Prenatal WIC participation can reduce low birth weight and newborn medical costs: a cost-benefit analysis of WIC participation in North Carolina


Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
A public health programme called the Special Supplemental Food Program for women, infants and children (WIC). It is evaluated here in the context of providing nutrition education and vouchers for low-income women.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Pregnant women with low-income in receipt of Medicaid services.

Setting
Hospitals in North Carolina, USA.

Dates to which data relate
The effectiveness and Medicaid expenses data related to 1988. Resource use data was not collected.

Source of effectiveness data
Single study.

Link between effectiveness and cost data
Costing was performed on the same sample of patients as the effectiveness analysis. Both were conducted retrospectively.

Study sample
22,343 live births in North Carolina in 1988 where the expenses were met by Medicaid, with 16,177 live births in the WIC group and 6,166 live births in the non-treated group. Births where the mother had no prenatal care were excluded as these would otherwise have fallen into the non-WIC group and biased the results. No method of sample selection was stated: it would appear to include all births in the area at that time.

Study design
This was a case-control study carried out on births occurring in more than one centre. There was no blinding in the
Analysis of effectiveness
The basis of analysis of the clinical study was not stated. The primary health outcome measures were low birth weight babies and very low birth weight babies. Data on the features of the group is sub-divided by ethnicity. 65% of the WIC group and 59% of the non-WIC group were unmarried, 15% and 12% respectively were aged under 18, 47% and 42% of women respectively had been in education for under 12 years and 31% of WIC and 33% of non-WIC women smoked. No statistical testing of these differences were performed, however these variables were controlled for in the logistic regression analysis.

Effectiveness results
WIC participation (classed as attending at least 1 prenatal WIC visit) was associated with significantly reduced rates of low and very low birth weight (p<0.001). The percentage of births occurring under 2,500g was between 8% and 12% for white and black women respectively in the WIC program versus 11% to 17% for women not in the program. Between 1.4% and 1.8% of births occurring to white and black women respectively in the WIC program weighed less than 1500g as opposed to between 2.5% and 4.1% among non-WIC participants. When variables were controlled for in the logistic regression analysis, women not receiving WIC were 1.45 times as likely as women receiving it to have a LBW baby and 2.15 times as likely to have a VLBW baby. Increased length of participation in the program was associated with a larger reduction in low birth weight births. The following factors were found to be statistically significant predictors of LBW and VLBW births: having a medical risk factor on the birth certificate, being black, not being enrolled in WIC, previous fetal death or live birth who died, and maternal age under 18.

Clinical conclusions
Prenatal WIC was effective in reducing the incidence of LBW and VLBW babies among this population.

Modelling
A logistic regression analysis was used to compare the intervention and comparator groups.

Measure of benefits used in the economic analysis
The outcomes were prevention of LBW and VLBW births.

Direct costs
Costs did not need to be discounted and were not analysed separately from quantities. The cost of the program itself (food vouchers and administration) and costs of hospital services for newborns in the first 60 days of life were included. The estimation of costs was based on actual Medicaid expenses occurring among the study population in 1988.

Currency
US dollars ($).

Sensitivity analysis
A sensitivity analysis was not carried out.

Estimated benefits used in the economic analysis
The benefits are in terms of reductions in LBW and VLBW births. Among white women, rates of LBW births were reduced by 22% and among black women reduced by 31% for women in the WIC program, compared to women
outside the program. For VLBW births the reduction in occurrence was 44% and 57% for white and black women respectively.

**Cost results**
The average Medicaid cost per live birth was $1,856 in the WIC group and $2,350 for the non-WIC group. For each $1 spent on WIC services, Medicaid saved $2.91 in newborn medical care. The savings with the program were $164 for white women and $451 for black women, and $324 per woman overall. Ordinary least squares regression analysis with cost as the dependent variable and factors other than WIC participation controlled had little impact on the estimates of savings.

**Synthesis of costs and benefits**
WIC participation among black women had a larger effect on costs and outcomes than among white women. The WIC programme is the dominant strategy.

**Authors’ conclusions**
The authors concluded that prenatal WIC participation is a cost-effective approach to reducing adverse birth outcomes for infants born to women in poverty.

**CRD Commentary**
As the authors themselves recognised there was no random allocation in this study so we do not know whether other differences between the study populations, apart from the intervention, accounted for the observed differences. The reason why several thousand women were not in the WIC group despite qualifying for it is not discussed. A full description of the intervention is not provided and the authors do not discuss why they think the program appeared to have an effect on birth weight. There was no blinded assessment of the outcomes or claims data. We do not know how many centres were involved nor whether different hospital charges would have affected the cost results. The authors described it as a cost-benefit study but the only benefits are in terms of resource savings.

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