Savings Achieved by Giving WIC Benefits to Women Prenatally

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Synopsis

The Special Supplemental Food Program for Women, Infants, and Children (WIC) provides supplemental food, nutrition and health education, and social services referral to pregnant, breastfeeding, and post-partum women, and their infants and young children who are both low-income and at nutritional risk. A number of statistically controlled evaluations that compared prenatal women who received WIC services with demographically similar women who did not receive WIC services have found WIC enrollment associated with decreased levels of low birth weight among enrolled women's infants. Several also have found lower overall maternal and infant hospital costs among women who had received prenatal WIC services compared with similar women who did not receive prenatal WIC services.

A meta-analysis of the studies shows that providing WIC benefits to pregnant women is estimated to reduce low birth weight rates 25 percent and reduce very low birth weight births by 44 percent. Using these data to estimate costs, prenatal WIC enrollment is estimated to have reduced first year medical costs for U.S. infants by $1.19 billion in 1992.

Savings from a reduction in estimated Medicaid expenditures in the first year post-partum more than offset the cost of the Federal prenatal WIC Program. Even using more conservative assumptions, providing prenatal WIC benefits was cost-beneficial. Because of the estimated program cost-savings, the U.S. General Accounting Office has recommended that all pregnant women at or below 185 percent of Federal poverty level be eligible for the program.

INTERVENTIONS consisting of effective health promotion techniques during pregnancy can reduce behavioral risks—such as smoking, drinking, and inadequate nutrition—which can lead to poor birth outcomes (*1*). In the United States, the Special Supplemental Food Program for Women, Infants, and Children (WIC) is a federally funded health promotion effort aimed at improving the nutritional status of low-income pregnant, breastfeeding, and post-partum women and their infants and children up to age 5 years who are considered to be at nutritional risk. WIC provides supplemental food, nutrition education, and social services referral. The Public Health Service Expert Panel on the Content of Prenatal Care has identified such services as crucial for women at risk of poor birth outcomes, such as low birth weights (*2*).

Funds for the WIC Program are appropriated yearly and given to States as grantees. It has never been funded so that all eligibles could be served. In 1991 WIC served an average of 731,519 pregnant women each month; they represented 15 percent of WIC's total caseload (*3*).

Pregnant women need to be both low income and found to be at nutritional risk by a competent professional to qualify for the Program. Generally, almost all pregnant women with family income at or below 185 percent of Federal poverty level qualify for WIC. The Food and Nutrition Service of the U.S. Department of Agriculture, which administers the Program, estimates that 91 percent of pregnant women with income at or below 185 percent of Federal poverty level would qualify for the Program on the basis of nutritional risk.

Evaluations of WIC have shown that women receiving prenatal WIC services, compared with

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demographically similar women who do not receive services, have lower rates of low birth weight (LBW) births (table 1) (*4–11*). Most of these evaluations used regression analysis to determine factors associated with differing rates of LBW. WIC participation was shown to be significantly related to decreased odds of having a LBW birth.

Promoting healthful birth outcomes, such as decreasing the rate of LBW births, has the potential to decrease costs for hospitalization in the first year, since infants born at LBW have higher costs for the initial hospitalization (*12*). They also have higher rehospitalization costs (*13*). Indeed, several evaluations that compared Medicaid recipients who received prenatal WIC services with Medicaid recipients not receiving prenatal WIC services showed both lower rates of LBW among women who had received WIC and lower initial hospitalization costs for them and their infants or for their infants alone (*14–19*).

The purpose of this study is to estimate whether providing WIC benefits to pregnant women returns savings to the Federal Government, State and local governments, and private payers through reducing the first-year medical costs of their infants. To do so, we needed to estimate WIC's effect at reducing LBW and to estimate the first-year medical costs of LBW. From these two analyses we then could estimate the cost savings that could accrue from reducing LBW due to WIC participation.

Methods to Estimate WIC's Effect

To determine the potential savings due to providing prenatal WIC services, we reviewed the literature to find WIC evaluations that analyzed LBW rates among recipients and nonrecipients and selected those we deemed strongest—those that either used random assignment or statistically controlled for other measured differences besides WIC participation associated with LBW, such as race, receipt of adequate prenatal care, and maternal smoking. We used these evaluations to estimate WIC's effect on reducing LBW (table 1). These evaluations were conducted at the local, State, and national levels between 1971 and 1988. They differed somewhat in methodology, but most were quasi-experimental comparisons of recipients and nonrecipients.

These evaluations have limitations, individually and as a set, that could affect both the results they reported for the particular WIC and non-WIC population studied at the time and their value aggregated and projected upon present WIC populations. In none of these evaluations were the results adjusted for selection bias—that women who participate in WIC might differ systematically in an unmeasured way from women who did not participate in WIC.

Not all States are represented among the evaluations; States like Missouri, North Carolina, and Massachusetts were evaluated more than once, but many other States are not represented at all. In addition, the States represented might not in aggregate serve as a good proxy for national LBW rates of WIC-eligible women. All of the newest evaluations (post-1984) were only of State Medicaid participants. For most of these evaluations, Medicaid income eligibility rules were more stringent than WIC rules, so WIC women receiving Medicaid were the less affluent segment of WIC participants in the State. Therefore, the larger effect WIC appears to have in reducing LBW in some of these evaluations may be due to these women's relative poverty and may exaggerate the effect WIC would have on the entire eligible population in these States. Still, looking only at the non-Medicaid studies would severely reduce the number of studies to be included and leave none in which the data had been collected after 1984.

Relatively few of these evaluations compared WIC and non-WIC rates of very low birth weight (VLBW), defined as less than 1,500 grams (g). VLBW infants are almost always born prematurely and have the highest death, disability, and morbidity rates. Of course, late entrants into the WIC Program may skew results that simply compare WIC and non-WIC VLBW rates, because late WIC entrants may have entered the Program after their fetuses was large enough to be born at a heavier weight.

Several evaluators attempted to control for this problem. Most recently, Devaney (*20*) and others compared VLBW rates of Medicaid women who enrolled in WIC before their infants were of 30 (or 32) weeks of gestation to Medicaid women not enrolled in WIC. That analysis found significant differences in VLBW rates in four of five States.

Table 1. Comparison of rates of low birth weight (LBW) for WIC and non-WIC samples in 13 studies, 1981–88

Evaluation's senior author and year published	Data years	State	WIC LBW rate	Non-WIC LBW rate	WIC sample size	Non-WIC sample size	Percentage point difference in LBW rate	Percentage difference in LBW
Silverman, 1981 [1]	1971–77	PA	9.7	13.0	1,047	1,361	[2]–3.3	–25
Kennedy, 1982	1973–78	MA	6.0	8.8	897	400	[2]–2.8	–32
Kennedy, 1984	1973–78	MA	7.3	12.5	316	316	[2]–5.2	–42
Kotelchuck, 1984	1978	MA	6.9	8.7	4,126	4,126	[2]–1.8	–21
Bailey, 1983	1980	FL	5.4	9.5	37	42	–4.1	–43
Metcoff, 1985	1980–82	[3]OK	8.7	6.9	242	174	1.8	26
Stockbauer, 1986	1979–81	MO	8.5	9.4	6,657	6,657	[2]–0.9	–10
Stockbauer, 1987	1982	MO	7.7	9.2	9,411	9,411	[2]–1.5	–16
Schramm, 1985 [4]	1980–81	MO	10.7	12.6	1,183	5,737	[2]–1.9	–15
Schramm, 1986 [4]	1982	MO	10.1	13.1	3,221	5,719	[2]–3.0	–23
National WIC evaluation-Rush, 1988 [5]	1983–84	US	5.7	6.8	2,708	497	–1.1	–16
Mathematica, 1980 [4]	1987	FL	9.5	12.8	18,758	12,974	[2]–3.3	–26
Mathematica, 1990 [4]	1987	MN	7.8	10.0	7,905	3,642	[2]–2.2	–22
Mathematica, 1990 [4]	1987	NC	11.1	16.2	14,219	6,469	[2]–5.1	–32
Mathematica, 1990 [4]	1987	SC	11.7	16.8	8,641	3,132	[2]–5.1	–30
Mathematica, 1990 [4]	1988	TX	8.8	12.2	12,303	13,407	[2]–3.4	–28
Buescher, 1991 [4]	1988	NC	10.4	14.3	16,177	6,166	[2]–3.9	–27

[1] Results as reported in General Accounting Office, Program Evaluation Methodology Division (GAO/PEMD) 84–4.
[2] Statistically significant difference.
[3] Only women attending Oklahoma Memorial Hospital, Oklahoma City, in sample.
[4] These results for State's Medicaid population.
[5] National study.
NOTE: WIC = Special Supplemental Food Program for Women, Infants, and Children.
SOURCE: U.S. General Accounting Office.

However, using all the studies to estimate VLBW effect may somewhat overestimate VLBW effects.

One major limitation on the ability of the WIC Program to influence LBW rates may be the underlying LBW rate in the population served. That is, the better the perinatal health of the underlying population, the less an intervention like WIC can have "added value." There is some evidence from other evaluations that interventions such as WIC, or comprehensive prenatal care services, have the greatest effect on the populations most at risk—populations with higher LBW rates to begin with. In this country, the LBW rate for African Americans is twice that of whites. Therefore it is not surprising that States like North Carolina and South Carolina, with Medicaid populations 60–75 percent African American in 1988, have high LBW rates. It is also not surprising that a State like Minnesota, with higher average income and a higher percentage of white inhabitants, has a lower LBW rate.

Nevertheless, meta-analysis does allow the results of many evaluations to be synthesized, even given the limitations of those analyses and the limitations on trying to determine the national effect discussed previously. To develop a point estimate of WIC's effect, we transformed the percentage proportions of WIC and non-WIC LBW rates into arcsine values and calculated a weighted effect size. We used the difference between the LBW rates of the WIC and non-WIC recipients as the effect size. We included all evaluations, even those where the differences, positive or negative, were not statistically significant and included the National WIC Evaluation, whose principal researcher had written that the way the WIC effect was calculated in his evaluation understated it (*11*).

One problem with using a weighted effect size is that statewide studies become heavy weights in the effect size. Most of the statewide studies were Medicaid studies, where the reported effect of WIC is greater. Therefore, we calculated separately an effect size for older evaluations that were of a general WIC population (in other words, excluding all Medicaid-only studies) and for Medicaid-only studies. This allowed us to place our estimate, based on a mix of studies, in a more realistic context and give a range around our estimate.

However, we were interested in estimating WIC's differential effects on reducing VLBW and moderately low birth weight (MLBW) (birth weight between 1,500 and 2,499 g). Therefore, we used a subset of the evaluations that examined differences in VLBW rates to estimate separately the effect of providing WIC benefits on VLBW rates and MLBW rates (table 2). To do so, we calculated a weighted average of the VLBW rates of WIC and non-WIC participants. We calculated the percentage of the LBW difference that was due to VLBW.

We then took this proportion of VLBW births to LBW births in this set of studies and applied it to all the studies. We determined the MLBW rate by subtracting the estimated VLBW rate from the LBW rate

Table 2. Findings in five studies of WIC Programs associated with lower rates of very low birth weight (VLBW) outcomes

Evaluation's senior author and year published	Data years	State	WIC VLBW	Non-WIC VLBW rate	WIC sample size	Non-WIC sample size	Percentage point difference in VLBW rate	Percentage difference in VLBW rate
Kotelchuck, 1984.....	1978	MA	0.49	1.04	4,126	4,126	[1]–0.55	–53
NWE-Rush, 1988 [2].....	1983–84	US	0.37	0.28	2,708	497	0.09	32
Stockbauer, 1987.....	1982	MO	1.01	1.38	9,411	9,411	[1]–0.37	–27
Schramm, 1985 [3].....	1980–81	MO	1.10	1.40	1,883	5,737	[1]–0.30	–21
Buescher, 1991 [3].....	1988	NC	1.63	3.43	16,177	6,166	[1]–1.80	–52

[1] Statistically significant.
[2] National sample.
[3] These results for Medicaid population in the State.

NOTE: WIC = Special Supplemental Food Program for Women, Infants, and Children; NWE = national WIC evaluation.
SOURCE: U.S. General Accounting Office.

Table 3. Estimates of the effect of the Special Supplemental Food Program for Women, Infants, and Children (WIC) on reducing very low, moderate, and low birth weights (percentage point reductions)

Birth weight	Non-Medicaid evaluations	All evaluations	Medicaid evaluations
Low.....	1.50	3.01	3.70
Very low.....	0.46	1.13	1.46
Moderately low.....	1.04	1.88	2.24

NOTE: Low birth weight includes both very low birth weight infants (less than 1,500 grams or 3.3 pounds) and moderately low birth weight infants (at least 1,500 grams, or 3.3 pounds, but less than 2,500 grams or 5.5 pounds).

for all the studies. We then did the same calculation for only the Medicaid studies and only the non-Medicaid studies to develop Medicaid and non-Medicaid estimates (table 3.) This gave us a range of WIC effect sizes. Because the evaluations we used did not adjust for late WIC entrants, the VLBW effect size shown may be somewhat high.

We then estimated the number of infants who might have been born at LBW in 1992 if their mothers had not been enrolled in the Program. To do so, we estimated the number of WIC births in 1992, based on the number of women served per month and the average length of time—about 6 months—in the Program as a prenatal participant. (In other words, we doubled the number of average monthly participants served in FY 1991 to estimate total number of pregnant women served—1,463,038.) We used the differences in VLBW and MLBW rates between participants and nonparticipants to come up with an excess rate of LBW if WIC women had not participated in WIC.

We applied this rate to the number of WIC births to approximate the number of LBW births averted due to the WIC Program. We used data on survival rates of VLBW and MLBW infants in 1985 that we obtained from the National Center from Health Statistics to estimate the number likely to survive their neonatal period (survive to 28 days) and the number likely to survive their first year (survive to 365 days) (table 4). Since survival of LBW infants has been improving, because of improved technology and care in neonatal intensive care units (NICUs), these survival rates are likely to be underestimates.

We estimated the number of infants receiving medical care through Medicaid by estimating the number of the Medicaid-eligible women among WIC income-eligible births. We used data from the National Governor's Association on State Medicaid income-eligibility levels as of January and April 1990 (*21–22*). We also used National Governor's Association data on women at or below 100, 125, 150, and 185 percent of the Federal poverty level, based on census Current Population Survey data by State for 1984–86, combined with estimates of the number of medically uninsured births before the recent Medicaid expansions of prenatal care, to estimate the number of women in each State who would be eligible for Medicaid if pregnant (*23*).

We calculated birth rates using 1984 State fertility rates adjusted upward by 54 percent for women at 100 percent of Federal poverty level and below, and adjusted upward by 42 percent for all other women—these adjustments were to compensate for higher fertility rates among low-income women (*24*). We assumed that essentially all pregnant women who were WIC- and Medicaid-eligible, and who were receiving WIC services prenatally, would have their hospitalizations covered by Medicaid. Actual average Medicaid participation rates of WIC prenatal women (covering women at different stages of pregnancy) are lower; however, Medicaid enrollment for pregnant women peaks sharply close to and at delivery (*25*).

Methods to Estimate Costs

We estimated the excess medical costs of VLBW and MLBW infants for their initial hospitalization and for subsequent medical costs in their first year of life. We took Maryland hospital charge data for 1989 and

adjusted them to represent a national estimate of hospital costs. Maryland identifies charge data by birth weight, and Maryland's Hospital Cost Review Commission sets hospital rates based on hospital costs. The charges file included all infants discharged from Maryland hospitals in 1989, including all infants who died before discharge. We confined our analysis to hospitals that had NICUs and to newborns who did not transfer to another institution within 1 day, in order to estimate full hospitalization costs. Including all hospitals would have double counted some infants transferred from non-NICU hospitals to NICU hospitals for care, decreasing average costs.

Using detailed charge data by admitting hospital, we adjusted the hospital charges back to actual hospital cost, using deflators given to us by the Maryland Hospital Cost Review Commission. We took the difference in average costs between normal and VLBW, and between normal and MLBW infants. We then adjusted these excess hospital costs twice more—first to account for the 7.6 percent difference between Maryland hospital cost per admission and national average hospital cost per admission in 1989, and second to inflate the 1989 dollar figures to 1992 levels using the medical services component of the Consumer Price Index for Urban Residents. Our estimate of the excess cost of the initial hospitalization includes the cost of infants who did not survive to be discharged. We applied this excess cost to the total estimated number of LBW births averted.

We calculated the average cost of physicians' services during an infant's initial hospitalization as a fixed percentage of adjusted excess hospital cost. We used the midpoint (15 percent) of the Office of Technology Assessment's range of between 10 percent and 20 percent of the total cost of the infant's initial hospitalization as an estimate of the cost of physicians' services.

We derived outpatient care costs in the first year of life through two steps. First, we calculated the average inpatient-outpatient Medicaid payment ratio for 38 States and the Virgin Islands in 1989 for children younger than 1 year, using Health Care Financing Administration data. We used this ratio as a proxy for the national average of a low-income infant's inpatient-outpatient cost ratio. We then multiplied the inverse of the average ratio of inpatient-outpatient Medicaid payment by the excess hospital (that is, inpatient) cost estimate to arrive at an estimate of average outpatient costs. We applied our estimate of the excess cost of outpatient care to the fraction of the original group of LBW births averted that survived the neonatal period.

We also used Maryland hospital charges data to develop an average cost per day of inpatient services for infants 28–365 days old. According to one study, the average total days of rehospitalization per infant rehospitalized is greater for LBW infants than for normal birth weight infants (*26*). We multiplied the estimated excess number of days that LBW infants were rehospitalized from that study by the adjusted average cost per day to arrive at an estimated excess cost for rehospitalization of LBW infants. Table 5 shows per patient costs and table 6 shows total costs.

We assumed, based on the estimated percentage of WIC-eligible babies born to Medicaid-eligible mothers, that 71 percent of the births were covered by Medicaid. Therefore, 71 percent of the total excess medical cost is charged to Medicaid. A recent American Hospital Association study estimated that Medicaid pays only 78 percent of actual hospital costs (*27*). Therefore, we assumed that only 78

Table 4. Estimates of low birth weight (LBW) births averted[1] and neonatal survivors[2]

Category	*VLBW*	*MLBW*	*LBW*
All evaluations:			
Births averted	16,532	27,359	43,891
Neonatal survivors	11,007	26,951	37,958
General WIC population evaluations:			
Births averted	6,730	15,216	21,946
Neonatal survivors	4,481	14,989	20,355
Medicaid WIC evaluations:			
Births averted	21,360	32,772	54,132
Neonatal survivors	14,222	32,284	50,208

[1] Births averted were calculated by multiplying the number of births served by WIC by the estimated WIC effect of reducing LBW, MLBW, and VLBW births.
[2] Neonatal survivors were calculated by multiplying the problem births averted by VLBW and MLBW 1985 survival rates as reported by the National Center for Health Statistics.
NOTE: WIC = Special Supplemental Food Program for Women, Infants, and Children; VLBW = very low birth weight; MLBW = moderately low birth weight.

Table 5. Estimated excess medical cost per child (hospital costs and physicians' fees for inpatient and outpatient care[1])

Category	*VLBW*	*MLBW*
Total first year medical costs	$56,407	$9,937
Average excess initial hospitalization cost	37,997	5,179
Average initial patients' physician fees	5,700	777
Average excess outpatient costs	5,318	725
Average excess days rehospitalized	8.4	3.7
Cost per hospital day	880	880
Costs per rehospitalization	7,392	3,256

[1] We developed our estimate of the excess average costs by analyzing Maryland hospital discharge data for 1989 by birth weight and estimated physicians' fees according to percentages used by the Office of Technology Assessment. We estimated rehospitalization costs using days in the hospital reported in reference *25* and outpatient costs using the Health Care Financing Administration inpatient and outpatient cost data.
NOTE: VLBW = very low birth weight; MLBW = moderately low birth weight.

Table 6. Estimates of excess overall medical costs attributable to infants with very low and moderately low birth weights

Evaluations	VLBW	MLBW	All
All evaluations:			
Initial hospitalization cost [1]	$ 722,414,411	$162,948,458	$ 885,362,869
Outpatient and rehospitalization cost [2]	185,930,635	122,652,635	308,583,270
Total medical costs	908,345,046	285,601,093	1,193,946,139
General WIC population evaluations:			
Initial hospitalization cost [1]	294,080,203	90,623,741	384,703,944
Outpatient and rehospitalization cost [2]	75,688,577	68,213,230	143,901,807
Total medical costs	369,768,780	158,836,971	528,605,751
Medicaid WIC evaluations:			
Initial hospitalization cost [1]	933,384,991	195,189,597	1,128,574,588
Outpatient and rehospitalization cost [2]	240,228,962	146,920,803	387,149,765
Total medical costs	1,173,613,953	342,110,400	1,515,724,353

[1] Initial hospitalization costs are calculated by multiplying the births averted by the sum of the excess initial hospital cost and the average physicians' fees.
[2] Outpatient and rehospitalization costs are calculated by multiplying the number of neonatal survivors by the per-child total outpatient and rehospitalization costs.
NOTE: VLBW = very low birth weight; MLBW = moderately low birth weight; WIC = Special Supplemental Food Program for Women, Infants, and Children.

Table 7. Estimated return in 1992 per Special Supplemental Food Program for Women, Infants, and Children (WIC) on each dollar spent in 1991

Savings	All evaluations	General WIC evaluations	Medicaid-WIC evaluations
Medicaid	$1.70	$0.75	$2.16
Federal	0.93	0.41	1.19
State	0.77	0.34	0.97
Private payer	1.37	0.61	1.74
Total	$3.07	$1.36	$3.89

NOTE: Numbers may not add due to rounding.

percent of the care actually incurred by Medicaid recipients was paid by Medicaid—the rest of the cost was assigned to private payers.

The Congressional Budget Office estimated the monthly cost of serving an average WIC participant to be $40.50 in 1989. This figure was adjusted to $44.35, since we calculated 9.5 percent inflation in WIC food costs from 1989–91, based on per participant costs. Using that cost figure, we estimated that the total cost of serving pregnant women who either delivered or were scheduled to deliver their infants in 1992 was $389 million. The average cost per child delivered in 1992 was $266.

Results

The results of the study showed a strong positive effect on VLBW and MLBW births from WIC services—no matter how the studies were aggregated. On average across all the studies, women who received WIC benefits had 25 percent fewer infants born at LBW than demographically similar women who did not receive WIC—a difference of 3 percentage points in LBW rates. Looking only at the non-Medicaid studies, women who received WIC benefits had 16 percent fewer LBW infants, a difference of 1.5 percentage points, whereas in the Medicaid studies women who received WIC benefits had 28 percent fewer infants born at LBW, a difference of 3.7 percentage points. Reviewing 5 of the 17 evaluations that compared rates of VLBW birth showed a more marked effect. We estimated that WIC reduced VLBW births on average by 44 percent—a 1 percentage point difference.

Our analysis excludes Mathematica's recent study on the relation of WIC participation to VLBW among Medicaid recipients, because that study did not publish separate, adjusted rates of LBW for WIC participants who joined the program before 30 weeks and non-WIC participants, but only the estimated difference in VLBW rates (*28*). Their estimated difference in VLBW rates among four of the States studied showed significant differences ranging from 0.6 percentage points to 2.1 percentage points and showed no difference in Minnesota.

As a result, we estimate that providing prenatal WIC services substantially reduces costs for infant medical services. The first-year Federal Medicaid savings based on the estimate for all evaluations—$364 million—offset the Federal cost of providing WIC to all prenatal WIC recipients. State first-year Medicaid savings totaled $298 million. Total first-year averted expenditures were $1.19 billion, compared with a Federal program investment of $389 million—or a total net savings of $805 million (see box).

Looked at another way, for every Federal dollar

Net Savings for 1992 Achieved by Payment of WIC Program Benefits

Category	*Total averted expenditures*		*Total WIC costs*		*Net savings*
All evaluations	$1,193,946,139	–	$389,292,466	=	$804,653,673
General WIC evaluations	$528,605,751	–	$389,292,466	=	$39,313,285
Medicaid-WIC evaluations	$1,515,724,353	–	$389,292,466	=	$1,126,431,887

NOTE: WIC = Special Supplemental Food Program for Women, Infants, and Children.

spent to provide prenatal WIC services, the Federal Government saved $.93 in Medicaid costs and State governments saved $0.77. Private payers—hospitals, insurers, and private persons—saved an additional $1.37 for each Federal dollar spent. First-year medical savings totaled $3.07 for every dollar invested in prenatal WIC services (table 7).

These estimates may be high, because of the heavy influence of the large State Medicaid studies on the estimate of LBW and VLBW rates. But even using estimates from the earlier evaluations that looked at birth weight effects in a general WIC population, WIC is cost beneficial. Total net savings for 1992, assuming WIC's effect from those studies alone, is $139,313,285 (see box). Using that estimate, WIC returns $1.36 for every dollar invested (table 7).

That WIC appears to have a greater effect at reducing VLBW is important both for infant health and fiscal reasons. Although VLBW infants were fewer in number, they represent most of the cases of death or severe disability among LBW infants. They disproportionately increased the savings, because the average hospital cost to serve VLBW infants is high. The average excess cost for initial hospitalizations of VLBW infants was more than seven times higher than the average excess cost for MLBW infants (table 5). As a result, their overall costs were more than four times greater, even though fewer VLBW births were averted.

The cost differential was less pronounced for older LBW infants' rehospitalization costs, but even there, VLBW infants had greater average costs, so that even though fewer VLBW births were estimated to be averted, the cost savings were greater for VLBW infants (table 5).

It is not clear exactly what elements of the WIC Program contribute to improvements in birth weight. WIC provides education and food assistance. In addition, it can serve to encourage pregnant women to come in regularly for prenatal care, particularly in locations where WIC and prenatal care services are co-located. WIC was designed as a adjunct to prenatal care, and many WIC clinics are co-located with prenatal care or well-child clinics. Most of the evaluations controlled for adequacy of prenatal care, but that is a simplified measure of the number and timing of visits that does not look at quality or comprehensiveness of care. Because of their contact with WIC, WIC prenatal participants may be more likely to receive risk assessment and other needed services to reduce risks in pregnancy. Or conversely, women who are receiving more comprehensive care may be more likely to be referred to WIC services. An analysis of care coordination in North Carolina done separately for prenatal Medicaid recipients who received prenatal care at the health department and from private physicians showed that women who had received coordinated care were more likely to receive WIC prenatally. In addition, women who received their prenatal care at the health department were more likely to receive WIC prenatally (*29*).

'. . . preventing a relatively few cases of low birth weight may, for those children, reduce the need for expensive special medical, supportive, and educational care for many years to come.'

Conclusions

Preventing poor birth outcomes makes fiscal sense, looking even at the 1-year return on an investment like WIC. Looking further down the road, preventing a relatively few cases of LBW may, for those children, reduce the need for expensive special medical, supportive, and educational care for many years to come.

But while the cost savings in a program like WIC are an important measure of its worth, it should not be the sole or perhaps even the most important criterion. There are greater human benefits in preventing or lessening the bad outcomes associated with LBW—increased infant mortality, mental retardation, cerebral palsy, and blindness.

Programs to improve health and survival are worthwhile public investments. Because of its demonstrated effectiveness, the U.S. General Accounting Office has recommended that Congress amend the Child Nutrition Act of 1966 to make all pregnant women with family incomes up to 185 percent of the Federal policy level eligible for WIC, irrespective of their level of nutritional risk, and to appropriate sufficient funds to ensure that such women receive WIC services (*29*).

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