 million cost for unintended and Medicaid funded pregnancies already occurring in this one state.

The data from PRAMS provides some insights into factors that might be addressed to reduce the incidence of unplanned pregnancies. Many of the mothers responded that they believed that they were not able to get pregnant; suggesting that better education to inform them of the possibility would be useful, particularly for those of middle and high school age. A partner refusing to use birth control also was a prominent factor, indicating a need for educational interventions, this time perhaps focused on the young adults. Finally, teen mothers often said they did not have access to birth control, suggesting that greater availability of contraceptives may reduce unwanted teenage pregnancies, particularly again among school age youth.

As a final consideration, it must be noted that the costs presented in this report are only the perinatal healthcare costs of pregnancy. Other financial costs and societal costs (e.g., missed school, missed work, financial hardship) are not included in this estimate. Further, these estimates are based only in pregnancies that ended in a live birth. Other outcomes may result in other costs outside the scope of this report.

The potential benefits of relatively low cost programming to improve education and increase access to contraception could be substantial. To say nothing of the potential life choice and career benefits to the young mother herself (and concomitantly her male partner), successful efforts to reduce unintended pregnancies among teens and young adults will greatly reduce the health care costs for these pregnancies largely born directly by public dollars. Based on the present study's estimates, in one year in a small state, over \$11 million is charged to Medicaid for unintended pregnancies to mothers aged 20 years or younger. Nearly \$14 million more are Medicaid cost for unintended pregnancies in

those 21-24. And these are the direct costs. Reducing those unintended pregnancies born by private insurance would have an indirect benefit on all by reducing health care insurance costs.

It is important to note the high incidence of unintended pregnancies reported by young adult mothers, aged 21-24. The economic and social costs of teen pregnancies are much in the public eye, but there are many more unintended pregnancies among those 21-24 than among those 20 and under. The total costs to Medicaid and private insurers in this age group were higher than for teen mothers. Moreover, as noted earlier, young adult mothers may actually receive less social support than mothers under 18 who are more likely to have support from parents or even grandparents living in the household.

The present study has limitations. First, the data used in this study are specific to the state of Delaware. In contrast, national averages from the HCUP data were used to estimate costs of pregnancies, as state specific costs were unavailable. Depending on whether medical costs are more or less expensive in Delaware, these estimates may be higher or lower than those actually incurred. Second, to match cost estimates to prevalence statistics some adjustments had to be made. For example, complicated and non-complicated births were not distinguishable in the Delaware data, so an averaged general cost had to be used from national estimates. Provided that Delaware is not biased to have a larger or smaller proportion of certain types of pregnancies, this approach should roughly approximate the average costs in Delaware. Additionally, Delaware PRAMS data are self-reported, which may introduce measurement error given that mothers were asked to recall pregnancy-related details retrospectively. Finally, our analysis examined only live births, and did not include those pregnancies resulting in miscarriage or had been terminated for medical or other reasons. Therefore these estimates might under-estimate the true costs.

In sum, unintended pregnancies among teens and young adults represent a social concern that has immediate real costs to both these unintended parents and to the taxpayers and insurance participants who are paying for the health care costs. These immediate health care costs are estimated here, but they represent only a fraction of the long term social and economic costs to these children and their families and to so-

ciety in terms of ongoing social service, health care costs, and foregone economic benefits from reduced unemployment. Since these costs are preventable and not even desired by the mothers who had not wanted to be pregnant at the time, prevention efforts have the potential to reap substantial societal benefits.

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