



Graphic Warning Labels and the Cost Savings from Reduced Smoking Among Pregnant Women

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BACKGROUND

- FDA has conducted an analysis on the economic impact of Graphic Warning Labels (GWL).
- FDA analysis omits the impact of GWL on tobacco consumption by pregnant women.
- There is very strong link between the occurrence of low birth weight babies and smoking while pregnant.
- Low birth weight babies generate much higher hospital costs and social costs than normal birth weight babies.
- By omitting the impact on pregnant women, the FDA analysis underestimates the economic benefits from the GWL.

EFFICACY OF GRAPHIC WARNING LABELS

- Huang et al. 2013: Graphic Warning Labels result in 5.3 to 8.6 million less smokers in 2013.
- 42.1 Million Smokers in 2012
- Graphic warning labels reduce smoking by 12.6 percent to 20.4 percent.

STUDY AIMS

- This study quantifies the national medical care cost and other cost savings from the reductions in prenatal smoking that will arise if GWL are implemented in the US.

ASSOCIATION BETWEEN PRENATAL SMOKING AND LOW BIRTH WEIGHTS BABIES

Data

- 2013 Micro-data Natality File, CDC
- Information is collected on all births in the 50 States and the District of Columbia
- 3,940,764 total births in 2013

Three dichotomous dependent variables

- Extremely Low Birth Weight (< 1,000g)
- Very Low Birth Weight (1,000-1,499g)
- Low Birth Weight (1,500-2,500g)



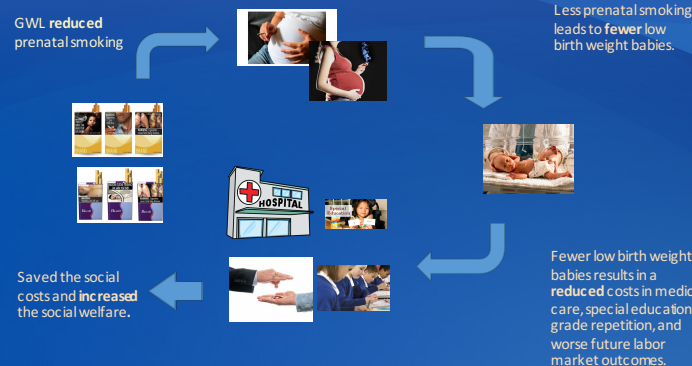
Smoking during pregnancy had a positive and significant impact on the probability of all 3 LBW classifications occurring.

Independent variables

Mother smoked during Pregnancy, Mothers Characteristics (Age, Race, Ethnicity, Marital status, Educational attainment, Pre-pregnancy weight, Pounds gained, Height) Other Determinants (Single or multiple birth, In hospital/elsewhere, Birth order of baby, Gender of baby, USDA WIC, Who paid for delivery (Insurance, Medicaid, OOP, other), Month Fixed Effects), and type of delivery (cesarean/normal)

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CONCEPTUAL FRAMEWORK



SIMULATION AND STATISTICAL ANALYSIS

Simulations: What would the prevalence of LBW be if smoking among pregnant women decreased by 12% and 20% (estimates from Huang et al on the effects of graphic warning labels on smoking). Using cost estimates found in the literature, we calculate the monetary savings that arise from GWL for this population.

Costs of first year hospitalization from the decrease in LBW Babies (Russell et al 2007; AHRQ, 2013)

Longer term Hospitalization Costs

- The annual hospital utilization by LBW children aged 3-5 result in an incremental cost per child of \$290 and an aggregate incremental cost of approximately \$240 million in 1988 dollars. (Coman, 1994)
- The annual hospital utilization by LBW children aged 6-10 result in an incremental cost per child of \$470 and an aggregate incremental cost of approximately \$610 million in 1988 dollars. (Lewit & Monheit, 1992)

Special Education Costs

- Children ages 6-15 who were LBW at birth were approximately 50% more likely than normal birth weight children to enroll in some type of special education, after controlling for individual, family, and regional factors. (Chaikind & Coman, 1991)
- The excess cost of special education, defined as the total per pupil cost for special education less the total per pupil cost for regular education was \$3,555 per pupil in the 1985-86 school year. (Chaikind & Coman 1991)

Grade Repetition Costs

- LBW children are more likely to repeat a grade in school than normal birth weight children: about 31% of LBW children will repeat a grade by grade 10 compared with about 26% of normal birth weight children. (Coman & Chaikind, 1993)
- The mean per pupil cost of repeating a grade is approximately \$4,000. (Shepard & Smith, 1990)

SIMULATION AND COST SAVINGS

Extremely low Birth weight (<1,000g)	Predicted percent of total births	Reduction in ELBW	Excess Cost in First Year Hospitalization	Excess Cost in >1 year Hospitalization	Excess Cost in Special Education	Excess Cost in Grade Repetition	Cost savings
current prev. of smoking	0.65269						
12% decline in smoking	0.65084	72.75	101,297	1,745	13,319	14,986	\$7,589,576
20% decline in smoking	0.64961	121.11	101,297	1,745	13,319	14,986	\$12,634,688
Very low Birth weight (1,000-1,499g)	Predicted percent of total births	Reduction in VLBW	Excess Cost in First Year Hospitalization	Excess Cost in >1 year Hospitalization	Excess Cost in Special Education	Excess Cost in Grade Repetition	Cost savings
current prev. of smoking	0.73477						
12% decline in smoking	0.73209	105.38	80,532	1,745	13,319	14,986	\$8,805,453
20% decline in smoking	0.73031	175.38	80,532	1,745	13,319	14,986	\$14,654,587
Low Birth weight (1,500g-2,500g)	Predicted percent of total births	Reduction in LVBW	Excess Cost in First Year Hospitalization	Excess Cost in >1 year Hospitalization	Excess Cost in Special Education	Excess Cost in Grade Repetition	Cost savings
current prev. of smoking	6.4307						
12% decline in smoking	6.39539	1,388.45	22,597	1,745	13,319	14,986	\$35,577,724
20% decline in smoking	6.37195	2,310.16	22,597	1,745	13,319	14,986	\$59,195,677
total cost savings 12% reduction in smoking							\$51,972,753
total cost savings 20% reduction in smoking							\$86,484,952

- All dollars are 2015 dollar.
- Excess cost = Cost of LBW - Cost of normal birth weight
- The excess cost for LBW is used for the excess costs of longer term hospitalization, special education and grade repetition for ELBW, VLBW, and LBW.
- The excess costs of longer term hospitalization, special education, and grade repetition are annual.
- Longer term hospitalization is measured for children aged 3-10.
- This study assumes that 4.4% LBW children enrolled in special education (Chaikind & Coman, 1991); 5% LBW

RESULTS AND CONCLUSION

Through decreased smoking by pregnant women, GWL will protect the health of newborns and lead to substantial cost savings for society. Our results indicated that GWL for this population will lead to cost saving of approximately 86 million dollars annually.