Center on
Children and Families
at BROOKINGS

BROOKINGS WORKING PAPER

THE PUBLIC COST OF PREGNANCY

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March 2011

* Email: emonea@brookings.edu. Thanks to Isabel Sawhill, Katherine Suellentrop, Larry Finer, Jennifer Frost, Julia Isaacs, and Liz Ananat for their helpful comments and suggestions. We are also grateful to the William and Flora Hewlett Foundation for their generous support of this project.

This technical report documents some of the key assumptions underlying analyses described in Thomas (2010b), which presents results from a series of benefit-cost simulations of various policies designed to prevent unintended pregnancy. These simulations measure the benefits of a given policy in terms of the pregnancies that would have occurred absent the policy in question but that are assumed to have been prevented as a result of its implementation. More specifically, such benefits are measured as a function of the cost savings generated by the prevention of unintended pregnancies. This paper describes the way in which those cost savings were estimated. The contents of this paper were also used to develop findings reported in Monea and Thomas (2011), which presents estimates of total taxpayer spending on unintended pregnancy and of the amount that taxpayers would save if all unintended pregnancies were prevented. However, the discussion that follows focuses primarily on the development of estimates for the purpose of parameterizing the benefit-cost simulations.

Assume that a policy averts 100 births, 100 abortions, and 100 fetal losses. Assume further that the estimated costs for births, fetal losses, and abortions are $1,000, $500, and $100, respectively. The policy could therefore be assumed to have generated ((100*$1,000) + (100*$500) + (100*$100)) = $1,600,000 in cost savings, which is to say that it could be assumed to have produced an equivalent amount of monetary benefit.[1] Our first task is therefore to define the specific pregnancy costs for which we do and do not account. For both theoretical and practical reasons, we limit the scope of this exercise to the measurement of the direct taxpayer costs associated with various pregnancy outcomes. Thus, we estimate a portion of the change in the total tax burden that is associated with the occurrence (prevention) of births, fetal losses, and abortions.[2]

[1] These numbers are used for illustrative purposes only. We present more realistic cost estimates for each pregnancy outcome in subsequent sections of this report.

[2] As is explained in a later section, we ultimately opt not to measure the cost of abortion at all, since: a) we choose to focus specifically on taxpayer costs associated with each outcome; b) publicly-subsidized abortions are relatively rare and therefore constitute only a very small cost to taxpayers relative to the cost of births, in particular; and c) logistical considerations enumerated below would make it difficult for us realistically to model eligibility for publicly-subsidized abortion services at an individual level.

There are a number of potential pregnancy costs for which we do not account. For example, evidence suggests that: a) a child whose birth is the result of an unintended pregnancy may face more negative outcomes as a consequence of the unintendedness of his/her conception; b) a woman may herself suffer diminished economic prospects over the course of her lifetime if she becomes pregnant unintentionally; and c) unintended pregnancies might pose a cost for society more broadly because, for instance, children who are conceived unintentionally may be relatively more likely engage in criminal behavior as they reach adulthood.[3] However, the extent of such costs is likely to be quite difficult to pinpoint. Moreover, the costs of the policies analyzed in Thomas (2010b) are measured in terms of the number of tax dollars that would be required to implement and sustain them. We therefore choose also to measure these policies' benefits in terms of their direct effects on taxpayers.

We consider four potential public costs for a given pregnancy:

- *The cost of publicly-subsidized prenatal care.* This cost is applied to some but not all publicly-subsidized pregnancies. Consider, for example, a fetal loss that would have resulted in an abortion rather than a birth if the fetal loss had not occurred. We do not estimate prenatal-care costs for such a pregnancy.
- *The publicly-subsidized medical cost of the outcome itself* (i.e., the cost of a delivery for a live birth or of medical treatment for a fetal loss).
- *The cost of publicly-subsidized postpartum medical care.* This category of costs applies only to publicly-subsidized births, and it accounts for near-term medical costs that are incurred on behalf of the mother in the wake of a birth.
- *The cost of providing publicly-subsidized benefits and services for a child.* This category of costs also applies only to births, and, for reasons described below, we focus on the cost of publicly-provided medical care for income-eligible infants under the age of one and on the cost of

[3] On the relationship between unintended pregnancy and child outcomes, see for example Ananat et al. (2009), David (2006), Gruber et al. (1999), Korenman et al. (2001), Logan et al. (2007), Miller (2009), and Myhrman et al. (1995). On the relationship between unintended childbearing and child outcomes, see for example Ananat and Hungerman (2008), Bailey (2006), Fletcher and Wolfe (2009), Goldin and Katz (2002), and Logan et al. (2007). And, on the relationship between unintended pregnancy and crime rates, see Donohue and Levitt (2001).

numerous other government benefits that are provided to eligible children under the age of five.

We would emphasize that we use the word "cost" here to refer to the cost of the relevant bundle of benefits and services *to the public*. In a subsequent section, for example, we note that the government is estimated to pay for a little more than 90 percent of the hospital charge for a publicly-subsidized delivery. In estimating the public cost of such births, we therefore focus only on that portion of the charge that is paid for using government funds. We also account for several other complicating factors in developing the parameters that are incorporated into our policy simulations. For instance, we account for the fact that not all pregnancies are eligible to be publicly subsidized: for reasons that are discussed later in this report, all of the benefits and services incorporated into our analysis are means-tested, which is to say that they are typically provided only to women whose incomes are below some threshold. We also account for the fact that not all eligible women and children take up the benefits and services that are available to them. And finally, we account for the fact that some prevented pregnancies are merely delayed, while others are averted altogether. This distinction has important implications for the amount of public savings that are produced by pregnancy-prevention programs.

We account for each of these considerations in different ways. We model eligibility for government benefits and services using a procedure that is explained in one of the last sections of the report. We simulate take-up of these programs by imputing to each eligible pregnancy an estimated benefit level that is expressed as an average calculated across all members of the eligible population; the higher the take-up rate, the larger the average benefit per member of the eligible population. And we model the distinction between delayed and altogether-averted pregnancies by discounting our estimates to reflect the fact that the prevention of pregnancies in the former category saves the government less money than does the prevention of pregnancies in the latter category. In the discussion that follows, we therefore typically present three different estimates for a given category of costs. First, we estimate each cost as averaged across all publicly-subsidized pregnancies. Second, we present modified cost estimates that are expressed as averages calculated across all members of the eligible population. And third, we present estimates of the average public cost savings

associated with the prevention of a pregnancy that account for the fact that some prevented pregnancies are merely delayed, while others are averted altogether. We begin by discussing our estimates of the costs to the public associated with the subsidization of live births and of the public savings that are produced by the prevention of unintended births. We then take up our treatment of fetal losses and abortions, respectively, in subsequent sections.

The Public Cost of Live Births

As is suggested by the discussion above, we estimate, in broad terms, two different sets of birth-related public costs. The first set of costs is a function of government spending on prenatal care, deliveries, and postpartum care. The second set of costs is driven by government spending on a range of benefits and services provided to infants and young children after birth. We consider the costs of two bundles of such benefits:

- We estimate the cost of a year's worth of publicly-subsidized medical care for a newborn, income-eligible infant (hereafter, "infant medical care").
- We estimate the cost per child for a broader package of government benefits and services (including medical care) that are provided to income-eligible children from birth until their fifth birthdays (hereafter, "children's benefits").

As is discussed in more detail below, we selected the time windows over which to measure these various costs based both on the practical consideration of data availability and on the practices of other researchers who have done related work in this area.

Virtually all public spending on prenatal care, deliveries, and postpartum care is disbursed on a means-tested basis by state-administered Medicaid programs under the so-called "pregnancy-care" provision. Similarly, publicly-subsidized infant medical care is provided almost exclusively via Medicaid and means-tested State Children's Health Insurance Programs (SCHIP). (Hereafter, we use the term "Medicaid-subsidized infant medical care" as shorthand to refer to care that is subsidized either by SCHIP-funded programs or by non-SCHIP Medicaid programs.) And, given that we focus on public spending on children who are under the age of five – i.e., before they typically enter the public-education system – most of the programs included under our "children's benefits" umbrella are also means tested.[4] For purposes of simplicity, we therefore consider only means-tested public spending in this analysis. As is discussed above, we account for program participation by calculating public-spending estimates that are averaged over all members of the population whom we assume

[4] The dependent exemption and the nonrefundable portion of the child tax credit represent notable exceptions to this rule. However, for reasons that are addressed briefly here and in more detail later in this report, we do not include such nonrefundable tax expenditures on children in our analysis. We present estimates in a subsequent section suggesting that, even after excluding spending on such programs from consideration, our analysis still captures about 70 percent of all public spending on pregnant women and children under the age of five.

to be eligible to participate in the programs that are incorporated into our analysis. Thus, although we describe our specific methods for imputing eligibility in a later section, it is necessary that we explain these programs' eligibility *criteria* here in order to provide the appropriate context for the discussion in the next several subsections of our estimates of average public spending per member of the eligible population.

States' income-eligibility thresholds for Medicaid pregnancy care and for Medicaid-subsidized infant medical care are expressed as a percentage of the federal poverty line, and the average eligibility threshold for these benefits across all states is about 200 percent of poverty (henceforth, when we refer to "the poverty line" or "the poverty threshold," the reader should assume that we are referring to the *federal* threshold, in particular).[5] Eligibility for the children's programs whose costs we consider is also typically limited to individuals who are at or below this threshold. Thus, we account here for public spending only on benefits that are taken up by women and children who are below 200 percent of poverty. As is discussed in a later subsection, we estimate that, even after limiting our analysis to public spending specifically on means-tested programs – and even after excluding from consideration all spending by these programs that goes to children who are over 200 percent of the poverty line – we capture about 70 percent of total public spending at the federal, state, and local levels on prenatal care, deliveries, postpartum care, infant medical care, and children's programs. Were we to account for the portion of spending on children that is not currently included in our estimates of the public cost of pregnancy, the benefit-cost ratios reported in Thomas (2010b) would be somewhat higher.

In the next three subsections, we discuss in turn our estimates of the public costs of prenatal care, deliveries, and postpartum care, which jointly constitute the benefits provided to pregnant women via Medicaid pregnancy-care programs. We then present estimates of the cost of these combined benefits that are adjusted to account for program participation. In subsequent subsections, we discuss our methods for estimating the costs of publicly-

[5] We estimate the average income-to-needs eligibility threshold for Medicaid pregnancy care by calculating a population-weighted average of states' thresholds for that program. We estimate the average threshold for Medicaid-subsidized infant medical care in much the same manner. Data on states' income thresholds for these programs are based on our tabulations of data taken from Kaiser Family Foundation (2010a, 2010b, 2010c, 2010d), and the population weights for these calculations are based on data taken from United States Census Bureau (2010a).

subsidized infant medical care and children's benefits, and we conclude this section of the report by describing the way in which we account for the differing implications of delaying a birth and of averting it altogether.

Live Births: The Public Cost of Prenatal Care

We rely on two different estimates of the cost of publicly-funded prenatal care. The first is taken from Machlin and Rhode (2007), and the second is taken from Amaral et al. (2007). Machlin and Rhode use data from the Medical Expenditure Panel Survey (MEPS) on medical expenditures associated with uncomplicated pregnancies that result in hospital deliveries.[6] The authors disaggregate their estimates into expenditures related to prenatal care and to the delivery itself. They also present separate sets of results for all women, for women with private health insurance, and for women with Medicaid.[7] Amaral et al. (2007) estimate the cost of Medicaid-subsidized prenatal care in California as part of their analysis of the cost-effectiveness of expanding access to family planning through that state's Medi-Cal program.[8]

Machlin and Rhode find that the average cost of prenatal care among women who have uncomplicated pregnancies and are covered by Medicaid is $2,142 in $2004, and they find that, on average, Medicaid pays 87.3 percent of this cost.[9] Thus, we estimate the average

[6] Medical expenditures are defined in MEPS data as payments made to hospitals, physicians, pharmacies, and other health care providers. These payments include direct disbursements by individuals, private and public health insurance plans, and other miscellaneous payment sources for services received.

[7] The authors define a woman as being privately insured if she had private insurance in the month of delivery and in the eight months prior, and they define Medicaid coverage in the same way. Their analysis therefore does not appear to account for all births that are paid for by Medicaid, since an eligible pregnant woman can sign up for Medicaid at any point during her pregnancy. It is unclear whether or not the inclusion of these women would substantially affect the average cost to Medicaid of prenatal care and/or a delivery. The authors do not report the proportion of their sample that was composed of women who are covered by Medicaid.

[8] To estimate the public cost of a pregnancy outcome (birth, abortion, fetal loss, or ectopic pregnancy) or a pregnancy-related service (prenatal or postpartum care), the authors use Medi-Cal data to calculate the average cost of medical services associated with a given outcome. They state that "cost estimates represent the average amount reimbursed for each service, including expenditures for related medical complications" (p. 1966).

[9] Note that this is a conditional mean, which is to say that it is an average only among women with Medicaid who incur publicly-subsidized prenatal-care expenses. This estimate could therefore be misleading to the extent that there are a substantial number of pregnant women with Medicaid who have no prenatal-care expenses. The authors write that less than one percent of women in their sample had no expenses for a hospital delivery, but they do not provide an equivalent statistic for prenatal-care expenses. However, according to our tabulations of data from the National Vital Statistics System, of those babies born in 2006 for whom data are available on their prenatal care (about 97 percent of all births), less than two percent received no such care.

cost to Medicaid of prenatal care for program participants who have an uncomplicated pregnancy and an in-hospital delivery to be ($2,142)*.873 ≈ $1,870 in $2004, or $2,195 in $2008.[10] The authors do not present a comparable estimate for complicated pregnancies. Estimates of the frequency of complicated pregnancies range from five percent to 20 percent, and such pregnancies tend to be more expensive than uncomplicated ones.[11] We have been unable to find any data that directly compare the costs of prenatal care for complicated and uncomplicated pregnancies. However, we have identified estimates comparing average provider costs for *deliveries* that are the result of complicated and uncomplicated pregnancies. Merrill and Steiner (2006), using data from the Healthcare Cost and Utilization Project (HCUP) on all hospital deliveries in 2003, present results suggesting that medical costs for all deliveries are about 17 percent higher than are the costs for uncomplicated deliveries.[12]

In order to generate an estimate of how much more expensive publicly-funded prenatal care is for all pregnancies than for uncomplicated pregnancies, we make three assumptions. First, we assume that the ratio of medical costs for all deliveries to medical costs for uncomplicated deliveries is the same for Medicaid-funded pregnancies as for the combined group of Medicaid-funded and non-Medicaid-funded pregnancies that are the focus of Merrill and Steiner's analysis.[13] Second, given that all deliveries cost 17 percent more than

[10] Unless otherwise noted, all cost estimates discussed in this report are inflated to $2008 using the medical component of the Consumer Price Index. According to our tabulations of data from the National Vital Statistics System, 99 percent of births took place in a hospital in 2006. Thus, the fact that Machlin and Rohde do not include non-hospital births in their analysis should have little effect on their cost estimates.

[11] SSM Health Care (2009); Sutter Medical Center (2009); University of California at Irvine Medical Center (2009); University of California at San Francisco Medical Center (2009); University Virginia Hospital Center (2009).

[12] The authors divide deliveries into six different categories: vaginal delivery without complications, vaginal delivery with complications, c-section without complications, c-section with complications, vaginal delivery with sterilization and/or dilation and curettage (D&C), and vaginal delivery with operating room procedure other than sterilization and/or D&C. Our tabulations of data presented in the authors' paper is based only on estimates for the first four categories, as the latter two – which account for only 3.4 percent of all deliveries – appear to include a non-delivery-related expense. We assume vaginal deliveries without complication and c-sections without complication to be uncomplicated deliveries, and we assume vaginal deliveries with complications and c-sections with complications to be complicated deliveries. Of these deliveries, 15.4 percent are complicated. If we include deliveries in the last two categories in our calculations and count them as complicated deliveries, we estimate that 18.3 percent of deliveries are complicated, that charges for complicated deliveries are 49 percent higher than charges for uncomplicated deliveries, and that charges for all deliveries are nine percent higher than charges for uncomplicated deliveries.

[13] According to Merrill and Steiner, the average charge for a Medicaid-funded birth was $8,600 in 2003, as compared with $8,300 for all births. The authors do not provide specific cost estimates for complicated and uncomplicated deliveries that are disaggregated by the type of payer, however. One might take the estimates

uncomplicated deliveries, we assume that prenatal care also costs 17 percent more for pregnancies in the former category than for the subset of pregnancies that fall into the latter category. And third, given our assumption that prenatal care for all Medicaid-funded pregnancies costs 17 percent more than does prenatal care for uncomplicated pregnancies subsidized by Medicaid, we assume further that the payments made by the government to pay for publicly-subsidized prenatal care for all pregnancies are 17 percent greater than the payments made by the government to pay for publicly-subsidized prenatal care for uncomplicated pregnancies. Under these assumptions, we estimate the taxpayer cost of publicly-funded prenatal care for an average publicly-subsidized pregnancy to be $2,195*1.17 = $2,567 in $2008. We refer to this amount as the "Machlin and Rohde alternative estimate."

Amaral et al. (2007) estimate the average cost to Medi-Cal of prenatal care among women who claim such care to be $2,561 (in $2002). Since this estimate is specific to the state of California, we "nationalize" it using a ratio that we have calculated using data contained in Amaral et al.'s paper and in Frost et al. (2006). Frost and her coauthors calculate an estimate for Medicaid -subsidized births of the combined cost of prenatal care, delivery, and postpartum care. They use data from 22 states to produce a national estimate of the average cost of these services.[14] They calculate separate estimates for each state, but they do not disaggregate the estimated costs of these three components (thus, we are unable to present separate estimates from this report for the costs of these subcomponents in Tables 1 – 3 below). In their paper, Amaral et al. separately estimate the cost of each of these three items (prenatal care, deliveries, and births) for Medicaid births in California. The sum of these

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cited here to imply that Medicaid-funded deliveries tend to be more complicated than deliveries paid for by all sources, which could in turn suggest that the ratio of the average government payment across all Medicaid-funded deliveries to the average government payment for an uncomplicated Medicaid-funded delivery is different than the corresponding ratio for all deliveries without regard to the payer. However, since we have no data with which to evaluate this hypothesis, we assume here that the ratio of costs is the same for Medicaid-funded births as it is for all births.

[14] Frost and her coauthors impute equivalent costs to the 29 states for which they do not have data, and to the District of Columbia, for which they also lack data (hereafter, we treat the District of Columbia as a separate state). They do so using a composite state-level index that was constructed by combining two indices developed by researchers at the Urban Institute. One of these indices measures the relative level of each state's average physicians' fees under fee-for-service Medicaid plans, and the other measures the level of states' Medicaid capitation rates for participants in capitated plans. The authors construct a composite of these two indices by calculating a weighted average of the two in which the weighting is based on the proportion of each state's Medicaid enrollees who participate in each type of plan. These two indices were developed using 2003 data, and the distribution of Medicaid enrollees is estimated using 2001 data.

three estimates from Amaral et al. thus measures the costs of the same package of benefits as the composite estimates reported by Frost et al. The combined costs for these three components in Amaral et al. and in Frost et al. are roughly similar: the estimate from the former is $7,664, while the equivalent estimate for the state of California in Frost et al. is $6,381 (both are expressed in $2008).

We take the following steps in order to "nationalize" the estimated costs reported in Amaral et al.'s paper:

- *First,* we use the Frost et al. data to calculate a ratio of the national weighted average of the composite cost of prenatal care, deliveries, and postpartum care to the equivalent estimate for the state of California. The weighting incorporated into this calculation accounts for differential frequencies of Medicaid births by state. As was mentioned above, the California-specific estimate as reported in Frost et al. is $6,381, and the national weighted average is $5,070. The ratio of the national estimate to the California estimate is thus ($5,070/$6,381) ≈ .795.
- *Second,* we make the simplifying assumption that the ratio of combined costs for these three components is the same as the ratio for each individual component. In other words, we assume that the ratio of the average cost of prenatal care for a Medicaid birth in California to the average cost of prenatal care nationally is also .795, and, for the purposes of calculations made later in this report, we make the same assumption for the cost of a delivery and of postpartum care. We therefore apply this ratio to each of these three costs as reported in Amaral et al. in order to produce "nationalized" estimates of the cost of each of the three sub-components using the California-specific data reported by Amaral and her co-authors.

Since Amaral et al. report that the average cost of prenatal care for a Medicaid birth in California is $2,561 in $2002, we estimate that the equivalent average for all Medicaid births nationally is ($2,561*.795) ≈ $2,035 in $2002, or $2,594 in $2008. Table 1 summarizes the Amaral et al., Machlin and Rhode, and Machlin and Rhode alternative estimates of the average public cost of prenatal care among women whose care is publicly-subsidized. The Machlin and Rhode estimates are preferable to that of Amaral et al. to the extent that the former are based on national data, whereas the Amaral et al. estimate is preferable to the

extent that it accounts directly for the costs of both complicated and uncomplicated pregnancies.

Table 1. Estimated Public Cost of Prenatal Care *Averaged Across Medicaid Births* *In $2008*		
Amaral et al. (2007)	Machlin and Rohde (2007)	Machlin and Rohde (2007) alternative estimate
2,594	2,195	2,567

Live Births: The Public Cost of a Delivery

In order to estimate the cost of the delivery itself, we again use estimates from Machlin and Rhode (2007) and from Amaral et al. (2007). Machlin and Rhode estimate that the mean cost of an in-hospital delivery resulting from an uncomplicated pregnancy among women whose deliveries were subsidized by Medicaid is $4,577 in $2004. The authors find that, on average, Medicaid pays for 93.1 percent of the cost of such deliveries, implying that the average cost to Medicaid is $4,261 in $2004, or $5,003 in $2008. As we did for our estimates of the cost of prenatal care, we adjust this estimate by assuming that the average cost to Medicaid for a publicly-subsidized delivery is 1.17 times the amount that it pays for an uncomplicated delivery, implying an alternative estimate of $5,849. Again using Medi-Cal data, Amaral et al. (2007) estimate the average cost of a publicly-funded delivery to be $3,200 (in $2002) among women whose deliveries were subsidized by Medicaid. "Nationalizing" this state-specific estimate in the manner described above, we calculate the average national cost of a publicly-funded delivery using these data to be $2,542 in $2002, or $3,241 in $2008. These estimates are summarized in Table 2.

Table 2. Estimated Public Cost of a Delivery *Averaged Across Medicaid Births* *In $2008*		
Amaral et al. (2007)	Machlin and Rohde (2007)	Machlin and Rohde (2007) alternative estimate
3,241	5,003	5,849

Live Births: The Cost of Postpartum Care

One could think of postpartum care as encompassing the care delivered to a woman immediately after giving birth (during her two- or three-day hospital stay, for example) or during the six or so weeks afterwards, or both.[15] Both Amaral et al. and Machlin and Rohde appear to include the cost of immediate postnatal care in their estimates of the cost of a delivery.[16] We therefore generate a cost estimate for care provided to the mother after her hospital stay has ended and up to six weeks or so after the delivery. We have found only one estimate of the public cost of postpartum care according to this definition: Amaral et al. estimate the average cost of such care to the Medi-Cal program to be $251 in $2002. Since this figure is specific to the state of California, we "nationalize" it in the manner described above and estimate that the average national public cost of postpartum care is $254 in $2008.[17]

Table 3 combines our estimates, under various assumptions, of the average public costs of prenatal care, delivery, and postpartum care among women whose births are publicly subsidized. Since we have three different estimates for the cost of prenatal care, three estimates for the cost of deliveries, and one estimate for the cost of postpartum care, the table below presents 3*3*1 = nine different estimates for the combination of these three cost categories that are based on data presented in Amaral et al and in Machlin and Rhode. As was discussed above, Frost et al. (2006) also estimate the combined average cost in each state of prenatal care, deliveries, and postpartum care for Medicaid births, although they do not disaggregate their composite cost figures into their three subcomponents. We thus

[15] On the average length of a hospital stay, see Jiang et al. (2002) and Merrill and Steiner (2006). As for the length of the postpartum state, Witt (2010) writes that the postpartum (or puerperium) period lasts for about six weeks after delivery. The Medical Expenditure Panel Survey (2009) also defines postnatal care as care given to the mother up to six weeks after childbirth.

[16] For example, Machlin and Rohde state that delivery expenditures are those that are "associated with the woman's inpatient event" (p. 2).

[17] Rather than "nationalizing" this figure and combining it with our cost estimates for delivery and prenatal care detailed above in order estimate their combined national costs, one might instead: 1) calculate a ratio of the estimated cost in California of postpartum care to the combined costs of a delivery and prenatal care; 2) assume that a similar ratio holds nationally; and 3) apply that ratio to the national estimates detailed above of the costs of a delivery and prenatal care. We conducted a sensitivity analysis in which we took this approach, and we found that it produced estimates that were quite similar to the ones that we report here. We therefore elect to adopt the approach described above without presenting any alternative postpartum-care cost estimates.

report a tenth composite estimate in the table below that is generated using the data in the report by Frost and her coauthors.[18]

Our estimates of taxpayer payments for prenatal care, delivery, and postpartum care for a publicly-funded birth range from about $5,500 to about $9,000. A study commissioned by the March of Dimes and conducted by Thomson Healthcare provides a comparable private-sector cost estimate. Using data on deliveries in the privately-insured population in 2004, the authors find that the cost of nine months of prenatal care, delivery, and three months of postpartum care is $8,802 in $2004, or $10,334 in $2008. One would expect this figure to be greater than the corresponding estimate for an equivalent bundle of publicly-subsidized services because Medicaid payment rates are generally lower than are those for private insurers, or even for Medicare.[19]

[18] As is discussed in a previous subsection, Frost et al. (2006) have administrative cost data for 22 states, and they impute average cost levels for the remaining 29 states using an index that reflects variation in Medicaid fees across states. Frost and her coauthors do not disaggregate their estimates of the cost of prenatal care, delivery, and postpartum care. They do, however, separately report an estimate of the average public cost of a year's worth of medical care for income-eligible infants. As is discussed below, we incorporate Frost et al.'s estimate of this cost into our analysis of the full cost of a publicly-subsidized birth. However, Frost et al. are able to disaggregate between the cost of pregnancy care and the cost of infant medical care for only 20 of the 22 states for which they have data. Since we are interested in using the Frost et al. data to develop separate estimates of the cost of pregnancy care and infant medical care, we only use administrative data from this report for the 20 states for which the authors are able to disaggregate between these two types of costs. We then impute estimates for both cost categories to the remaining 31 states using the index that is referenced above and is described in more detail in footnote 14. In order to generate a national estimate of these two types of costs, we calculate weighted averages of them across states, in which the weighting accounts for differential state-level frequencies of Medicaid births.

[19] Zuckerman et al. (2009) report that, in 2008, Medicaid physicians' fees amounted to an average of only 72 percent of Medicare fees. In turn, Medicare fees amounted to about 80 percent of private-insurance payment rates in 2007, the latest year for which data are available (Medicare Payment Advisory Commission, 2009). Note that this estimate refers only to physicians' fees and is not necessarily representative of Medicaid payments for other services. For example, Zuckerman et al. also found that Medicaid fees for obstetrical services were equal to 93 percent of Medicare fees in 2008.

Table 3. Estimated Public Cost of a Birth (prenatal care, delivery, postpartum care)* *Averaged Across Medicaid Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
2,594+3,241+254 = 6,089	2,594+5,003+254 = 7,851	2,594+5,849+254 = 8,697

Table 3, cont'd. Public Cost of a Birth (Prenatal care, delivery, postpartum care)* *in $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
2,195+3,241+254 = 5,691	2,195+5,003+254 = 7,452	2,195+5,849+254 = 8,299

Table 3, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care)* *Averaged Across Medicaid Births* *in $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
2,567+3,241+254 = 6,062	2,567+5,003+254 = 7,824	2,567+5,849+254 = 8,670

Table 3, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care)* *Averaged Across Medicaid Births* *in $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006)
5,070

*Components may not sum to total due to rounding.

Live Births: Take-up of Medicaid Pregnancy Care

Given that we assume Medicaid pregnancy care to be provided only to women who are below 200 percent of poverty, we model take-up of these benefits within the policy simulations by: 1) estimating the proportion of births to women below this threshold that are subsidized by Medicaid; 2) re-expressing our estimates of the cost of a Medicaid-subsidized birth as an average that is calculated across all members of the eligible population; and 3) imputing, for any birth that occurs to a woman who is assumed to fall below this threshold, a public cost that is equal to this participation-adjusted average. We therefore require information on the income-to-needs statuses of women who give birth and on the frequency with which the Medicaid program subsidizes the cost of childbearing among women who are below 200 percent of poverty. Our tabulations of the 2002 National Survey of Family Growth (NSFG) suggest that 56.5 percent of births to women who are below 200 percent of the poverty line were subsidized by Medicaid in 2001.

However, we have reason to believe that receipt of Medicaid pregnancy care is underreported in the NSFG. According to estimates from the National Governors Association (NGA) – which is considered to provide the most reliable counts of Medicaid-subsidized births – there were a total of 1,534,106 births financed by Medicaid in 2001, and, according to our tabulations of data from the National Vital Statistics System, there were a total of 4,025,933 births in the United States in that year.[20] These two estimates jointly imply that (4,025,933/1,534,106) ≈ 38.1 percent of all births in 2001 (without reference to income-to-needs status) were subsidized by Medicaid. We estimate the equivalent quantity using data from the NSFG (also without reference to income-to-needs status) to be 34 percent. We therefore assume that take-up of Medicaid pregnancy care is underreported in the NSFG by ((38.1/34) – 1) ≈ 12 percent. Under the assumption that take-up of this benefit is underreported among women under 200 percent of poverty to the same extent as for all women, we therefore estimate the actual take-up rate for Medicaid-subsidized delivery-related services among the former group to be (56.5*1.12) ≈ 63.3 percent. We assume the

[20] On the number of births that were subsidized by Medicaid in 2001, see National Governors Association Center for Best Practices (2005). Although the 2002 NSFG contains data on births in years other than 2001, we limit our analysis to data on births occurring in calendar year 2001 for the purposes of producing the tally reported above.

same take-up rate for prenatal care and postpartum care. This estimate is quite consistent with Dubay and Kenney's (1997) finding (although it is admittedly somewhat dated) that, in 1992, two-thirds of all pregnant women who were eligible for Medicaid coverage actually participated in the program.

We can also estimate the proportion of births covered by Medicaid that are to women who are *over* 200 percent of poverty (since, in fact, some states' eligibility thresholds for pregnancy care are over 200 percent, which means that, by modeling take-up only among women under 200 percent of poverty, we underestimate the true public cost of Medicaid pregnancy care). According to our tabulations, 50.9 percent of all births in the NSFG are to women under 200 percent of poverty. Thus, our participation rate of 63.3 percent among this group implies that (.633*.509) ≈ 32.2 percent of all births are both paid for by Medicaid and are to women who are under 200 percent of poverty. Comparing this figure with our most reliable estimate of the total share of all births that are subsidized by Medicaid (38.1 percent, calculated using data from the NGA and NVSS) we therefore estimate that (1 – (.322/.381)) ≈ 15 percent of Medicaid-subsidized births are to women over 200 percent of poverty. According to these calculations, then, we capture about 85 percent of total spending under the Medicaid pregnancy-care provision by focusing on public expenditures on births among women who are under 200 percent of poverty.

Table 4 presents our estimates of the combined costs of prenatal care, delivery, and postpartum care, as averaged across all women who are under 200 percent of poverty. The estimates presented below are identical to the ones reported in Table 3, save for the fact that they are adjusted to account for take-up of these benefits.

Table 4. Estimated Public Cost of a Birth (prenatal care, delivery, postpartum care)* *Averaged Across all Medicaid-Eligible Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
(2,594+3,241+254)*0.633 = 3,854	(2,594+5,003+254)*.633 = 4,970	(2,594+5,849+254)*0.633 = 5,505

Table 4, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care)* *Averaged Across all Medicaid-Eligible Births* *In $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
(2,195+3,241+254)*0.633 = 3,602	(2,195+5,003+254)*0.633 = 4,717	(2,195+5,849+254)*0.633 = 5,253

Table 4, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care)* *Averaged Across all Medicaid-Eligible Births* *in $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
(2,567+3,241+254)*0.633 = 3,837	(2,567+5,003+254)*0.633 = 4,952	(2,567+5,849+254)*0.633 = 5,488

Table 4, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care)* *Averaged Across all Medicaid-Eligible Births* *in $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006)
(5,070)*.633= 3,209

*Components may not sum to total due to rounding.

Live Births: The Public Cost of Infant Medical Care

Pregnancy-prevention programs have the potential to generate public savings by limiting government expenditures not only on prenatal care, hospital deliveries, and postpartum care, but also on a wide range of programs that provide benefits and services to children after they are born. We produce a set of estimates of the public cost of pregnancy that account for government spending on programs of this sort. We openly acknowledge that the choice of time period over which such benefits are measured is, at least in part, an arbitrary one. The public costs associated with a birth will clearly be larger for longer time periods, which is to say that, on average, three-year-old children will have consumed more government benefits and services over their lifetimes than have two-year-old children, that four-year-olds will have consumed more than have three-year-olds, and so forth. On the other hand, if one were to extend one's analytical time frame far enough into the future, such a trend might be reversed: as children age into adulthood, enter the labor force, and become productive members of society, their economic contributions will presumably, in many cases, be sufficient to offset and eventually exceed the financial costs that they imposed when they were younger.

Since there is no clear "cutoff point" after which one should stop measuring programmatic costs for child-related benefits and services, we take what we would argue is a relatively-conservative approach by measuring such costs only in the first few years of childhood. This approach is also the most compatible with the data that are available to us. We generate two sets of estimates. One measures only the cost of publicly-subsidized medical services provided to children in the first year after birth. The second set of estimates measures the cost of a range of publicly-provided benefits and services provided to children up to their fifth birthdays. Our decision to stop measuring child-related costs after the first five years of childhood is in part a function of our belief that including the cost of public education in our calculations would create considerable complications because: a) public schooling is mandatory until age 16; b) we believe that extending the time frame over which government benefits are measured up to this age would be enormously difficult and could probably also be somewhat controversial; c) we would also have to account for the fact that the cost of public schooling is partially offset by tax payments made by the parents of public

schoolchildren; and d) the most obvious "cutoff point" if one wishes to avoid such complications is at the age just before the typical child enters the public school system. These time frames are also roughly consistent with those of Frost et al. (2006) and Macomber et al. (2010), whose results we rely upon to produce our estimates.

As was discussed above, Frost et al. (2006) estimate the combined average cost of prenatal care, delivery, and postpartum care for a birth that is covered by Medicaid, although they do not present separate estimates for the cost of each of these three subcomponents. They do, however separately present data on the average cost of a year's worth of medical care for Medicaid-covered infants. Using these data, we estimate the national average cost of such care to be $6,100 in $2008.[21] We add this amount to the figures reported in previous tables to produce estimates of the combined costs of prenatal care, delivery, postpartum care, and infant medical care. In the next subsection, we discuss the fact that, according to our analysis of the best available data, virtually all eligible infants participate in Medicaid. Thus, our participation-adjusted estimate of the public cost of infant medical care is identical to the unadjusted figure cited above. We therefore do not include a separate table here that reports unadjusted estimates of the combined costs of these benefits.

Live Births: Take-up of Infant Medical Care

Since the average income-eligibility threshold for infant medical care across states is somewhat more than 200 percent of poverty, we assume that all infants under this threshold qualify for such care and that infants over this threshold do not.[22] We use data from the 2001 Current Population Survey (CPS) to estimate the proportion of infants under 200 percent of poverty whose medical care was subsidized by Medicaid in calendar year 2000 (we define an "infant" as any child under the age of one).[23] According to our tabulations, about 53 percent of infants in this income-to-needs range use Medicaid-subsidized medical

[21] We calculate this estimate using a process that is detailed in footnote 18.
[22] In footnote 28 later in this section, we describe the way in which we calculate the average income-eligibility threshold across states for Medicaid-subsidized infant medical care.
[23] We choose to use the 2001 CPS for the purposes of this discussion because of the fact that the data described later in this subsection on the undercount of Medicaid recipients in the CPS are specific to a tally from that year's dataset. Were we to use data for a more recent year, we would reach a conclusion that is identical to the one described below regarding the participation rate in Medicaid among infants in families that are below 200 percent of poverty.

services. It is, however, widely known that, if one uses the more-reliable data from the Medicaid Statistical Information System (MSIS) as a yardstick, Census data sources are found to underestimate Medicaid recipiency substantially. In fact, the Census Bureau sponsors the Medicaid Undercount Project for the specific purpose of addressing this issue.[24] The project has produced several reports that attempt to document the extent of the CPS undercount. We use data from one such report to attempt to develop our own estimate of the likely extent of the undercount of take-up of Medicaid-subsidized medical benefits among infants in the CPS. None of the Undercount Project's documents provides an estimate of this precise quantity. However, the project's Phase II report provides enough data to allow us to produce our own estimate that we believe roughly approximates the undercount among children under the age of one.[25] In that report, analysts for the project produce tallies of Medicaid respondents in calendar year 2000 as measured using both CPS and MSIS data.

Because of a number of discrepancies between the way in which Medicaid recipiency is measured in these two data sources, none of the CPS and MSIS estimates presented in the Phase II report are perfectly comparable. However, the authors write that the tallies that they refer to in Table 2 of their report as "MSIS Total E" (hereafter, the "MSIS total") and "CPS Total B" (hereafter, the "CPS total") are the most directly comparable. Both estimates are age-specific, and one of the age categories included in the report is for children under the age of six (none of the project's reports provides estimates specifically of the number of children under the age of one who participate in the program). The MSIS total is adjusted in a number of ways – for example, by excluding individuals who were known to have died prior to March of the survey year and by deleting duplicative client accounts – in order to make it as comparable as possible to the CPS-based count.

All participants in Medicaid-subsidized State Children's Health Insurance Programs (SCHIP) are excluded from the MSIS total. However, the CPS count referenced above excludes some, but not all, SCHIP recipients. While a substantial portion of children's publicly-

[24] United States Census Bureau (2007). The authors of the report cited here attribute the disparity between estimates of Medicaid receipt produced using the CPS and administrative data to three primary causes: differences in the universe of individuals from which their samples are drawn, differences in the coverage of these individuals in the two data sources, and response error in the CPS.
[25] United States Census Bureau (2008).

subsidized medical care is administered directly by the main Medicaid program, state SCHIP programs provide health insurance to low-income children who would not otherwise qualify for Medicaid but whose families are deemed to be unable to afford health insurance.[26] SCHIP programs are funded jointly by the federal government and state governments. Each state has three options in structuring its SCHIP program. It can use its SCHIP funds to expand coverage under its existing Medicaid program, to create a "stand-alone" program that is administered separately from its Medicaid program; or to do a combination of the two (for the remainder of this discussion, we refer to states in this third category as "combination states"). Stand-alone SCHIP programs are generally allowed greater flexibility in terms of the structure of benefits that they are able to provide and the extent to which the burden of paying for the program is shared with the federal government, SCHIP-funded Medicaid expansions must operate in accordance with states' Medicaid program rules. According to the most recently available data, 18 states operate stand-alone SCHIP programs, ten states operate Medicaid-expansion programs, and 23 states operate a combination of the two programs.[27]

The CPS count of Medicaid recipients described above appears to exclude children in stand-alone programs but to include children in Medicaid-expansion programs, while, again, the MSIS total excludes all SCHIP participants. Thus, in order to make the MSIS and CPS totals directly comparable, we must adjust the latter by subtracting from it our best estimate of the number of children included within it who are participating in Medicaid-expansion programs. We make the following simplifying assumptions: a) that half of the SCHIP-funded recipients in combination states are participating in a stand-alone program and are therefore excluded from the CPS count; b) that the other half are participating in an SCHIP-funded Medicaid expansion program and are therefore included in the CPS count; and c) that the share of SCHIP participants included in the CPS count is equal to the proportion of state programs whose participants are included in the count. Thus, we estimate that $((10 + 23*0.5)/51) \approx 42.1$ percent of children in SCHIP programs are included in the CPS total, and we assume that the remaining share (≈ 57.8) are excluded from it.

[26] The discussion here of state SCHIP programs is based on information provided in Kaiser Family Foundation (2010a, 2010b, 2010c, 2007d) and in National Association of State Budget Officers (2007).
[27] Based on the authors' tabulations of data reported in Kaiser Family Foundation (2010a).

The Undercount Project's report presents CPS-based estimates of the number of Medicaid recipients under the age of six both before and after excluding a portion of SCHIP recipients. Thus, the former estimate includes all SCHIP participants, and the latter excludes participants in stand-alone programs. The difference between these tallies is about 760,000. We therefore estimate that a total of (760,000/0.578) ≈ 1,300,000 children participated in any SCHIP program, and that (1,300,000 – 760,000) = 540,000 children must be subtracted from the CPS total in order to purge it completely of SCHIP recipients. After making this modification, we estimate that, according to the CPS count, a total of about 4,560,000 children under the age of six are covered by Medicaid but do not participate in states' SCHIP programs. The equivalent count from MSIS data is 8,840,000. We therefore estimate that the CPS undercounts the number of non-SCHIP Medicaid recipients under the age of six by a factor of (8,840,000/4,560,000) ≈ 1.945.

For the purposes of our simulation, we are interested in estimating the cost to the public of providing benefits through the main Medicaid program or through any of the three varieties of SCHIP programs to children under the age of one. We therefore assume, first, that the extent of the CPS undercount of children under the age of six who participate in the main Medicaid program is equivalent to the extent of the undercount of children participating in an SCHIP program, and, second, that the extent of the undercount is the same for children under the age of one as it is for children under the age of six. Under these assumptions, we therefore estimate that our original, CPS-based estimate of the share of eligible infants who take up Medicaid benefits is about half of the actual participation rate for this group. As was stated above, we assume that all children under 200 percent of poverty are eligible to participate in either SCHIP or Medicaid.[28] Recall that our original, CPS-based estimate of

[28] This assumption is based on our calculations using data taken from Kaiser Family Foundation (2010a, 2010b, 2010c). The authors report income thresholds for each state's SCHIP-funded program(s). For combination states, we calculate a simple average of their stand-alone and Medicaid-expansion programs' income-eligibility thresholds under the simplifying assumption that infants are equally distributed between these two types of programs. For states that only operate either a stand-alone or a Medicaid-expansion program, we use the relevant program's income threshold for the purposes of making this calculation. We calculate that the national, population-weighted average of these thresholds is about 239 percent of the poverty line. After having inspected the eligibility thresholds for states' SCHIP-funded and non-SCHIP Medicaid programs, we have determined that infants' income-eligibility thresholds for the latter are always less than or equal to their thresholds for the former. We choose to assume that only children under 200 percent of poverty qualify for Medicaid-subsidized infant medical care because: a) according to our tabulations of data reported in Kaiser

participation in these programs among children under 200 percent of poverty was greater than 50 percent. In view of our estimate of the extent of the undercount in the CPS, we therefore assume a 100 percent take-up rate for Medicaid-subsidized medical care for children who qualify to participate in the program. Given our assumption of a 100 percent take-up rate, we do not adjust our estimates of the cost of infant medical care for participation; rather, we assume the estimated per-participant cost of the program to be identical to the estimate of its cost per member of the eligible population.

Since we only model Medicaid and SCHIP participation among infants who are under 200 percent of poverty, we now estimate the share of all enrollees in these programs whose participation we fail to consider by limiting ourselves to this group. Because the MSIS data reflect counts of participants under the age of six, but not under the age of one, we estimate the share of enrollees in the former category who are over 200 percent of poverty, and we then assume that it is equivalent to the share of enrollees in the latter category who are above the same threshold. Recall from the discussion above that, according to our MSIS-based estimates, there were 8.84 million Medicaid (non-SCHIP) recipients under the age of six in the year 2000.[29] However, MSIS data do not contain comprehensive information on SCHIP recipiency. Thus, we use the CPS to estimate the ratio of the number of SCHIP recipients (about 1,400,000, as discussed above) to the number of Medicaid (non-SCHIP) recipients (about 4,475,000, also discussed above), and we then apply that ratio to the MSIS count of Medicaid (non-SCHIP) recipients in order to develop an estimate of the combined number of recipients in both programs. We are implicitly assuming, then, that the extent of the

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Family Foundation (2010c), the population-weighted average income-eligibility threshold across states for Medicaid pregnancy care is about 197 percent of poverty; and b) this exercise is greatly simplified if we are able to assume that the same threshold applies to Medicaid pregnancy care and Medicaid-subsidized infant medical care. Although we do not consider public spending on medical care for infants who are over this threshold, we present estimates below suggesting that our analysis captures more than four-fifths of total Medicaid and SCHIP recipiency among children under the age of one.

[29] As was discussed above, the CPS Undercount Project's Phase II report presents several different estimates of the number of Medicaid recipients. MSIS Total E – which is the count that we use throughout the discussion above – excludes from the original MSIS count all individuals who died before March of the calendar year in question, a subset of SCHIP clients who are included in the original MSIS total, partial-benefit recipients, individuals living in institutional group quarters, and duplicative records. One might argue that, for the purposes of the comparison described here, we should add some of these recipients back to the MSIS total that we used when comparing counts administrative and CPS data. We have conducted sensitivity analyses in which we used alternative MSIS counts in order to make the calculations described above, and we arrived at the same essential result. Thus, and for purposes of simplicity, we continue to use MSIS Total E in this portion of our exposition.

undercount of program participants in the CPS is the same for Medicaid (non-SCHIP) as it is for SCHIP. Our count of the number of participants in these two programs suggests that, for every 100 Medicaid (non-SCHIP) recipients, there are about 30 are SCHIP recipients. We therefore multiply the MSIS-based count of Medicaid (non-SCHIP) recipients by a ratio of 1.3 to estimate the total number of Medicaid and SCHIP clients combined. Thus, we calculate that, in 2000, there were a total of 1.3*8.84 million ≈ 11.492 million participants under the age of six in these two programs combined.

We now consider the number of participants in these programs who were under 200 percent of poverty. According to our tabulations of the 2001 CPS, there were 9.635 million children under the age of six who were below 200 percent of the poverty line in the year 2000. Given the discussion above, we assume that all of these children participate in Medicaid. Thus, we estimate that, by considering recipiency of Medicaid benefits only among children who were under 200 percent of poverty, we fail to account for (1 – (9.635/11.492)) ≈ 16 percent of the total number of Medicaid and SCHIP recipients under the age of six. We assume that the same holds true for recipients under the age of one. To put it another way, we estimate that our simulations capture about 84 percent of Medicaid and SCHIP recipiency among children under the age of one even after we limit our pool of simulated recipients to infants who are below 200 percent of the poverty line.

Table 5 presents participation-adjusted estimates of the combined cost of prenatal care, delivery, postpartum care, and infant medical care for a publicly-subsidized birth. Since we do not make any participation adjustments to the cost of infant medical care, the only such adjustments to these figures are for the preceding benefits provided via Medicaid pregnancy care. These estimates can be interpreted as representing, across all Medicaid-eligible births, the average cost of a publicly-subsidized birth, including infant medical care.

Table 5. Estimated Public Cost of a Birth (prenatal care, delivery, postpartum care, one year of medical care for infant)* *Averaged Across all Medicaid-Eligible Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007), Frost et al. (2006)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007), Frost et al. (2006)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Frost et al. (2006)
(2,594+3,241+254)*0.633+6,100 = 9,954	(2,594+5,003+254)*0.633+6,100 = 11,069	(2,594+5,849+254)*0.633+6,100 = 11,605

Table 5, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care, one year of medical care for infant)* *Averaged Across all Medicaid-Eligible Births* *in $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Frost et al. (2006)
(2,195+3,241+254*0.633)+6,100 = 9,701	(2,195+5,003+254)*0.633+6,100 = 10,817	(2,195+5,849+254)*0.633+6,100 = 11,352

Table 5, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care, one year of medical care for infant)* *Averaged Across all Medicaid-Eligible Births* *in $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Frost et al. (2006)
(2,567+3,241+254)*0.633+6,100 = 9,937	(2,567+5,003+254)*0.633+6,100 = 11,052	(2,567+5,849+254)*0.633+6,100 = 11,587

Table 5, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care, one year of medical care for infant)* *Averaged Across all Medicaid-Eligible Births* *in $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006), Frost et al. (2006)
(5,070)*.633+6,100 = 9,309

*Components may not sum to total due to rounding.

Live Births: The Public Cost of Children's Benefits

For our alternative method of calculating after-birth costs, we estimate the amount of public spending on a range of benefits and services that are provided to children up to their fifth birthdays. We estimate the amount of such spending using data detailed in a series of reports by researchers at the Urban Institute and the Brookings Institute (hereafter, the "Urban-Brookings reports").[30] These reports present estimates of public expenditures on children of various ages. We rely primarily on data contained in Macomber et al. (2010), in which the authors estimate combined per-child spending by a large number of federal, state, and local programs.[31] However, due to limitations in the state data available to them, the authors choose to exclude all tax expenditures from their analysis with the exception of the refundable portions of Earned Income Tax Credit (EITC) and the Child Tax Credit (CTC). The authors use 2004 data, and they present separate estimates for spending on children from birth until their third birthdays and from their third birthdays until their sixth birthdays. As is discussed in more detail later in this subsection, they estimate that the bulk of the spending that they measure is disbursed on a means-tested basis. For the sake of simplicity – and in order to make more tractable the process of simulating children's eligibility to participate in these programs – we therefore focus only on the means-tested portion of this spending. The estimates presented in Thomas (2010b) of the cost-savings associated with various pregnancy-prevention programs would thus be larger to the extent that we were to expand our analysis to consider spending on universal programs.

Given our method for imputing program eligibility, we wish to generate estimates of mean spending per child, as averaged across all children who qualify for the means-tested benefits described above. Eligibility to participate in these programs is typically limited to children who are at or under 200 percent of the poverty line.[32] We therefore assume that children

[30] See Kent et al. (2010), Macomber et al. (2010), and Macomber et al. (2009).

[31] The authors collect their own spending data on over 100 federal programs, while they use information from a separate paper by Billen et al. (2007) to measure spending on state and local programs.

[32] The largest means-tested federal programs included in Macomber et al.'s estimates of the costs of children's programs are the CCDF; the EITC, Medicaid and SCHIP, Section 8 housing, SNAP, TANF, and WIC. In rough terms, the income-eligibility thresholds for these programs are as follows: the CCDF, about 185 percent of poverty; the EITC, about 200 percent of poverty in terms of the income limit at which it begins to phase out and about 233 percent of poverty in terms of the income level at which it phases out completely; Medicaid and SCHIP for children up to age 5, about 200 percent of poverty; SNAP, 130 percent of poverty; TANF, between 50 and 100 percent of poverty; WIC, 185 percent of poverty; and thresholds for Section 8 housing vary considerably across localities. States may only provide assistance through CCDF to families with incomes

qualify to participate in these programs if their family incomes place them below this threshold. It should be noted that the income-eligibility limits for some of these programs are over 200 percent of poverty (e.g., EITC benefits for families with two or more children phase out at an income level that is about 2.33 times the poverty line for a family of four), that eligibility for some programs is limited to children whose incomes are below this threshold (e.g., TANF benefits, which are generally limited to children in families whose incomes place them under a threshold that is between 50 percent and 100 percent of the poverty line), and that other programs' eligibility limits are quite close to this threshold (e.g., Medicaid and SCHIP). We assume that discrepancies in eligibility limits across programs

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below 85 percent of their states' median income levels; as long as the state fulfills this requirement, it may set income eligibility wherever it chooses. In practice, some states set their income limits as a percentage of the federal poverty line, while others set their thresholds as a percentage of median state income. Some states (e.g., Virginia) allow the threshold to vary across the state, and others (e.g., Idaho) use an outdated version of the federal poverty line (Redding and Cohen, 2009). For these reasons, it is difficult to estimate precisely the income threshold for CCDF-funded child care assistance as a percentage of the federal poverty line. However, Schulman and Blank (2007) calculate income eligibility limits for each state for a family of three as a percent of poverty for the year 2007. We calculate the weighted average (by population) of the thresholds contained in that report to be 184 percent of poverty (for states that have a range of thresholds, we used the midpoint of that range in making these calculations). However, because states are required to prioritize services for families with very low incomes and for children with special needs, effective average income thresholds may be considerably lower than this estimated average, since, in most states, child-care assistance is not an entitlement (Center for Law and Social Policy, 2009). According to the Urban-Brookings Tax Policy Center (2010), the income level at which the EITC phased out in tax year 2009 for a family headed by an unmarried parent with one child was about $35,500. According to the United States Census Bureau (2010b), this income level is equivalent to about 240 percent of the poverty threshold for such a family. We use these same data to estimate that the income-to-needs level at which the credit phases out for married-parent families with one child, for unmarried-parent families with two children, and for married-parent families with two children to be about 234 percent of poverty, 233 percent of poverty, and 208 percent of poverty, respectively. We calculate the income-eligibility thresholds for Medicaid and SCHIP cited here using the data described in footnote 28. We use the approach detailed in that footnote to calculate a population-weighted average of states' income-eligibility thresholds for children aged one through five, and we find that the weighted average of states' thresholds for SCHIP-funded programs is 226 percent of poverty for this age group. After having inspected eligibility thresholds for states' SCHIP-funded and non-SCHIP Medicaid programs, we have determined that children's income-eligibility thresholds for the latter are always less than are their thresholds for the former. Sherman (2009) writes that states have broad discretion to determine who is eligible for TANF benefits and services, that they can set different eligibility limits for different programs funded by the TANF block grant, and that income-eligibility limits for most states are below 100 percent of the poverty line (indeed, eligibility thresholds are below 50 percent of poverty in the majority of states). In general, Section 8 vouchers are available only to families with incomes below 50 percent of the median income for the county/metropolitan area in which they live, but public housing agencies must provide 75 percent of their vouchers to applicants with incomes that are below 30 percent of the area's median (United States Department of Housing and Urban Development, 2010). According to our analysis of data available through the HUDUSER tool online, there is substantial variation in median income levels across states and counties (for example, 80 percent of median income in Massachusetts for one person is $44,800, while the equivalent figure for Arkansas is $27,500). For these reasons, it is difficult to estimate the average nationwide income threshold for Section 8 vouchers as a percentage of the federal poverty line. For further information on the thresholds discussed in this footnote, see the Center on Law and Social Policy (2009), Food and Nutrition Service (2009), Kaiser Family Foundation (2010a, 2010b, 2010c, 2010d), Sherman (2009), United States Department of Agriculture (2009), United States Department of Housing and Urban Development (2010), and Urban-Brookings Tax Policy Center (2010).

essentially produce offsetting errors under our assumption that these benefits are only available to children who are under 200 percent of poverty.

Our goal is to use the information contained in the Urban-Brookings reports to produce estimates of annual, per-child, means-tested public spending that are averaged across all children who are below 200 percent of poverty. Macomber et al. (2010) report estimates of combined means-tested and non-means-tested government spending per child as averaged across all children. We therefore adjust the data contained in that report by: a) calculating the portion of this spending amount that is means-tested; b) multiplying the average amount of spending per child on means-tested programs by our tabulation of the total number of children in order to calculate total means-tested expenditures (excluding most spending on tax programs) across all children; and c) under the simplifying assumption that means-tested spending is only disbursed to children who are under 200 percent of poverty, dividing our estimate of the total amount of means-tested spending by the number of children under this threshold in order to calculate average means-tested spending per low-income child.

Macomber et al. (2010) estimate that, each year up to a child's third birthday, state and local governments spend $942 per child. We assume, based on personal communications with one of the authors of this report, that 100 percent of such spending is means-tested. Macomber and her coauthors also find that the federal government spends $3,179 per child in this age range. We assume, based on an estimate contained in another Urban-Brookings report (Macomber et al., 2009), that 89 percent of this spending is means-tested. Thus, we calculate that total spending at all levels of government on children under the age of three ($3,179 + $942) = $4,121 in $2004, and we calculate that all levels of government combined spend ((.89*$3,179) + $942) ≈ $3,771 per child under the age of three on means-tested programs in particular (also in $2004).[33] We multiply this per-child average by the total

[33] This is an average and not a marginal estimate, which is to say that it does not necessarily reflect the incremental costs to the publicly-subsidized programs in question of providing benefits to one more child. To the extent that some programs have waiting lists (Section 8 housing, for example), it is unlikely that the birth of an additional child(ren) would have a meaningful impact on those program's costs. However since most of the means-tested programs for children this age are entitlements for which all eligible children qualify – and because it would be difficult to purge our estimates with any precision of the limited number of dollars spent on means-tested benefits that are not entitlements – we ignore this consideration here. Since Macomber et al. (2010) express spending levels in $2004, we do so here as well. However, later in this subsection, we inflate our

number of children under the age of three to generate an estimate of the total amount of spending on individuals in this age range. Specifically, we estimate that such spending totals about $45.3 billion. This figure represents the sum of our estimates of federal spending ($34 billion) and state and local spending ($11.3 billion) on children under the age of three.[34]

As is discussed above, Macomber and her colleagues, in their 2010 report, exclude most tax expenditures from consideration. Given that we are focusing specifically on means-tested spending, the authors' exclusion from their analysis of expenditures on provisions such as the dependent exemption and the nonrefundable portion of the CTC does not pose a problem for our analysis. However, we would ideally like to capture all spending on means-tested programs such as the EITC and the refundable portion of the CTC. The Macomber et al. (2010) report does in fact capture all spending by these programs that is used to provide refundable (cash) benefits to tax filers, but it does not capture that portion of spending by these programs that is used to offset filers' tax liabilities. However, another Urban-Brookings report (see Macomber et al., 2009) estimates that tax reductions provided by federal means-tested programs totaled $1 billion in $2007, or about $910 million in $2004.[35] They do not report an equivalent estimate for state and local spending. We therefore make the simplifying assumption that the ratio of spending on targeted tax reductions to all other means-tested expenditures is the same for state and local governments

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final estimate of per-child spending to $2008 in order to ensure that it is consistent with other estimates cited elsewhere in this paper.

[34] We use the 2004 CPS to produce the population counts used for this calculation and for all other population counts incorporated into the calculations described in this section.

[35] More generally, Macomber et al. (2009) divide federal expenditures into two broad categories: spending programs (including the refundable portions of the EITC and the CTC) and tax reductions (e.g., the dependent exemption and the portions of the EITC and the CTC that are devoted specifically to the reduction of filers' tax liabilities). They also report separate spending estimates based upon whether expenditures are targeted at low-income children. (Thus, for example, the standard deduction is an example of a non-targeted tax reduction; EITC expenditures that reduce tax liabilities are an example of spending on targeted tax reductions; spending on the refundable portion of the CTC is an example of a targeted tax expenditure that does not subsidize tax reductions; etc.) The authors estimate that, of the $57 billion spent on children under the age of three in 2007, $39.2 billion was devoted to targeted spending (non-tax-reduction) programs, $1 billion was devoted to targeted tax reductions, $4.8 billion was devoted to non-targeted spending (non-tax-reduction) programs, and $11.9 billion was devoted to non-targeted tax reductions. The authors note that only the nonrefundable portion of the EITC and the exclusion of public assistance from taxable income fall into the category of targeted reductions in taxes. Note that the estimate cited here of the amount of spending on targeted tax reductions is for 2007, while all other relevant estimates are for 2004. We therefore deflate this estimate to $2004 using the CPI-U-RS. While there were at least minor changes in real spending on these benefits over this four-year period, we lack sufficient data to be able to incorporate this consideration into our analysis.

as for the federal government. We estimate that, at the federal level, this ratio is about (.91/34) ≈ .027. We therefore assume that state and local governments spend (.027*$11.3 billion) ≈ $300 million (in $2004) on means-tested tax reductions. Adding these figures to the amounts cited above raises our total estimate of public means-tested spending on children under the age of three to (($34 billion + $910 million) + ($11.3 billion + $300 million)) ≈ $46.5 billion in $2004. We then divide this amount by our tabulation of the number of children in this age range who are below 200 percent of poverty in order to generate an average annual estimate of means-tested public spending per child. Specifically, we estimate an average spending level for children in this age range of $8,891 in $2004, or $10,134 in $2008.[36]

We perform a similar exercise using the authors' estimates of public spending on children between their third and sixth birthdays. Macomber et al. (2010) estimate that annual, per-child spending by the federal government on children in this age range was about $3,179 in 2004. They report an equivalent estimate of $3,523 for state and local spending on such children. Based on data contained in another Urban-Brookings report and on personal communication with one of the authors of these reports, we assume that 78 percent of the federal spending cited here was means-tested and that 16 percent of such spending by state and local governments was means-tested.[37] (Note that, relative to the figures cited earlier in this discussion reflecting spending on younger children, the estimate cited here of state and local spending on children between their third and sixth birthdays is much higher, and the estimated share of such spending that is means-tested is much lower. These disparities are a function of the fact that a large chunk of state and local spending on children in this age range is devoted to public schooling for kindergarteners.) Our calculations thus suggest that public, per-child, means-tested spending on children in this age range at all levels of government totaled (.78*$3,179 + .16*$3,523) ≈ $3,043 in $2004. We then multiply this average by our tabulation of the number of children aged three to five to calculate

[36] Throughout this exposition, we use the CPI-U-RS to adjust our estimates for inflation.
[37] Our assumption regarding the share of federal spending on children in this age range that is means-tested is based on an estimate reported in Kent et al. (2010), and our equivalent assumption for state and local spending is based on personal communication with Julia Isaacs, who was one of the coauthors of the Urban-Brookings reports.

preliminarily that federal, state, and local governments spend a total of about $36 billion (in $2004) on means-tested benefits for children in this age range.

Using the process described earlier to estimate the additional amount of spending by means-tested programs on children in this age range that is devoted specifically to tax reductions and adding this amount to the total cited here, we calculate that total means-tested spending at all levels of government on children in this age range was about $37 billion in 2004.[38] We then adjust this estimate for inflation and divide it by our tabulation of the number of children who are in this age range and under 200 percent of poverty in order to calculate a per-child, means-tested public spending amount on low-income children of about $8,483 in $2008. Although this is an estimate of the average annual level of spending on children between their third and sixth birthdays, we are in fact interested only in spending up to a child's fifth birthday. We therefore make the assumption that the average annual level of means-tested, per-child public spending between a child's third and fifth birthdays is the same as the equivalent level of spending between his or her third and sixth birthdays (to remind the reader: our estimate of average public expenditures on children in this age range excludes the cost of public schooling by virtue of the fact that it only accounts for means-tested spending).

In order to create an average spending estimate for children from birth up to their fifth birthdays, we calculate a weighted average of our estimates of spending from birth up to one's third birthday and from one's third birthday up to one's fifth birthday. Thus, our estimate of public spending on federal, state, and local means-tested programs for all children from birth up to age five, as averaged across children who are under 200 percent of poverty, is ((.6*$10,134) + (.4*$8,483)) = $9,474 in $2008. In order to generate a total per-child estimate of average government expenditures on this group over a period of five years, we discount the annual spending amounts in years two through five using a three percent

[38] Based on data reported in Kent et al. (2010) and using the process described in a previous paragraph, we estimate that the federal government spends about $790 million and that state and local governments spend about $180 million on targeted tax reductions for children in this age range. Both of these figures are expressed in $2004.

real discount rate.[39] We use this discount rate to estimate that the net present value of five years' worth of annual expenditures of $9,474 per year is $44,688 in $2008. We add this amount to our estimates of the cost of prenatal care, deliveries, and postpartum care in order to produce an overall estimate of the average cost of providing these services plus five years' worth of means-tested benefits for a child after his or her birth.

Live Births: Take-up of Children's Benefits

Since we calculate spending on children's programs by taking total spending estimates and dividing them by the number of children under 200 percent of the poverty line (i.e., by the number of children that are presumed to be eligible to take up these benefits), participation rates are already implicitly incorporated into the $44,688 figure cited above. Thus, we need make no further adjustments to this estimate in order to express it as an average across all members of the population whom we assume to be eligible to participate in these programs. Table 6 presents participation-adjusted estimates of the combined cost of publicly-subsidized prenatal care, delivery, postpartum care, and children's benefits. Because we do not adjust the cost of children's benefits for participation, the only participation adjustments made to these estimates account for the take-up of benefits provided via Medicaid pregnancy care. These estimates can be interpreted as representing, across all eligible births, the average cost of a publicly-subsidized birth and the cost of five years' worth of children's benefits.

[39] Amaral et al. (2007), Aos et al. (2004), and Trussell et al. (2009) also use a three percent discount rate for similar purposes. The Congressional Budget Office, in its estimates of the costs of government programs in out years, uses a two percent rate, and the Office of Management and Budget uses a seven percent rate (Kohyama, 2006). And in a paper in which they engage in somewhat-similar benefit-cost assessments of pregnancy-prevention programs, Wang et al. (2000) use a six percent real discount rate.

Table 6. Estimated Public Cost of a Birth (prenatal care, delivery, postpartum care, five years of services for child)* *Averaged Across all Income-Eligible Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007), Macomber et al. (2010)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007), Macomber et al. (2010)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Macomber et al. (2010)
(2,594+3,241+254)*0.633 +44,688 = 48,452	(2,594+5,003+254)*0.633 +44,688 = 49,657	(2,594+5,849+254)*0.633 +44,688 = 50,193

Table 6, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care, five years of services for child)* *Averaged Across all Income-Eligible Births* *in $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Macomber et al. (2010)
(2,195+3,241+254)*0.633 +44,688 = 48,290	(2,195+5,003+254)*0.633 +44,688 = 49,405	(2,195+5,849+254)*0.633 +44,688 = 49,941

Table 6, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care, five years of services for child)* *Averaged Across all Income-Eligible Births* *in $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Macomber et al. (2010)
(2,567+3,241+254)*0.633 +44,688 = 48,525	(2,567+5,003+254)*0.633 +44,688 = 49,640	(2,567+5,849+254)*0.633 +44,688 = 50,176

Table 6, cont'd. Public Cost of a Birth (prenatal care, delivery, postpartum care, five years of services for child)* *Averaged Across all Income-Eligible Births* *in $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006), Frost et al. (2006)
5,070*0.633 + 44,688 = 47,897

Live Births: Accounting for Delayed vs. Prevented Births

Our ultimate goal is to estimate the cost savings that would be associated with the implementation of various pregnancy-prevention programs. In order to calculate such savings, we must consider both: a) the immediate public cost posed by pregnancies that result in various outcomes, and b) whether a pregnancy that is prevented by a policy intervention is in fact averted altogether or is instead only delayed until a later point in time. We discuss here the way in which we account for the second consideration. We begin by assuming that all pregnancies that are prevented by a given policy intervention would have been unintended, had they occurred. Unintended pregnancies are typically classified as being either mistimed or unwanted. We address our treatment of unwanted and mistimed births in this section, and we discuss our treatment of unwanted and mistimed pregnancies resulting in fetal losses and abortions in subsequent sections of this report.

We make three key simplifying assumptions that we would highlight here. First, we assume that a mistimed birth that is prevented by a given intervention will simply be delayed – that it will instead occur at a later point in time. Second, we assume that an intervention that delays a mistimed birth will induce the mother in question to put off that birth until such time as it is no longer unintended. And third, we assume that an unwanted birth that is prevented by a given intervention will be averted altogether. The first two of these three assumptions may have important implications for the following reasons. Recall that our birth-related public-cost estimates are limited to Medicaid costs for prenatal care, deliveries, and postpartum care, and to the costs associated with various means-tested programs that serve young children. Consider a mistimed birth that – were it to occur – would be to a low-income mother who would use Medicaid benefits to pay for the medical costs of the pregnancy and would then claim means-tested benefits for her child after that child is born. Assume that a policy intervention would cause her to delay that pregnancy. It is possible that, if the focal birth were delayed for a sufficient period of time, the mother would be in a more favorable financial position and would therefore no longer require means-tested benefits for herself or for her child.

Thus, delaying a mistimed birth has the potential to save taxpayers money for two reasons: a) the present discounted value of the same bundle of benefits and services is smaller if that bundle is provided in the future than if it is provided today; and b) a woman who delays a mistimed pregnancy may be less likely, when the pregnancy actually occurs, to claim the means-tested benefits and services that drive our estimates of the public cost of unintended pregnancy. We would ideally like to be able to address both considerations in our estimates. However, due to the likely difficulty of quantifying with any precision the causal relationship between the delaying of a pregnancy and the likelihood that the mother will claim means-tested benefits for herself and/or her child in the future, we have elected not to incorporate this consideration into our estimates. As such, our estimates of the cost savings associated with the prevention of mistimed pregnancies are a function only of the fact that the discounted value of a given level of spending in the future is smaller than the present value of the same level of spending today. In this sense, then, the reader should consider our estimates of a given program's cost savings to be relatively conservative.[40]

In order to measure the proportion of prevented births that are delayed and the proportion are averted altogether, we use special tabulations of data gathered by the Guttmacher

[40] There is another important sense in which our estimates should be considered to be conservative. As is discussed above, we assume that a policy that delays a mistimed birth will simply induce the mother in question to put off that pregnancy until such time as it is no longer unintended. We therefore assume that the delaying of a mistimed pregnancy will have no effect on a woman's total lifetime fertility. To put it another way, we implicitly assume that, if an intervention merely delays a birth, the mother in question is going to have the same number of children over the course of her lifetime as she otherwise would have had; what has changed is the fact that the focal pregnancy will now occur at the time that the mother intends (since the policy is in place at the time when the unintended pregnancy would otherwise have occurred) rather than being mistimed (which would have been the case if the policy had not been in place). This presumption is, on the margins, almost certainly incorrect, since it is presumably the case that the occurrences of at least some pregnancies that are reported as being "mistimed" actually increase a woman's lifetime fertility. In other words, it is almost certainly not true that all mistimed pregnancies prevented by a policy are merely delayed. Some such pregnancies will actually, for all practical purposes, be averted altogether, in the sense that the prevention of some number of mistimed pregnancies will reduce the lifetime fertility levels of the women to whom they occur. However, because we lack data regarding the effect on lifetime fertility of the occurrence of a mistimed pregnancy, we ignore this dynamic here. As is discussed below, the public cost savings associated with averting a birth altogether are substantially larger than are the cost savings associated with simply delaying a birth. Thus, if we were to account for the fact that the prevention of mistimed pregnancies sometimes reduces total lifetime fertility, the estimates presented below of the savings associated with preventing a typical birth (which represent a weighted average of the cost savings of preventing births that are delayed and are averted altogether) would be higher.

Institute.[41] Because the ratio of mistimed to unwanted births among teens is quite different than the equivalent ratio among non-teens, we distinguish between these groups in estimating the relative frequencies of these two types of births. According to the Guttmacher tabulations, 71 percent of teen births that result from an unintended pregnancy are reported to have been mistimed, and 29 percent are reported to have been unwanted. Among births to non-teems, 54 percent are reported to have been mistimed and 46 percent are reported to have been unwanted. As such, we assume that equivalent proportions of births are delayed (for mistimed births) and are averted altogether (for unwanted births). Table 7 summarizes our assumptions in this regard.

Table 7: Proportion of Policy-Prevented Births that are Assumed to have been Delayed vs. Averted Altogether*

Proportion that are Assumed to have been Delayed (%)	Proportion that are Assumed to have been Averted Altogether (%)
Teens	
71.0	29.0
Non-Teens	
54.0	46.0

*Based on special tabulations of data gathered by the Guttmacher Institute on the relative frequencies of mistimed and unwanted pregnancies.

In order to estimate the savings that would be produced by a given intervention, we must determine the difference between the present value of the amount that the public would spend on the various pregnancy-related benefits described above in the absence of that policy and the present value of the amount that the public would spend with the policy in place. This calculation will depend in part on the relative shares of prevented births that are delayed and are averted altogether. For births that are delayed, the relevant public savings will be equal to the difference between the of the cost to the public of providing all relevant benefits and services for that birth today and the discounted cost of providing the same

[41] Special tabulations of unpublished data by the Guttmacher Institute for the National Campaign to Prevent Teen and Unplanned Pregnancy. Published data presented in Finer and Henshaw (2006). We thank the National Campaign for Preventing Teen and Unplanned Pregnancy for providing us with these tabulations.

bundle of benefits and services at a later point in time. For births that are averted altogether, the relevant savings are simply equal to the cost to the public of providing benefits and services for that birth today.

Assume that *b* represents the public cost (again, in $2008) of providing a bundle of benefits and services for a birth that occurs today. If a pregnancy leading to a birth is averted altogether, then the savings to the public from preventing that pregnancy is *b*. If the pregnancy in question is simply delayed, then the equivalent public savings will be a function both of *b* and of the present value of the cost that the birth will pose to the public when it eventually occurs. In accounting for the future cost of this pregnancy, we make two assumptions in addition to the ones discussed above:

- That delayed teen and non-teen births will, on average, occur 4.5 years and 2 years in the future, respectively. This assumption is based on Chandra et al.'s (2005) analysis of data from the 2002 NSFG. These values are close to the median number of years by which pregnant teenagers and non-teenagers report their pregnancies to be mistimed.
- That the pregnancy in question, if it is delayed, will not eventually result in an abortion or a fetal loss.[42]

Both Amaral et al. (2007) and Trussell et al. (2009) use a three percent real discount rate to calculate the net present value of the future costs associated with various pregnancy outcomes. We use the same discount rate here. Thus, we calculate the public savings associated with preventing an unintended birth to a teen mother as follows:[43]

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[42] We assume that such a pregnancy will not eventually result in an abortion because of our underlying assumption that a delayed birth will ultimately occur at a point in time when it is intended. We assume similarly that, if a delayed pregnancy eventually results in a fetal loss, then, because that pregnancy will presumably be intended by the time that the fetal loss occurs, the woman in question will subsequently attempt to give birth once again and will continue doing so until her attempts are successful. It is clear that this assumption is not always borne out. On the other hand, to the extent that delayed pregnancies do sometimes result in one or more fetal loss before ultimately manifesting themselves as births, one might argue that our estimates of the cost of a delayed birth should therefore incorporate the expected public cost, averaged across all delayed births, of such fetal losses. However, for the sake of practicality, we ignore these considerations here and assume instead that any delayed pregnancy that would initially have resulted in a birth had it not been delayed will indeed result in a live birth at the point in time when that pregnancy later occurs.

[43] Trussell et al. (2009), in estimating the cost-effectiveness of various contraceptive methods, use a formula whose structure identical to that of the formulas cited here. The only difference between Trussell et al.'s formula and ours lies in the specific values of the parameters that they and we use in these equations. Much of that difference is attributable to the fact that they utilize a single equation for teens and non-teens. Thus, for

$$Public\ Savings = b - \frac{(0.71*b)}{(1.03)^{4.5}}$$

The equivalent equation for births for non-teens is as follows:

$$Public\ Savings = b - \frac{(0.54*b)}{(1.03)^{2}}$$

Live Births: Public Savings from Preventing an Unintended Birth

We estimate the average amount of public savings associated with preventing an unintended birth using the formulas shown above and the participation-adjusted cost estimates presented in previous subsections. For our policy simulations, we calculate benefit-cost ratios using three different types of cost-savings estimates. The first set of ratios accounts for the cost savings produced by a given intervention only in terms of the public monies that would, absent the program in question, have been spent on Medicaid pregnancy care. The second set of ratios accounts for savings on pregnancy care and infant medical care, and the third set of ratios accounts for savings on pregnancy care and children's programs (the third set of ratios subsumes the second, which is to say that the cost of infant medical care is included within the cost of children's programs). We therefore present separate cost savings estimates for each of these three categories in the tables below. Since we also use separate formulas to estimate the net present value of a prevented pregnancy for teens and non-teens, we report six different sets of estimates in all. The results of these calculations are presented in Tables 8 – 13.

example, their estimate of the proportion of births that are mistimed (.6) is in between the estimates that we use here for non-teens and teens (.54 and .7, respectively).

Table 8. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
1,459	1,882	2,085

Table 8, cont'd. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
1,364	1,786	1,989

Table 8, cont'd. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum car) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
1,453	1,875	2,078

Table 8, cont'd. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care) *Averaged Among Medicaid-Eligible Births* *In $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006)
1,215

Table 9. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
1,891	2,438	2,700

Table 9, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care) *Averaged Among Medicaid-Eligible Births* *in $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
1,767	2,314	2,577

Table 9, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care) *Averaged Among Medicaid-Eligible Births* *in $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)
1,882	2,429	2,692

Table 9, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care) *Averaged Among Medicaid-Eligible Births* *in $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006)
1,574

Table 10. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care, one year of medical care for infant) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007), Frost et al. (2006)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007), Frost et al. (2006)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Frost et al. (2006)
3,769	4,192	4,395

Table 10, cont'd. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care, one year of medical care for infant) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Frost et al. (2006)
3,674	4,094	4,299

Table 10, cont'd. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care, one year of medical care for infant) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Frost et al. (2006)
3,763	4,185	4,388

Table 10, cont'd. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care, one year of medical care for infant) *Averaged Among Medicaid-Eligible Births* *In $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006), Frost et al. (2006)
3,525

Table 11. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care, one year of medical care for infant) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007), Frost et al. (2006)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007), Frost et al. (2006)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Frost et al. (2006)
4,883	5,430	5,693

Table 11, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care, one year of medical care for infant) *Averaged Among Medicaid-Eligible Births* *in $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Frost et al. (2006)
4,759	5,306	5,569

Table 11, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care, one year of medical care for infant) *Averaged Among Medicaid-Eligible Births* *in $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007), Frost et al. (2006)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Frost et al. (2006)
4,875	5,422	5,684

Table 11, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care, one year of medical care for infant) *Averaged Among Medicaid-Eligible Births* *in $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006), Frost et al. (2006)
4,566

Table 12. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care, five years of services for child) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007), Macomber et al. (2010)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007), Macomber et al. (2010)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Macomber et al. (2010)
18,383	18,805	19,008

Table 12, cont'd. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care, five years of services for child) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Macomber et al. (2010)
18,287	18,710	18,913

Table 12, cont'd. Estimated Public Savings from Preventing a Birth to a Teenaged Mother (prenatal care, delivery, postpartum care, five years of services for child) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Macomber et al. (2010)
18,376	18,799	19,002

Table 12, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care, one year of medical care for infant) *Averaged Among Medicaid-Eligible Births* *in $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006), Macomber et al. (2010)
18,139

Table 13. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care, five years of services for child) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Amaral et al. (2007), Amaral et al. (2007), Amaral et al. (2007), Macomber et al. (2010)	Amaral et al. (2007), Machlin and Rohde (2007), Amaral et al. (2007), Macomber et al. (2010)	Amaral et al. (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Macomber et al. (2010)
23,813	24,360	24,623

Table 13, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care, five years of services for child) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Machlin and Rohde (2007), Amaral et al. (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007), Machlin and Rohde (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007), Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Macomber et al. (2010)
23,690	24,237	24,499

Table 13, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care, five years of services for child) *Averaged Among Medicaid-Eligible Births* *In $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007), Amaral et al. (2007), Macomber et al. (2010)	Machlin and Rohde (2007) alternative estimate, Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007), Macomber et al. (2010)
23,805	24,352	24,615

Table 13, cont'd. Estimated Public Savings from Preventing a Birth to a Non-Teenaged Mother (prenatal care, delivery, postpartum care, five years of services for child) *Averaged Among Medicaid-Eligible Births* *in $2008*
Frost et al. (2006), Frost et al. (2006), Frost et al. (2006), Macomber et al. (2010)
23,497

Live Births: Simulation Parameters

One of the most striking features of the estimates presented in these tables is their internal consistency. Given the various combinations of cost estimates that were taken from numerous different data sources, we find it reassuring that there is only relatively modest variation in the figures presented in any given table. We are therefore comfortable, for the purposes of the policy simulations, in selecting a single public-savings estimate of each of these six types of costs that is representative of the relevant range shown here. Specifically, we assume that the prevention of a birth to a teen mother will save the public $1,750, $4,000, and $19,000, according to the three definitions of birth costs articulated above.[44] For non-teens, we use savings estimates of $2,000, $5,000, and $24,000 for the same three categories.[45] We summarize these assumptions in Table 22 in a subsequent subsection.

[44] The mean, median, and midpoint of the estimates reported in Table 8 of the average amount of public savings across all eligible women that are produced by avoiding expenditures on prenatal care, delivery, and postpartum care for a birth to a teenaged mother are approximately $1,719, $1,831, and $1,650, respectively. For savings amounts that are defined based on the costs of these three benefits plus infant care, the equivalent statistics are $4,028, $4,140, and $3,960, respectively. For savings amounts that are defined based on these costs plus children's benefits, the equivalent statistics are $18,642, $18,754, and $18,573, respectively.

[45] The mean, median, and midpoint of the estimates reported in Table 11 of the average amount of public savings across all relevant eligible women that are produced by avoiding expenditures on prenatal care, delivery, and postpartum care for a birth to a non-teenaged mother are approximately $2,226, $2,372, and $2,137, respectively. For savings amounts that are defined based on the costs of these three benefits plus infant care, the equivalent statistics are $5,219, $5,364, and $5,130, respectively; and, for savings amounts that are defined based on these costs plus children's benefits, the equivalent statistics are $24,149, $24,294, and $24,060, respectively.

The Public Cost of Fetal Losses

The cost for medical treatment of a fetal loss to a low-income woman is often subsidized by Medicaid.[46] Since fetal losses are typically unexpected, we also assume that many mothers who experience them will have consumed prenatal care before the event in question, and that such care is sometimes subsidized by Medicaid. We thus attempt to estimate the average Medicaid cost of a fetal loss, in terms of both the cost of any subsidized prenatal care that might have been consumed prior to the event in question and the cost of treatment for the event itself.

Fetal Losses: The Public Cost of Prenatal Care

We assume the percent of fetal losses for which the mother consumes prenatal care is equal to the percent of such pregnancies that would, had a fetal loss not occurred, have ended in a birth.[47] Thomas and Monea (2009) find that, among pregnancies that do not result in a fetal loss, about 77 percent result in a birth. We therefore assume that 77 percent of fetal losses would, had the fetal loss not occurred, have resulted in a birth, that the same share of such pregnancies therefore involve the consumption of prenatal care, and that this care is sometimes publicly subsidized when it is provided to income-eligible women.

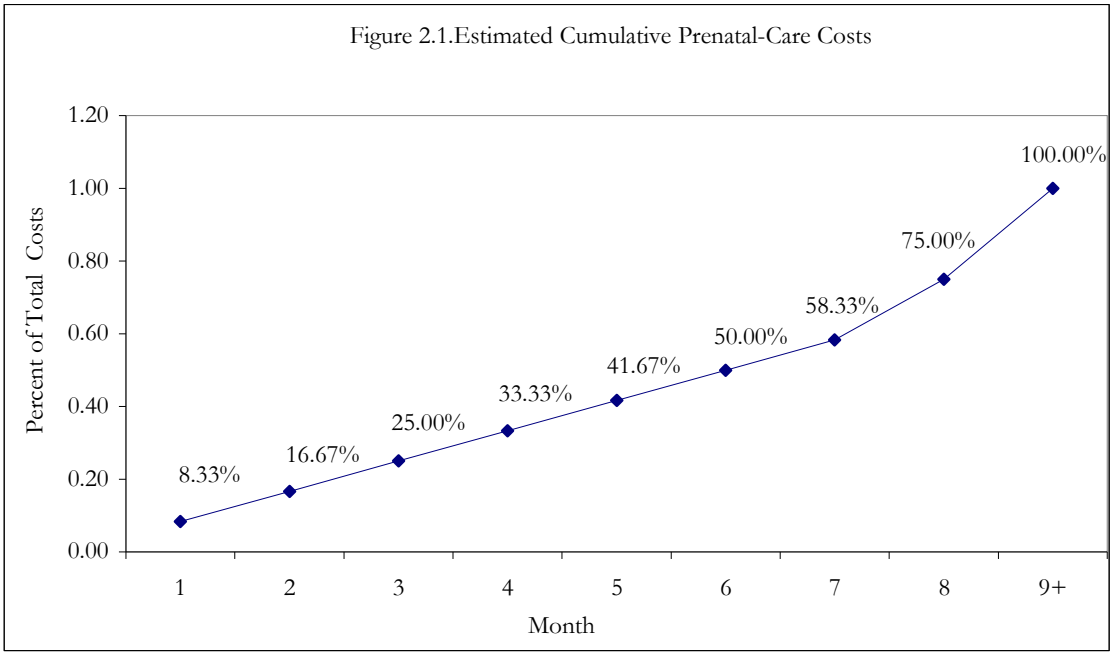
In the previous section, we presented estimates of the average public cost of prenatal care for publicly-subsidized pregnancies that result in a birth. In order to calculate the cost of care for pregnancies ending in a fetal loss, we must correct these estimates to account for the

[46] Fetal losses are often referred to as "miscarriages," although this terminology is technically imprecise. We use the term "fetal loss" to refer here to pregnancies that fail to result in a live birth for reasons other than induced abortion. This discussion applies only to detectable fetal losses. A substantial number of fetal losses are undetected – often, even by the mother. We assume that undetected fetal losses impose no cost on taxpayers and are therefore irrelevant to this exercise.

[47] We thus implicitly assume that, for any fetal loss that would otherwise have ended in an abortion, the mother consumed no prenatal care prior to the loss of the fetus. We conducted a sensitivity analysis in which we re-estimated the cost of prenatal care for fetal losses by attempting to account – using the relatively-scarce data that are available on the subject – for the fact that a small subset of pregnancies resulting in an abortion involved the consumption of prenatal care prior to the termination of the pregnancy. Such occurrences are sufficiently rare, however, that our accounting for them had virtually no effect on our estimates of the average cost of prenatal care per fetal loss. One might argue that some fetal losses would not have involved the use of prenatal care, even if the pregnancy in question would eventually have resulted in a birth had the fetal loss not occurred. Indeed, one might argue further that a lack of prenatal care may have contributed to the occurrence of the fetal loss. However, we are unaware of any data that would help us to determine how often this is the case. As such, we make the arguably-strong (but, in our view, sensible) assumption that all fetal losses that would otherwise have ended in a birth involve the consumption of prenatal care prior to the loss of the fetus.

fact that such pregnancies are not carried to term. Using data on gestation periods reported in Thomas and Monea (2009), we calculate that the average gestation period for a fetal loss lasts about 19 percent as long as for the average birth.[48] There is, however, some evidence that prenatal-care costs do not grow linearly with gestation length. For example, in its prenatal-care guidelines, the U.S. Department of Health and Human Services (HHS) recommends that a pregnant woman visit her doctor about once per month during weeks 4 through 28 of her pregnancy, twice per month during weeks 28 through 36, and weekly from week 36 until the birth.[49] Thomas and Monea (2009) present data indicating that the typical gestation period for a pregnancy resulting in a birth is about 37 weeks.[50] The HHS guidelines thus suggest that a pregnant woman visit her doctor twelve times during her pregnancy (seven times during the first 28 weeks, four times between weeks 28 and 36, and once in the 37th and final week).[51] If the intensity of prenatal care mirrors the frequency of doctors' visits, then the cumulative distribution of prenatal care costs might roughly resemble the following:

[48] We make this calculation using the midpoints of the ranges provided in Thomas and Monea (2009). The authors report that the typical gestation period lasts between 245 and 273 days for a live birth and between 28 and 70 days for a fetal loss.
[49] U.S. Department of Health and Human Services (2009).
[50] The midpoint of the gestation period for a typical birth referenced in footnote 46 is 259 days, which corresponds to 37 weeks.
[51] Our own tabulations of NVSS data suggest that the number of prenatal visits associated with pregnancies resulting in live births is roughly consistent with HHS's recommendations. We find that, among pregnancies resulting in a birth in 2006 for which data are available (97 percent of all births in that year), about 84 percent involved between seven and 16 visits, and that about two thirds of such pregnancies involved between nine and 14 visits.



The data reported in Thomas and Monea (2009) suggest that the typical gestation period for a pregnancy resulting in a fetal loss is roughly 49 days, or seven weeks.[52] If we were to assume that prenatal-care costs do not grow linearly with gestation length, but that their growth is instead proportional to the growth in the number of recommended doctor's visits over the term of a pregnancy, we would estimate that a woman whose pregnancy results in a fetal loss will have consumed about 16.7 percent of the amount of prenatal care that she would have consumed had her pregnancy resulted in a birth. Thus, we estimate the public cost of prenatal care among pregnancies resulting in a fetal loss by multiplying our initial estimates of the cost of prenatal-care (see Table 1) by .167:[53]

[52] The midpoint of the range of gestation periods for a typical fetal loss referenced in footnote 46 is 49 days.
[53] We calculated an alternative set of estimates in which we assumed that public prenatal-care costs do in fact increase linearly with the length of the gestation period, which is to say that we multiplied our base prenatal-care costs by .19, rather than by .167. The differences between the cost estimates that we produced using that method and the estimates presented here were quite small. Thus, we only report estimates here that were generated using the "non-linear" adjustment method described above.

Table 14. Estimated Unadjusted Public Cost of Prenatal Care *Estimated Averages Across all Fetal Losses whose Medical Treatment was Subsidized by Medicaid in $2008*		
Amaral et al. (2007)	Machlin and Rohde (2007)	Machlin and Rohde (2007) alternative estimate
2,594*0.167 = 432	2,195*0.167 = 366	2,567*0.167 = 428

Finally, we account for the fact that, as discussed above, only 77 percent of fetal losses are estimated to have resulted from a pregnancy that would otherwise have ended in a birth. We assume that the same proportion of these pregnancies involved the consumption of prenatal care. Thus, our final estimates of average cost to the public of prenatal care for a publicly-subsidized fetal loss are as follows:

Table 15. Estimated Corrected Public Cost of Prenatal Care *Estimated Averages Across all Fetal Losses whose Medical Treatment was Subsidized by Medicaid in $2008*		
Amaral et al. (2007)	Machlin and Rohde (2007)	Machlin and Rohde (2007) alternative estimate
2,594*0.167*0.77 = 332	2,195*0.167*0.77 = 281	2,567*0.167*0.77 = 329

Fetal Losses: The Public Cost of Medical Treatment

We are unaware of any published estimate that uses national data to calculate the cost of medical treatment for the average publicly-funded fetal loss. However, Trussell et al. (2009) estimate the average cost of a fetal loss without regard to whether the cost is public or private. We have some confidence that this estimate may be roughly equivalent to the public cost of a government-subsidized fetal loss because, in examining other results reported in the same study, we concluded that the authors' estimate of the average cost of an abortion (again, without regard to the source of the funding for the procedure) is similar to other published estimates of the taxpayer cost of a publicly-funded abortion.[54] Thus, we take Trussell et al.'s estimates to be a proxy for the taxpayer cost of the average publicly-funded fetal loss. The authors separately report the cost of an ectopic pregnancy (which is a particular type of fetal loss resulting from a pregnancy that occurs outside the uterus;

[54] Trussell et al. (2009) estimate that the cost of the average abortion is $537 in $2007, or $557 in $2008. According to Sonfield et al. (2008), state governments spent $88.8 million to fund 177,213 abortions in FY 2006, while the federal government spent $183,000 on 191 abortions. We use these figures to estimate that the cost to the public of the average publicly-funded abortion was $501 in $2006, or $543 in $2008.

treatment of an ectopic pregnancy is relatively expensive) and all other fetal losses. They estimate that, in $2007, the average cost of an ectopic pregnancy is $10,613 and that the average cost of any other spontaneous abortion is $537. Since about one percent of pregnancies result in an ectopic pregnancy and about 16.5 percent result in a fetal loss, we calculate that about six percent of fetal losses result in an ectopic pregnancy.[55] As such, we use the data reported by Trussell et al. to estimate that the average cost of a publicly-subsidized fetal loss is ((.06*$10,613) + (.94*$537)) = $1,148 in $2007, or $1,190 in $2008.

This estimate, however, differs from the quantity that we would ideally like to measure in two ways. First, it is, as discussed above, explicitly based on the cost of all fetal losses, rather than of fetal losses that are publicly subsidized. And second, while Trussell et al.'s estimate of the cost of a non-ectopic fetal loss appears to measure the cost of the procedure to the insurer, their estimate of the cost of an ectopic pregnancy appears to be based on the cost of the procedure to the medical-care provider. All of the other estimates presented in this report refer specifically to costs that are billed to the party that helps to cover the expense of the patient's medical care (which, for the purposes of the current discussion, is the government). This approach ensures that we are in fact measuring, to the extent possible, the cost to taxpayers of subsidizing a given bundle of medical services, rather than the combination of taxpayer costs, patient copayments, and any discount below cost that the medical-care provider might be offering. Given that a portion of the Trussell et al. estimates measure the cost of treatment for fetal losses to the provider rather than to the insurer, these figures are therefore less than ideal for the purposes of our analysis. As such, we generate an alternative estimate using Trussell et al.'s approach that partially accounts for these considerations and is therefore somewhat closer to a measure of the cost to the insurer (in this case, taxpayers) of a publicly-subsidized fetal loss.[56] See the footnote below for an

[55] On the proportion of pregnancies resulting in an ectopic pregnancy, see Amaral et al. and Trussell et al (2009), and, on the proportion of pregnancies resulting in a fetal loss, see Ventura et al. (2009).

[56] Trussell et al. estimate the cost of an ectopic pregnancy by multiplying by a factor of 1.6 Machlin and Rhode's (2007) estimate of the median medical-care-provider cost of a hospital birth across all births (regardless of whether the cost of the birth was subsidized by the government). We adopt a modified version of Trussell et al.'s approach in order to produce an estimate that more closely approximates the cost to the insurer (i.e., the government) of treatment for a publicly-subsidized ectopic pregnancy. Like Trussell and his coauthors, we use data from Machlin and Rhode – who report average costs for all births and for only those births that are to women who are covered by Medicaid for the duration of their pregnancies – and we make use of the fact that, according to estimates reported earlier in this report, an average of 93.1 percent of the expenses for a Medicaid-subsidized birth are paid for by Medicaid. Machlin and Rhode estimate that the median cost of

explanation of the way in which this alternative estimate is calculated. This adjusted estimate (which, for reasons discussed in the footnote, still can not be considered to be a pure estimate of the public costs of a fetal loss but is closer to this quantity than is the original cost estimate described above) suggests that the average cost of medical treatment for a publicly-subsidized fetal loss is $939 in $2008.

We produce another estimate of the public cost of medical treatment for a fetal loss using data on Medicaid-subsidized fetal losses in the state of California as reported in Amaral et al. (2007). The authors estimate that the average cost to Medi-Cal for an ectopic pregnancy is $1,016 and that the average cost to the program for all types of fetal losses other than ectopic pregnancies is $406 (both are expressed in $2002). We use these data to estimate an average cost of a Medicaid-subsidized fetal loss in California of ((.06*$1,016) + (.94*$406)) = $443. We have no way of knowing with certainty the extent to which the average national cost of a publicly-subsidized fetal loss might differ from the equivalent average cost in California. However, we do, as discussed in a previous section, have data on the extent to which costs in California are higher than in the U.S. as a whole with respect to the costs of prenatal care, deliveries, and postpartum care combined for pregnancies that result in a live birth. We assume here that the same proportional difference exists between California-specific and national-level costs with respect to publicly-subsidized fetal losses. Under this assumption, we use the Amaral et al. data to estimate that the average national cost of a publicly-subsidized fetal loss is $352 in $2002, or $449 in $2008. Table 16 summarizes our various estimates of the public cost of medical treatment for a fetal loss.

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a birth for a woman who has Medicaid throughout her pregnancy is $3,928 in $2004. Thus, we estimate a taxpayer cost in $2008 of a publicly-subsidized ectopic pregnancy by: a) multiplying this amount by .931 to calculate the portion of the cost of an average publicly-funded birth that is subsidized by the government, b) multiplying this amount by 1.6, as per Trussell et al.'s methodology, and c) inflating this estimate to $2008. This process produces an estimate of the average government cost of publicly-subsidized medical care for an ectopic pregnancy of $6,869 in $2008. Combining this figure with Trussell et al.'s reported estimate for the cost of a non-ectopic fetal loss, we estimate that the average cost to the government for a publicly-subsidized fetal loss is $939. Recall that Trussell et al.'s estimate of the cost of a non-ectopic fetal loss *does* appear to measure the cost to the insurer rather than to the medical-care provider but that it is *not* based on the cost of a publicly-subsidized non-ectopic fetal loss. Given the latter stipulation, we still can not claim that this adjusted estimate is purely a reflection of the public cost of a fetal loss. However, it is closer to this quantity than is the original, "unadjusted" Trussell et al. estimate.

Table 16. Estimated Public Cost of a Fetal Loss (medical treatment) *Averaged Across all Fetal Losses whose Medical Treatment was Subsidized by Medicaid in $2008*		
Amaral et al. (2007)	Trussell et al. (2009)*	Trussell et al. (2009) alternative estimate*
449	1,190	939

*Not purely a public-cost estimate.

Table 17 presents a range of estimates of the average full taxpayer cost of a publicly-subsidized fetal loss, accounting both for the cost of the medical treatment for the outcome itself and of prenatal care in those instances in which such care was used prior to the loss of the fetus. These estimates are expressed as averages calculated across all publicly-subsidized fetal losses.

Table 17. Estimated Public Cost of a Fetal Loss (prenatal care (adjusted), medical treatment)* *Averaged Across all Fetal Losses whose Medical Treatment was Subsidized by Medicaid in $2008*		
Amaral et al. (2007), Amaral et al. (2007)	Amaral et al. (2007), Trussell et al. (2009)**	Amaral et al. (2007), Trussell et al. (2009) alternative estimate**
332+449 = 781	332+1,190 = 1,522	332+939 = 1,272

Table 17, cont'd. Public Cost of a Fetal Loss (prenatal care (adjusted), medical treatment)* *in $2008*		
Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Trussell et al. (2009)**	Machlin and Rohde (2007), Trussell et al. (2009) alternative estimate**
281+449 = 730	281+1,190 = 1,471	281+939 = 1,221

Table 17, cont'd. Public Cost of a Fetal Loss (prenatal care (adjusted), medical treatment)* *in $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Trussell et al. (2009)**	Machlin and Rohde (2007) alternative estimate, Trussell et al. (2009) alternative estimate**
329+449 = 777	329+1,190 = 1,519	329+939 = 1,268

*Components may not sum to total due to rounding. **Not purely a public cost estimate.

Fetal Losses: Take-up of Medicaid Pregnancy Care

As was discussed above, the public subsidizes the cost of prenatal care (when such care is used) and medical treatment for fetal losses via the pregnancy-care component of the Medicaid program, which we assume to be available to women who are below 200 percent of the poverty line. We are unaware of any data on the take-up of pregnancy care that are specific to women whose pregnancies result in fetal losses. Thus, we assume that the take-up rate for medical care for fetal-loss pregnancies is the same as for pregnancies resulting in live births. Recall that we assume there to be a 63.3 percent take-up rate among women under 200 percent poverty for Medicaid pregnancy care for pregnancies resulting in live births. We therefore adjust our fetal-loss cost estimates by multiplying them by the same estimated take-up rate in order to produce estimates of the public cost of prenatal care and medical treatment for fetal losses that are averaged across all women who are eligible to take up these services (i.e., across all fetal losses that are to women who are below 200 percent of the poverty line). Our participation-adjusted estimates of the full public cost of fetal losses are presented in Table 18 below.

Fetal Losses: Public Savings from Preventing a Fetal Loss

We assume that, even if a fetal loss is the result of an unintended pregnancy that is reported as having been mistimed, the prevention of the relevant pregnancy will have no effect on a woman's future fertility. Thus, assume, for example, that a woman who intends to have a child five years in the future becomes unintentionally pregnant before reaching that point in time, and that her pregnancy results in a fetal loss. We assume that the experience of having had that fetal loss will not affect her future childbearing, and that preventing the fetal loss in question will therefore also have no effect on her fertility history from that point forward. As a result, we assume that the question of whether a fetal loss is the result of a mistimed or an unwanted pregnancy is irrelevant since, in either case, the pregnancy in question can be assumed to have been averted altogether. We therefore assume that, when a fetal loss is prevented, the public always recoups the full cost of subsidizing the pregnancy in question. Thus, we do not adjust our fetal-loss cost estimates to account for the possibility that a prevented "mistimed fetal loss" will occur at some point in the future. As such, our participation-adjusted estimates of the public cost of a fetal loss are identical to our estimates

of the public savings produced by preventing a fetal loss, as averaged across all fetal losses that occur to women who are below 200 percent of poverty. The figures reported in the table below can therefore be considered to represent our estimates of the public cost of fetal losses *and* of the public savings associated with the prevention of pregnancies that produce them.[57]

Table 18. Estimated Public Savings from Preventing a Fetal Loss (prenatal care (adjusted), medical treatment)* *Averaged Among Medicaid-Eligible Pregnancies Resulting in Fetal Losses in $2008*		
Amaral et al. (2007), Amaral et al. (2007)	Amaral et al. (2007), Trussell et al. (2009)**	Amaral et al. (2007), Trussell et al. (2009) alternative estimate**
(332+449)*0.633 = 494	(332+1,190)*0.633 = 964	(332+939)*0.633 = 805

Table 18, cont'd. Public Savings from Preventing a Fetal Loss (prenatal care (adjusted), medical treatment)* *Averaged Among Medicaid-Eligible Pregnancies Resulting in Fetal Losses in $2008*		
Machlin and Rohde (2007), Amaral et al. (2007)	Machlin and Rohde (2007), Trussell et al. (2009)**	Machlin and Rohde (2007), Trussell et al. (2009) alternative estimate**
(281+449)*0.633 = 462	(281+1,190)*0.633 = 931	(281+939)*0.633 = 773

Table 18, cont'd. Public Savings from Preventing a Fetal Loss (prenatal care (adjusted), medical treatment)* *Averaged Among Medicaid-Eligible Pregnancies Resulting in Fetal Losses in $2008*		
Machlin and Rohde (2007) alternative estimate, Amaral et al. (2007)	Machlin and Rohde (2007) alternative estimate, Trussell et al. (2009)**	Machlin and Rohde (2007) alternative estimate, Trussell et al. (2009) alternative estimate**
(329+449)*0.633 = 492	(329+1,190)*0.633 = 961	(329+939)*0.633 = 803

*Components may not sum to total due to rounding. **Not purely a public cost estimate.

[57] Note that we do not differentiate these estimates by age. We present separate estimates of public savings associated with the prevention of unintended births for teens and non-teens because of the fact that we make different assumptions for these two groups regarding the share of unintended pregnancies that are unwanted and mistimed. As per the discussion above, we do not consider, when calculating our fetal-loss estimates, whether a given pregnancy is unwanted or mistimed. We therefore present a single set of estimates for both age groups.

Fetal Losses: Simulation Parameters

The table above shows proportionally-large differences between estimates that rely on Amaral et al.'s data and Trussell et al.'s data to calculate the cost of medical treatment for a fetal loss. This discrepancy may be a function of imperfections in either or both of the two sets of estimates. To the extent that the proportional difference between the average public cost of fetal losses in California and in the country as a whole is not equivalent to the analogous difference for births, our method of "nationalizing" the California-specific Amaral et al. estimate rests upon a faulty assumption. On the other hand, the fact that even the adjusted Trussell et al. figure is not a "pure" estimate of the public cost of a fetal loss may also explain at least part of the discrepancy between these estimates. We have no way of gauging which of these estimates is the most reliable.

Fortunately, however, while the variation among these estimates is large in proportional terms, it is also, in practical terms, relatively small. Because fetal losses are less common than births – and since the magnitudes of these savings estimates are much smaller than the comparable estimates of the savings generated by preventing an unintended birth – the specific value that we select from within the range presented in this table has little effect on the bottom-line results of the benefit-cost simulations that are informed by this analysis. For the purposes of the simulations, we therefore assume that the prevention of a fetal loss resulting from an unintended pregnancy will save the public an average of $750 (where this average is calculated across all fetal losses that are presumed to be eligible for public subsidies). This amount is less than the median of the estimates shown in the table and is slightly more than the mean.[58] However, if we were to have selected even the smallest or largest estimates from the table for this purpose, the results of the policy simulations described in Thomas (2010b) would have been qualitatively similar.

[58] This amount is expressed in $2008. The mean, median, and midpoint of the estimates reported in Table 18 of the average public savings across all eligible women that are produced by avoiding expenditures on prenatal care and medical treatment for a fetal loss are $743, $803, and $713, respectively.

The Public Cost of Abortions

The so-called Hyde Amendment places tight restrictions on the circumstances under which the federal government may subsidize abortion services. Specifically, a woman's abortion may be paid for by the government only if she is income eligible *and* is having an abortion because a) she became pregnant due to rape or incest; b) the pregnancy is endangering her life; or c) the woman lives in one of 17 states that use their own funds to subsidize most or all abortions that are deemed to be "medically necessary" by a health-care professional.[59] Sonfield et al. (2008) estimate that that, in fiscal year 2006, state governments spent $88.8 million to subsidize 177,213 abortions, and that the federal government spent an additional $183,000 to subsidize 191 abortions using federal Medicaid funds. In total, then, we estimate that the federal and state governments combined spent less than $90 million on abortions in FY 2006. In the next section, we describe calculations in which we estimate that total public spending on subsidized births and children's benefits combined is about $105 billion. Thus, due to restrictions on the public funding of abortions, such expenditures are dwarfed by public spending on births.

Given that taxpayer expenditures on abortions are, in relative terms, quite limited – and because it would be difficult to determine which abortions within the simulation satisfy the requirements for public financing in the states in which they occur – we opt to ignore the cost of abortion altogether in our simulations. In other words, we do not include cost savings from prevented abortions in our estimates of the monetary benefits of preventing unintended pregnancies.[60]

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[59] Six of the 33 states that fund abortions according to federal guidelines and therefore only in cases of rape, incest, or life endangerment also make exceptions in cases of fetal abnormality or physical health endangerment to the mother. For more detail on public abortion funding rules by state, see Guttmacher Institute (2010) and Kaiser Family Foundation (2010e).

[60] For prevented pregnancies that: a) are mistimed and b) would have resulted in abortions in the event that they had occurred, we also assume that their prevention will have no effect on women's total lifetime fertility levels. For example, consider a teenager who intends to become pregnant in her twenties but becomes pregnant unintentionally and has an abortion at, say, age 18. We assume that the termination of that mistimed pregnancy will have no effect on the number of children that she will bear in the future. If it were in fact the case that the prevention of an abortion could cause the subsequent occurrence of a birth or a fetal loss that would not otherwise have occurred, it might be possible for there to be net negative cost savings associated with the prevention of some abortions. However, we see no compelling reason to relax our assumption that, for all intents and purposes, there is no such thing as a "mistimed abortion."

Estimating the Share of Total Public Spending Captured by our Analysis

In the exposition above, we exclude from consideration public spending on non-means-tested programs, we only consider means-tested spending on women and children who are under 200 percent of the poverty line, and we do not consider public spending on abortions. We estimate here the share captured by our analysis of total government spending at the federal, state, and local levels on the subsidization of pregnancies and on the provision of benefits and services to children under the age of five.

Assume, for the sake of argument, that 50 percent of all government spending on pregnant women and young children is non-means-tested and that 80 percent of means-tested spending goes to pregnant women and young children who were under 200 percent of the poverty line. Under these circumstances, our analysis would capture .5*.8 = 40 percent of total government expenditures on these individuals. Thus, we must consider, for each spending category, the share of public dollars that are disbursed on a non-means-tested basis and the proportion of means-tested dollars that go to pregnant women and young children who are over 200 percent of poverty. We begin with a discussion of spending on births, which is followed by a treatment of fetal losses and abortions. We then conclude this section by estimating the total proportion of government spending on pregnant women and young children that is captured in our analysis. In order to make this final calculation, we must have estimates of total spending on each pregnancy outcome. As we discuss these outcomes below, we therefore present rough estimates of total government spending on each of them.

With respect to births, we specifically consider public spending on pregnancy care and children's benefits (since spending on infant medical care is subsumed by spending on children's benefits, we do not consider the former as a separate spending category for the purposes of the current discussion). As is discussed in an earlier section, essentially all public spending on prenatal care, deliveries, and postpartum care is disbursed by the Medicaid program on a means-tested basis. In Table 3, we report estimates of government spending on publicly-subsidized pregnancy care per Medicaid birth. Our estimates range from $5,070 to $8,697. The National Governors Association (2007) reports that there were

approximately 1.5 million births financed by Medicaid in 2003, which is the most recent year for which data are available.[61] We therefore estimate in rough terms that total annual expenditures on Medicaid-financed births are between (1.5 million*$5,070) ≈ $8 billion and (1.5 million*$8,697) ≈ $13 billion. As was discussed in a previous section, we calculate that our analysis captures about 85 percent of total public spending on Medicaid-subsidized pregnancy-care services. Presuming that there is no public spending on pregnancy care that is disbursed on a non-means-tested basis, we therefore assume that our analysis captures an equivalent share of all public spending on these services.

Regarding public spending on children's benefits, we use data contained in Macomber et al. (2009) and in Kent et al. (2010) to estimate the proportion of spending that our analysis captures by focusing solely on means-tested expenditures. Macomber et al. (2009) find that, of the roughly $57 billion in federal expenditures on children under the age of three in 2007, $40.2 billion – or 71 percent – was means-tested. Similarly, Kent et al. (2010) report that, of the $60.5 billion in federal expenditures on children aged three to five in 2008, $38.6 billion – or 64 percent – was means-tested. As such, we assume that, by virtue of limiting our analysis to means-tested spending, we capture equivalent proportions of total spending on these two groups. We are unable to calculate an equivalent quantity for state and local spending because (as is described in an earlier section) the relevant reports do not contain information on tax expenditures at these levels of government. We therefore make the simplifying assumption that the share of federal and of state and local expenditures that are means tested are the same.

Under the assumption that children under the age of three constitute 60 percent of all children under the age of five, we thus estimate that (.6*.71 + .4*.64) ≈ 68 percent of all spending on children under the age of five is means tested. In calculating the public cost of children's benefits, we express means-tested spending on these programs as averages that are calculated by dividing total spending on them by the number of children who are under 200 percent of poverty. We therefore do not exclude any spending on children's benefits by

[61] The analysis described in this subsection requires that we draw on data from a variety of different sources. Due to limitations in these data, it was not possible for us to ensure that all of the estimates incorporated into this discussion were taken from the same year. We therefore chose instead to use estimates corresponding to the most recent year for which data are available in each instance.

virtue of our focus on children in this income-to-needs range.[62] As such, we assume that our analysis captures 68 percent of total government spending on children's benefits by virtue of the fact that it is limited to spending on means-tested benefits that are disbursed to children who are under 200 percent of poverty.

We combine our estimates of per-child spending with our tabulation of the number of children who are under the age of five and whose families are below 200 percent of the poverty line to calculate that the federal government spends about $90 billion annually on this group.[63] Thus, we estimate that, roughly speaking, total annual spending on these children and on pregnancies that result in births is between ($90 billion + $8 billion) = $98 billion and ($90 billion + $13 billion) = $103 billion. As such, we assume that pregnancy care constitutes between ($8 billion/$98 billion) ≈ eight percent and ($13 billion/$103 billion) ≈ 13 percent of total spending on children under the age of five. Finally, we estimate that the share of total spending at all levels of government on pregnant women and young children that is a) means-tested and b) spent specifically on individuals under 200 percent of the poverty line is between (.08*.85 + .92*.68) ≈ 69 percent and (.13*.85 + .87*.68) ≈ 70 percent. For the purposes of the calculations made at the end of this section, we assume that our analysis captures 70 percent of combined government spending on publicly-subsidized births and benefits for young children.

For the public cost of fetal losses, the equivalent calculation is more straightforward. We assume that our analysis captures 85 percent of total public spending on fetal losses, since: a) medical treatment and prenatal care for fetal losses are sometimes publicly subsidized via Medicaid; b) we assume that all public spending on these services is provided through

[62] On the other hand, one might critique our approach by suggesting that we are inappropriately concentrating means-tested spending on this group in particular – that, in other words, it would be more appropriate for us to average this spending over a group of children that is bounded by an income-to-needs threshold higher than 200 percent of poverty. While it is certainly true that at least some of these dollars are in fact spent on children over the 200-percent-of-poverty threshold, we would argue that the amount of spending for which this is true is likely to be quite small, relative to the total amount of federal, state, and local expenditures on children's benefits.

[63] According to our tabulations of 2009 CPS data, there were about 9.5 million children in that year who were under the age of five and were living in families whose incomes placed them under 200 percent of the poverty line. We estimated in a previous section that federal, state, and local governments spend an average of $9,474 per year per child on children in this group. We therefore calculate total annual public spending on these children to be (9.5 million*$9,474) ≈ $90 billion.

Medicaid, which is to say that we assume 100 percent of such spending to be means-tested; c) there is no equivalent for fetal losses of the spending on children's benefits described above in our treatment of births; and d) we calculate, as is discussed above, that our analysis captures 85 percent of total spending on Medicaid-subsidized pregnancy care. In order to estimate total government spending on pregnancies resulting in fetal losses, we would ideally like to have an estimate of the number of such pregnancies that are subsidized by Medicaid. However, we are unaware of any published estimates of this quantity. We therefore assume that the proportion of fetal losses that are publicly subsidized is the same as the proportion of births that are publicly subsidized. As was discussed in a previous subsection, we estimate that about 38 percent of births are subsidized by Medicaid. Ventura et al. (2009) report that there were about 1.06 million fetal losses in 2005, which is the most recent year for which data are available. We therefore assume that there are (1.06 million*.38) ≈ 400,000 publicly-subsidized fetal losses each year. The estimates reported in Table 15 suggest that the average level of public spending on a Medicaid-subsidized fetal loss is between $730 and $1,272. We therefore calculate that total annual public expenditures on fetal losses are between (400,000*$730) ≈ $292 million and (400,000*1.272) ≈ $509 million.

Regarding abortions, our discussion in the previous section suggests that total government expenditures on pregnancy terminations (which we estimate to be a little under $90 million annually) amount to less than one tenth of one percent of spending on publicly-subsidized births and children's benefits.[64] Thus, consideration of public spending on abortions would have little effect on the results of our policy analyses. To summarize, then: a) we estimate that our analysis captures about 70 percent of total public spending at all levels of government on pregnancies that result in births and on benefits provided to young children; b) we estimate further that we capture about 85 percent of spending on pregnancies that result in fetal loss, and c) we do not consider the limited amount of government funding for publicly-subsidized abortions.

[64] If we instead exclude the cost of children's benefits from this calculation and use our most conservative estimate of the combined taxpayer costs of prenatal care, delivery, and postpartum care, we find that public spending on abortions amounts to about one percent of public spending on subsidized births.

We combine our estimates from the discussion above of spending on each of these outcomes to calculate, in rough terms, the total amount of public spending on pregnant women and young children that is captured by our analysis. Since we present a range of estimates for spending on births and fetal losses, we select the midpoint of these ranges.[65] Thus, we estimate that annual government expenditures on publicly-subsidized births and children's benefits combined, on publicly-subsidized fetal losses, and on publicly-subsidized abortions are as follows: ($98 billion + $103 billion)/2 ≈ $100 billion for births; ($292 million + $509 million)/2 ≈ $400 million for fetal losses; and, as stated in the previous section, about $90 million for abortions. We therefore calculate total government spending on pregnant women and young children to be roughly ($87 billion + $400 million + $90 million) ≈ $87.5 billion, and we calculate the portion of this spending captured by our analysis to be (($100 billion*.71) + ($400 million*.85) + ($90 million*0)) ≈ $70.3 billion. We thus estimate that our analysis captures (70.3/100.5) ≈ 70 percent of total spending at all levels of government on pregnant women and children under the age of five. Had the analysis described in Thomas (2010b) accounted for that portion of public spending that is not considered here, the benefit-cost ratios reported in that paper would have been somewhat higher.[66]

[65] Had we instead selected any combination of the minimum or maximum values of these ranges, the outcome of the calculations described here would be essentially unchanged.

[66] In all likelihood, only the benefit-cost ratios for the analysis of the mass media campaign in Thomas (2010b) would be noticeably affected if we were to account for the remainder of public spending on pregnant women and children's benefits that is not incorporated into our analysis. Both the Medicaid expansion and the teen pregnancy prevention program simulated in that paper are targeted on low-income populations whose members are disproportionately likely to fall below 200 percent of the poverty line (for the teen pregnancy prevention program) or are often statutorily required to fall below this threshold (for the Medicaid expansion). Most of these individuals would likely be unable to take full advantage of non-means-tested programs such as the dependent exemption and the child tax credit, since they are in low tax brackets and tend to owe relatively little in taxes. However, the simulated mass media campaign affects the behavior of individuals throughout the income distribution. A disproportionate share of the roughly 30 percent of public spending not incorporated into this analysis would presumably be distributed across the 60 percent or so of the population that is over 200 percent of the poverty line, some of whose members are affected by the simulated mass media campaign described in Thomas (2010b).

Imputing Eligibility for Pregnancy-Related Programs

For reasons that have been described in previous sections, we assume that women and children who are below 200 percent of poverty are eligible to take up publicly-subsidized pregnancy care, infant medical care, and children's benefits. The costs of these benefits are modeled within the policy simulations described in Thomas (2010b) by imputing, for each pregnancy to an eligible woman, a set of costs that represent our estimates of the average level of public spending that are associated with a given pregnancy outcome. These costs are adjusted for participation by expressing them as averages that are calculated across all eligible individuals. Eligibility is modeled by explicitly by assigning to each member of the simulation population a binary income-to-needs status as a function of whether the person in question is assumed to be above or below 200 percent of the poverty line. Income-to-needs status is assigned using coefficients from OLS regressions of real-world data in which the dependent variable is a dummy that is set equal to one if a respondent is below twice the poverty line and zero otherwise and the independent variables are demographic controls for age, race, education, and socioeconomic status. We estimate separate regressions for married and unmarried women, and we determine whether a newborn child falls below the 200-percent-of-poverty eligibility threshold as a function of his or her mother's estimated income-to-needs status.[67]

We considered using three different data sources for this simulation: the 2003 Current Population Survey (CPS), the full sample from the 2002 National Survey of Family Growth (NSFG), and a subset of the NSFG that is limited to women who are designated as being currently pregnant. Table 19 reports income-to-needs characteristics for each of these three samples. We also report significance results from student's t-tests that compare the

[67] The simulation model used to conduct the benefit-cost analyses described in Thomas (2010b) is designed to produce a recurring steady state that replicates the conditions that prevailed in 2002, which is the year to which the model is calibrated. In other words, if the model is allowed to run for several years of analysis time, any given slice of 365 days should roughly replicate the salient conditions that prevailed in calendar year 2002. Given this feature of the model, individuals are not aged over the course of the simulation and, as a result, lifetime fertility histories are not tracked for members of the simulation population. As such, we do not account in these regressions for changes in women's income-to-needs status as a result of giving birth. Rather, we estimate a woman's status as a function of her demographic characteristics without reference to the composition of her family. A child's own income-to-needs status within the simulation therefore depends only on his or her mother's characteristics.

characteristics of all women in the CPS and of all women in the NSFG to the characteristics of currently-pregnant women in the NSFG.[68]

Table 19. Proportion Below 200 Percent of the Federal Poverty Line, by Data Source, Marital Status, and Sample Composition

		CPS	NSFG	NSFG
		Women Aged 15-44	*Women Aged 15-44*	*Currently-Pregnant Women Aged 15-44*
Percent below 200% of the Federal Poverty Line	*Among all Women*	32.6***	39.9	41.7
	Among Unmarried Women	40.1***	47.8***	63.5
	Among Married Women	24.8	31.5	31.4

Note: Significance results reported in the first column of data are from t-tests comparing the income-to-needs characteristics of all women aged 15 to 44 in the CPS to the equivalent characteristics of women in the NSFG who are in the same age group and are currently pregnant. Significance results reported in the second column of data are from t-tests comparing the income-to-needs characteristics of women aged 15 to 44 in the NSFG who are not currently pregnant to the equivalent characteristics of women in the NSFG who are in the same age group and are currently pregnant. One asterisk (*) indicates that the difference in question is significant at or beyond the .1 level, two asterisks (**) indicate that the difference is significant at or beyond the .05 level, and three asterisks (***) indicate that the difference is significant at or beyond the .01 level.

The CPS and full-NSFG samples are somewhat similar, although a smaller share of women in the former than in the latter are below 200 percent of the poverty line. The CPS is the dataset used to estimate the official poverty rate, so we consider the income-to-needs estimates that are produced using that dataset to be the most reliable. However, the CPS does not allow us to identify women's pregnancy status. Because the purpose of this exercise is to assign public costs to pregnancies, and since a comparison of the tabulations of the full and currently-pregnant samples from the NSFG suggests that there are substantial income-to-needs differences between all unmarried women and currently-pregnant unmarried women in particular, we are reluctant simply to use CPS-based regression results for all women to assign income-to-needs statuses to pregnant women within the simulation.

[68] Thus, the first column of data reports the results of tests that compare the characteristics of all women in the CPS to the characteristics of currently-pregnant women in the NSFG. Since currently-pregnant women in the NSFG constitute a subset of all women in the same data source, the second column of data actually reports the results of tests that compare the characteristics of currently-pregnant women to women who are not currently pregnant in the NSFG. However, according to our tabulations, less than five percent of women in this dataset are currently pregnant. Thus, the characteristics of all women and of women who are not currently pregnant are very similar. For practical purposes, the significance results reported in the second column can therefore be taken to represent the results of tests comparing the characteristics of all women and currently-pregnant women in the NSFG.

This concern is reinforced by the findings reported in Table 20, which compares the demographic characteristics of women in the three samples. As we do in Table 19, we report here significance results from t-tests that compare the characteristics of all women in the CPS and all women in the NSFG to the characteristics of currently-pregnant women in the NSFG.[69]

[69] See the previous footnote for additional details regarding the way in which these tests were specified. The model used to conduct the analyses described in Thomas (2010b) accounts for variation in the behaviors and outcomes that it simulates as a function of marital status, gender, age, race, education, and socioeconomic status. The demographic profiles of the individuals in the simulation population are similar to the equivalent characteristics of CPS sample members. The simulation model assigns age, race, education, and SES characteristics using the categories that are reflected in the table above. The CPS does not measure maternal education, which is the variable is used to assign a binary socioeconomic status to each member of the simulation population. Thus, we do not report SES characteristics for the CPS sample. See Thomas and Monea (2009) for a thorough description of numerous dimensions of the simulation model's architecture, including its treatment of agents' demographic profiles. We describe in that paper our reasoning for assigning demographic characteristics using the particular disaggregations that are shown here.

Table 20. Characteristics of Women in the CPS and the NSFG

	CPS	*NSFG*	*NSFG*	*NSFG Sample Size*
	Women 15-44	*Women 15-44*	*Currently Pregnant Women 15-44*	*Currently Pregnant Women 15-44*
15-19	16.1%***	16.0%***	9.6%	36
20-24	16.0%***	16.0%***	28.6%	91
25-29	15.1%***	14.9%***	23.2%	93
30-44	52.8%***	53.0%***	38.6%	130
White	64.2%*	65.6%**	57.9%	172
Black	13.5%	14.0%	15.2%	64
Hispanic	15.3%	14.8%*	18.7%	96
Other	7.0%	5.6%	8.2%	18
Less Than High School	21.9%*	21.1%	17.7%	70
High School	25.9%	28.0%	26.2%	104
More Than High School	52.2%	50.9%	56.1%	176
Low SES	--	24.1%	22.6%	97
High SES	--	75.9%	77.4%	253
Unmarried	50.9%***	51.3%***	32.0%	130
Married	49.1%***	48.7%***	68.0%	220

Note: Significance results reported in the first column of data are from t-tests comparing the characteristics of all women aged 15 to 44 in the CPS to the equivalent characteristics of women in the NSFG who are in the same age group and are currently pregnant. Significance results reported in the second column of data are from t-tests comparing the characteristics of women aged 15 to 44 in the NSFG who are not currently pregnant to the equivalent characteristics of women in the NSFG who are in the same age group and are currently pregnant. One asterisk (*) indicates that the difference in question is significant at or beyond the .1 level, two asterisks (**) indicate that the difference is significant at or beyond the .05 level, and three asterisks (***) indicate that the difference is significant at or beyond the .01 level. Separate joint tests were also conducted to measure the significance of between-group differences for the combined age dummies, for the combined education dummies, and for the combined race dummies. For both the comparison of the age characteristics of all women in the CPS to the age characteristics of pregnant women in the NSFG and the comparison of the age characteristics of women who are and are not pregnant in the NSFG, the results of these joint tests were significant beyond the .01 level. The results of the joint test of the race characteristics of women who are and are not pregnant in the NSFG were significant beyond the .1 level. Results were not statistically significant at conventional levels for the joint tests of the race characteristics of all women in the CPS and of pregnant women in the NSFG, of the education characteristics of all women in the CPS and of pregnant women in the NSFG, and of the education characteristics of women who are and are not pregnant in the NSFG.

Notwithstanding the small sample sizes for some demographic categories among pregnant women in the NSFG (see the column on the far right of the table), we interpret these results as suggesting that there are genuine differences between the demographic and income-to-needs characteristics of all women and pregnant women. We have therefore concluded that it would be inappropriate for us to use the CPS to conduct the regressions whose coefficients we use within the policy simulations to assign income-to-needs status. We rule out the full NSFG sample for the same reason. Thus, we use the currently-pregnant subsample of the NSFG to conduct these regressions. However, since the estimates

presented in Table 19 suggest that the NSFG overstates the number of women who are below 200 percent of the poverty line, we apply an adjustment factor to the coefficients from the regressions that were estimated using data on currently-pregnant women in the NSFG. Using the data reported in Table 19, we estimate that the NSFG over-reports the number of all unmarried and married women who are below 200 percent of poverty by (1 – (47.8/40.1)) ≈ 19 percent and (1 – (31.5/24.8)) ≈ 27 percent, respectively. We make the simplifying assumption that the NSFG over-reports the same characteristic to a proportionally-equivalent extent among currently-pregnant women. As such, we adjust each of the coefficients from the NSFG regressions among unmarried and married pregnant women by multiplying them by (1/1.19) ≈ .84 and (1/1.27) ≈ .79, respectively.

Table 21 presents unadjusted and adjusted coefficients from these regressions. Within the simulations described in Thomas (2010b), the adjusted coefficients reported in the two right-hand columns of the table to assign are used to assign to each pregnant woman a probability of falling below 200 percent of the poverty line. Each woman's assigned probability is then compared to the results of a random draw from a uniform (01,) distribution in order to impute an income-to-needs status for her.[70]

[70] A somewhat-different approach is used to impute income-to-needs status in the simulation of expanded income eligibility for Medicaid family-planning services. Under the assumption that women must fall below 200 percent of the poverty line in order to take up these services, the results of regressions of income-to-needs status that are conducted using data on all women (rather than just on pregnant women) are used for the purposes of imputing income eligibility for the Medicaid family-planning simulation. For more information on these imputations, see the discussion of income eligibility in the section of Thomas (2010a) that describes the simulation of an expansion in Medicaid family-planning services.

Table 21. Regressions Results for Imputing Income
Below 200 Percent of Poverty
Among Currently-Pregnant Women Aged 15 – 44 in the 2002 NSFG

	Original Parameter Estimates		*Adjusted Parameter Estimates*	
	Unmarried Women	Married Women	Unmarried Women	Married Women
Age: 20-24	-0.0378	-0.1655	-0.0317	-0.1303
Age: 25-29	0.0075	-0.5167***	0.0063	-0.4068***
Age: 30-44	0.1709	-0.6215***	0.1433	-0.4893***
Education: More Than High School	-0.4805***	-0.2528	-0.4031***	-0.1990
Education: High School	-0.1884*	-0.0826	-0.1580*	-0.0651
Race: Black	-0.3880***	0.1325	-0.3255***	0.1044
Race: Hispanic	-0.4429***	0.1186	-0.3715***	0.0934
Race: White	-0.4051***	-0.0636	-0.3399***	-0.0501
SES dummy *(1 = High SES)*	-0.0049	-0.0274	-0.0041	-0.0215
Constant	1.2310***	1.0312***	1.0327***	0.8119***
Mean of Predicted Values	0.635	0.314	0.533	0.247
P-Value for Joint Test of all Covariates	0.000	0.000	0.000	0.000
Adjusted R^2	0.1544	0.3172	0.1544	0.3172
N (unweighted)	130	220	130	220
N (weighted)	851,172	1,807,187	851,172	1,807,187

Note: One asterisk (*) indicates that the parameter estimate is significant at or beyond the .1 level, two asterisks (**) indicate that the parameter estimate is significant at or beyond the .05 level, and three asterisks (***) indicate that the parameter estimate is significant at or beyond the .01 level. The reference categories for the age, education, race, and SES covariates are, respectively, teens aged 15 – 19, individuals with less than a high-school education, individuals whose race categories are coded as "other," and individuals whose mothers have less than a high-school education.

Savings from Averting an Unintended Pregnancy: Simulation Parameters

The table below summarizes our assumptions incorporated into the benefit-cost simulations described in Thomas (2010b) regarding the public savings associated with the prevention of unintended pregnancies that result in various outcomes. These estimates are averaged across – and are imputed to – all pregnancies that involve individuals who are assumed to be eligible to take up these services, which is to say that they are imputed to all pregnancies that are to women who are assumed to fall below 200 percent of the poverty line.

Table 22. Summary Table of Public-Savings Assumptions
for Benefit-Cost Simulations of Pregnancy-Prevention Programs
Imputed for Each Prevented Pregnancy
to a Woman Below 200 Percent of Poverty
In $2008

	Among Teens	*Among Non-Teens*
Public Savings per Prevented Live Birth *(estimates based on the cost of prenatal care, delivery, and postpartum care)*	$1,700	$2,000
Public Savings per Prevented Live Birth *(estimates based on the cost of prenatal care, delivery, postpartum care, and one year of infant medical services)*	$4,000	$5,000
Public Savings per Prevented Live Birth *(estimates based on the cost of prenatal care, delivery, postpartum care, and five years of children's benefits)*	$19,000	$24,000
Fetal Losses	$750	

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