

The economic burden of preterm and low birth-weight (LBW) births



This section summarizes pre-term and LBW statistics for the United States, Tennessee and Shelby County.

In 2005 1,711 infants weighing less than 2,500 grams were born in Shelby County. They accounted for 11.8 percent of total live births in the county but were responsible for 75 percent of total hospital expenses for deliveries, or \$22 million. That is an average cost of almost \$13,000 each.

Nationally, extremely preterm (<28 weeks) births are only six percent of all births but require one-third of all costs through the age of 7, according to the Institute of Medicine (IOM).

Total Medical Costs of Preterm Births in the U.S, 2005

Gestational Age (weeks)	Total Inpatient and Outpatient Costs	
	Total (Billions of 2005 Dollars)	Per Preterm Infant (2005 Dollars)
Infant born < 28 weeks	\$6.1	\$198,945
Infant born 28-31 weeks	\$5.1	\$100,725
Infant born 32-36 weeks	\$4.9	\$11,415
Total	\$16.1	

SOURCE: Table 12-7, *Preterm Birth: Causes, Consequences, and Prevention*, Richard E. Behrman and Adrienne Stith Butler, Editors, Washington DC: The National Academies Press

NOTE: Costs are incremental, above those term birth, through age 7 years, with costs beyond infancy discounted to the year of birth at a 3 percent rate. Outpatient care included prescription medications.

- In the U.S. total medical care costs associated with infants born prior to 37 weeks gestation were \$16.1 billion in 2005. These costs were incremental, above those of term birth, through age 7 and discounted at a three percent rate.
- Per-infant cost increases dramatically as the gestational age decreases.
- About six percent of infants are born at less than 28 weeks, according to the IOM book, *Preterm Birth: Causes, Consequences and Prevention*, but they represented \$6.1 billion, or nearly 38 percent, of the \$16.1 of total medical care costs (p. 337).
- The data are based on the 1998 to 2000 birth cohort in the U.S. Normal survival after infancy was assumed.

Estimated Lifetime Cost of Preterm Births, U.S., 2005

Gestational Age (weeks)	U.S.	
	Total (Billions of 2005 Dollars)	Infant (2005 Dollars)
Medical care costs (infants)	\$16.9	\$33,210
Maternal delivery costs (mothers)	\$1.9	\$3,800
Early intervention services	\$0.6	\$1,203
Special education costs for 4 DDs*	\$1.1	\$2,150
Lost household and labor market productivity	\$5.7	\$11,200
Total	\$26.2	\$51,289

SOURCE: Table 12-1, *Preterm Birth: Causes, Consequences, and Prevention*, Richard E. Behrman and Adrienne Stith Butler, Editors, Washington DC: The National Academies Press

NOTE: Costs are lifetime estimates discounted at a 3 percent rate; >85% of medical care costs are delivery in infancy
 *4 DDs = the four developmental disabilities (cerebral palsy, mental retardation, vision impairment, and hearing loss)

- Lifetime costs include medical delivery costs, costs due to early intervention, social programs, special education services, disabling conditions and lost household and labor market productivity
- Excess lifetime medical care costs amounted to \$16.9 billion in 2005 dollars in the U.S. Excess maternal delivery costs were \$1.9 billion in 2005 dollars.
- LBW and preterm births have major impacts on special education resources for children ages 3 to 18. A child in special education costs 40 percent more than a child in regular school programs
- Each of the four major developmental disabilities is estimated to add \$2,150 per child annually to education costs, or \$1.1 billion nationally in 2005 dollars.
- Need for special education is prevalent for all premature or LBW children, even those without specific disabilities
- Cost estimates for preterm, or LBW infants, invariably are low. They emphasize mostly medical costs and explicit costs of the first few years of life and not many of the long-term social costs
- The majority of medical costs accrue in the first year of life, but substantial incremental costs of preterm birth, or LBW, extend after initial hospitalization for the majority of these infants, even if only a few weeks premature.
- Indirect preterm birth costs of lost household productivity associated with only four common conditions equal \$11,200 per case or \$5.7 billion total.

**Number of Low Birth-Weight Births in U.S.,
Tennessee and Shelby County, 2005**

	Race			Total
	White	Black	Other	
United States				
Low Birth-Weight (LBW)	166,769	81,747	89,630	339,514
Total Live Births	2,284,505	583,907	1,172,007	4,140,419
LBW as % of Total Live Births	7.3%	14.0	7.1%	8.2%
Tennessee				
Low Birth-Weight (LBW)	5,195	2,536	167	7,898
Total Live Births	63,215	16,546	1,959	81,720
LBW as % of Total Live Births	8.2%	15.3%	8.5%	9.7%
Shelby County				
Low Birth-Weight (LBW)	413	1,249	49	1,711
Total Live Births	5,795	8,206	479	14,480
LBW as % of Total Live Births	7.1%	15.2%	10.2%	11.8%

SOURCES: Center for Disease Control and Prevention, National Center for Health Statistics, <http://www.cdc.gov/nchs/products/pubs/pubh/hestats/prelimbirths05/prelimbirths05.htm>, and Tennessee Department of Health, Division of Health Statistics, <http://health.state.tn.us/statistics/birth.htm>

NOTE: The "Other" race category includes Hispanics, Asians and other minority groups

- In the United States 339,514, or 8.2 percent, of 4.14 million live births in 2005 were LBW births.
- In Tennessee 7,898, or 9.7 percent, of 81,720 live births in 2005 were LBW births.
- In Shelby County 1,711, or 11.8 percent, of 14,480 live births in 2005 were LBW births.
- Among whites LBW births were 8.2 percent in Tennessee and 7.1 percent in Shelby County.
- Among blacks LBW births were 15.3 percent in Tennessee and 15.2 percent in Shelby County
- Among minority groups in the "Other" category LBW births were 9.7 percent in Tennessee and 11.8 percent in Shelby County.

**Inpatient Hospitalization Costs of LBW Births
in Tennessee and Shelby County, 2005**

Birth Weight in Grams	Births	Length of Hospital Stay	Average Cost	Total Cost
Tennessee				
1) < 500g	25	64.4	\$126,015	3,093,929
2) 500g to 999g	647	49.4	\$76,177	49,316,661
3) 1000g to 1499g	1,120	31.3	\$34,688	38,862,704
4) 1500g to 1999g	2,168	15.1	\$14,520	31,483,853
5) 2000g to 2499g	3,937	6.5	\$5,853	23,047,030
All LBW	7,898	16.1	\$18,461	145,804,188
All Live Births	3,937	3.5	\$2,402	196,254,961
Shelby County				
1) < 500g	6	37.2	\$41,135	265,191
2) 500g to 999g	173	40.7	\$45,545	7,869,057
3) 1000g to 1499g	253	28.8	\$23,602	5,964,512
4) 1500g to 1999g	498	13.3	\$9,470	4,713,418
5) 2000g to 2499g	781	6.1	\$4,107	3,209,428
All LBW	1,711	15.2	\$12,871	22,021,614
All Live Births	14,480	3.6	\$2,024	29,307,652

SOURCE: Tennessee Department of Health, Hospital Discharge Data Set 2005

NOTE: Average costs were derived from billable charges by a cost-to-charge ratio of the admitting hospital

- The 81,720 live births in Tennessee incurred \$196,254,961 in hospital delivery expenses in 2005.
- LBW births accounted for 9.7 percent of total live births in Tennessee and were responsible for 74 percent, or \$145,804,188, of total hospital delivery expenses.
- In Shelby County, the 14,480 live births cost \$29,307,652 in hospital expenses in 2005.
- The 1,711 LBW births in Shelby County accounted for 11.8 percent of total live births but were responsible for 75 percent, or \$22,021,614, of total hospital expenses for deliveries.
- A 2008 article published in the journal *Pediatrics* by R. B. Russell et al.* reported that in the United States eight percent of all infants born in 2001 had a diagnosis of preterm birth/low birth weight, but accounted for 47 percent of total inpatient hospitalization costs. LBW infants in Tennessee and Shelby County both are proportionately more expensive than the U.S. average.
- Across the different weight categories the lower the birth weight, the longer the length of hospital stay and the higher the costs.

*Russell, RB, NS Green, CA Steiner et al. Cost of hospitalization for preterm and low birth weight infants in the United States, *Pediatrics* 2007, 120(1):e1-e9.