

Indiana's Tiniest Citizens: Born Too Small, Born Too Soon

IN BRIEF:

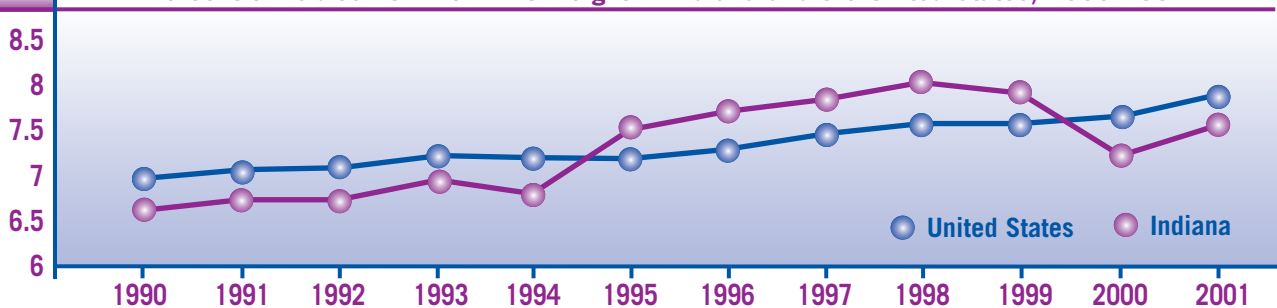
Too many Indiana babies are born too small and arrive too early. While the medical profession has made remarkable strides in saving the lives of fragile newborns, it reports far less success in reducing the number of premature and underweight babies. Low birthweight (less than 5.5 lbs.) is a major contributing factor to death among infants under one year of age, and preterm birth is the major contributor to low birthweight. The result is that many of our tiniest citizens survive difficult births only to cope with lifelong disabilities, chronic physical problems, and mental challenges.

Concern: The percentage of infants born low birthweight in Indiana was *higher* in 2001 than in 1990. In five out of the last seven years, Indiana ranks higher than the national average for the percentage of low-birthweight births (Figure 1).

RIPPLE EFFECT:

Low birthweight and premature birth account for 13 percent of all infant deaths in Indiana (Table 1). Babies who weigh less than 5.5 lbs. at birth are at a greater risk of experiencing vision and hearing impairment, hyperactivity, cerebral palsy, poor concentration, developmental delays, school failure, and mental retardation¹. In addition, they are almost 50 percent more likely to require special education services^{1,2}. Recent research also indicates a link between low birthweight and adult conditions such as hypertension and diabetes³. In general, research suggests the smaller the newborn, the more developmental hardships⁴. What's more, studies suggest a cycle: women who are underweight at birth are more likely to deliver underweight infants⁵.

Figure 1: Percent of Babies Born Low Birthweight in Indiana and the United States, 1990-2001



Source of data: Indiana State Department of Health, Epidemiology Resource Center, Data Analysis Team, March 2003.

¹ Hack, M., Klein, N. K., & Taylor, H. G. (1995). Long-term developmental outcomes of low birth weight infants. *The Future of Children*, 5, 176-196. Available at: http://www.futureofchildren.org/information2826/information_show.htm?doc_id=79895.

² Chaikind, S., & Corman, H. (1991). The impact of low birth weight on special education costs. *Journal of Health Economics*, 10, 291-311.

³ e.g., Rich-Edwards, J.W., Colditz, G. A., Stampfer, M. J., Gillman, M. W., Hennekens, C. H., et al. (1999). Birthweight and risk for type 2 diabetes. *Annals of Internal Medicine*, 130, 278-284. Summary available at: http://www.turner-white.com/pdf/jcom_may99_orrweight.pdf; Curhan, G. C., Willett, W. C., Rimm, E. B., Spiegelman, D., Ascherio, A. L., & Stampfer, M. J. (1996). Birth weight and adult hypertension, diabetes mellitus, and obesity in US men. *Circulation*, 94, 3246-3250.

⁴ Taylor, H. G., Klein, N., Minich, N.M., & Hack, M. (2000). Middle-school-age outcomes in children with very low birthweight. *Child Development*, 71, 1495-1511.

⁵ e.g., Skjaerven, R., Wilcox, A.J., Oyen, N., & Magnus, P. (1997). Mothers' birth weight and survival of their offspring: Population based study. *BMJ*, 314, 1376-1380. Abstract available at: <http://www.bmj.com/cgi/content/abstract/314/7091/1376>.

The Top Challenges

Concern: More than 9 percent of Hoosier infants are born too early, and of those, 57 percent weigh less than 5.5 lbs.

Table 1: Leading Causes of Infant Deaths in Indiana, 2001

	Number	Percent
Birth Defects	157	24
Prematurity and Low Birthweight	85	13
Sudden Infant Death Syndrome (SIDS)	50	8
Other	360	55
All Infant Deaths	652	100

Source of data: Indiana State Department of Health, Epidemiology Resource Center, Data Analysis Team, March 2003.

HIGH COST OF LOW BIRTHWEIGHT

The health and well-being of Indiana newborns obviously is of primary importance, but the issue of low birthweight has other consequences as well. For example, birth-related costs for Indiana's tiniest residents far exceed fees attached to full-term, uncomplicated deliveries. In this state, the birth of an average full-term Hoosier baby (more than 5.5 lbs.) costs \$2,399; for a low-birthweight baby (3.3 to 5.5 lbs.) the cost is \$15,009; and for fragile very low-birthweight patients (less than 3.3 lbs.), the cost is \$99,077⁶. The financial implications attached to poor birth outcomes are daunting, especially for the 14.6 percent of Hoosier women of childbearing age who have no health insurance⁷. The ongoing costs associated with the care for low-birthweight babies is perhaps even more daunting. In 2003 dollars, direct annual costs to the U.S. economy attributable to low-birthweight children—from birth through age 15—can be conservatively estimated at \$8.4 billion⁸. Direct costs include healthcare, childcare, special education, and grade repetition.

Concern: Dollars and cents aside, infants born low birthweight pay most dearly. They may spend weeks or even months in newborn intensive care units and then go on to develop lifelong disabilities.

⁶ Indiana State Department of Health, Epidemiology Resource Center, Data Analysis Team. Based on 2001 Public Hospital Discharge Data files.

⁷ Three-year moving average (1999 to 2001) for uninsured women of childbearing age (15 – 44 years). Data prepared for the March of Dimes by the Bureau of the Census using Current Population Surveys from March 2000, March 2001, and March 2002. Available at: http://www.marchofdimes.com/aboutus/855_4474.asp.

⁸ This 2003 estimate is taken from the 1988 estimate found in the following source and corrected for inflation. However, it does not take into account the fact that healthcare costs have risen faster than the inflation rate, and that the number of survivors of low birthweight has increased significantly during this period. Lewit, E.M., Schuurmann Baker, L., Corman, H., & Shiono, P.H. (1995). The direct cost of low birth weight. *The Future of Children*, 5, 35-56. Available at: http://www.futureofchildren.org/information2826/information_show.htm?doc_id=79879.

⁹ Women with less than 12 years of schooling are slightly more likely to have low-birthweight infants. In 2001, of all births to Hoosier women with less than 12 years of schooling, 9.2 percent were low birthweight, compared to 7.2 percent of births to women with at least a high school diploma.

Risk Factors

There are numerous factors associated with mothers of low birthweight babies, including low education⁹, unplanned pregnancy, too little weight gain during pregnancy, vaginal infections¹⁰, too little time between births, stress, drug use, poor nutrition, and diabetes. Other known risk factors are:

Risk Factors	
Age	Both teens and women past their mid-thirties are more likely to give birth to infants at low and very low birthweights. It is interesting to note that Hoosier mothers age 35 and older now have rates of low-birthweight babies similar to our teens, and older women might surpass teens if the trends continue. For older women, preterm births and low birthweight are related to age, higher incidence of multiple births, and the use of assisted reproductive technologies ¹¹ .
Race and Ethnicity	Women of different racial and ethnic groups have different rates of low birthweight among their newborns. In 2001, African-American women (12.9%) were almost twice as likely as White women (7.0%) and women of Hispanic ethnicity (6.5%) to have low-birthweight babies in Indiana.
Marital Status	Unmarried women are more likely than married women to have low-birthweight infants. Of the 30,695 babies born in Indiana to unmarried parents in 2001, almost 10 percent were low birthweight. Of the 55,427 babies born to married Hoosier parents, 6.5 percent were low birthweight. This trend is true for all racial and ethnic groups.
Prenatal Care	Prenatal care, in the first trimester of gestation, is an important factor for the health of both mother and child. In Indiana, about 1 in 5 pregnant women (21.2 percent) did not begin prenatal care until after the crucial first three months in 2001; 1 percent received no care at all.
Smoking	Maternal smoking is detrimental to fetal growth and is linked with respiratory problems and Sudden Infant Death Syndrome. The percent of Hoosier mothers who report smoking during pregnancy has declined over the last decade, but remains high—in 2001, 1 in 5 Hoosier women (20.2 percent) reported smoking during their pregnancy. This rate is 68 percent higher than the national average.
Alcohol	Alcohol use has been found to have an impact on birth outcomes. Of all infants born to Hoosier mothers who reported alcohol consumption, 14.6 percent were low birthweight in 2001. Pregnant women over age 35 were most likely to report drinking alcohol; African-American women in this age group reported drinking more than 4 times the rate of White women in the same age group.
Community	Risk factors associated with the community in which a pregnant mother lives as well as her support system increase the risk of low birthweight. These include: neighborhood poverty ¹² , lack of father involvement ¹³ , exposure to environmental toxins ¹⁴ , lack of social support ¹⁵ , and poor access to health care. These conditions not only create specific associated risks, but also add to the general level of stress experienced by residents. Singular stressful events (e.g., unintended pregnancy) and long-term stressful events (e.g., poverty) are known to have an impact on physical and mental health generally, and have been identified as factors in poor pregnancy and birth outcomes ¹⁶ .

Concern: *Alarming, factors leading to low birthweight are becoming more prevalent. More women are waiting until after age 35 to start their families; the number of unmarried mothers is increasing; teenagers, already at risk because of their age, are generally less likely to begin prenatal care early. As for tobacco use, Indiana ranks fourth highest in the nation for number of mothers who smoked during pregnancy.*

¹⁰ Findings from the Low Birthweight Patient Outcomes Research Team (PORT) indicate that vaginal infections are strongly associated with preterm birth in women, and can explain as much as 40 percent of the excess preterm birth in African American women. See <http://www.ahcpr.gov/clinic/lobrhigh.htm>.

¹¹ Not only is the use of assisted reproductive technologies associated with multiple births, but new research indicates that full-term *single* infants conceived with assisted reproductive technology have a risk of low birthweight that is 2.6 times that of the general population. See Schieve, L. A., Meikle, S. F., Ferre, C., Peterson, H. B., Jeng, G., & Wilcox, L. S. (2002). Low and very low birth weight in infants conceived with use of assisted reproductive technology. *New England Journal of Medicine*, 346, 731-737.

¹² e.g., Shiono, P. H., Rauh, V. A., Park, M., Lederman, S. A., & Zuskar, D. (1997). Ethnic differences in birthweight: The role of lifestyle and other factors. *American Journal of Public Health*, 87, 787-793.

¹³ Padilla, Y. C., & Reichman, N. E. (2001). Low birthweight: Do unwed fathers help? *Children and Youth Services Review*, 23, 427-452.

¹⁴ e.g., Ha, E., Cho, S. I., Chen, D., Chen, C., Ryan, L., Smith, T. J., Xu, X., & Christiani, D. C. (2002). Parental exposure to organic solvents and reduced birth weight. *Archives of Environmental Health*, 57, 207-214.

¹⁵ e.g., Buka, S. L., Brennan, R. T., Rich-Edwards, J. W., Raudenbush, S. W., & Earls, F. (2003). Neighborhood support and the birth weight of urban infants. *American Journal of Epidemiology*, 157, 1-8.

¹⁶ Altarac, M., & Strobino, D. (2002). Abuse during pregnancy and stress because of abuse during pregnancy and birthweight. *Journal of the American Medical Women's Association*, 57, 208-214.

Recent Efforts

In the past decade, most Indiana counties have reported *increases* in the number of premature and low-birthweight deliveries. In response to this discouraging trend, many counties are implementing comprehensive programs to reverse the statistics. Some communities are seeing favorable results as they attempt to reduce teen pregnancies, monitor high-risk births, provide prenatal and perinatal care, and educate the public about risk factors linked with low birthweight and premature deliveries. Among the success stories:

Clark County has reduced its incidence of low-birthweight babies by 10 percent¹⁷ between 1995 and 2000. The county's health department is using the Prenatal Substance Use Prevention Program (PSUPP, funded by the Indiana Division of Mental Health) grant money to support home visits and to inform pregnant women about the negative effects of alcohol, tobacco, and other drugs. The department's community partner, Clark Memorial Hospital, hosts free prenatal classes and houses the department's clinic.

Dubois County's 14 percent decrease in low-birthweight babies between 1995 and 2000¹⁷ may be related to its clinic that offers instruction in birthing, baby care, and breastfeeding. At least half of the clinic's clients are Hispanic, and 90 percent fall below the poverty line. This clinic is partially funded by Maternal and Child Health (MCH) block grant awarded by the Indiana State Department of Health (ISDH).

Jefferson County reports a 32 percent decrease in low-birthweight babies between 1995 and 2000¹⁷, a turnaround that may be linked to its Women, Infants, and Children (WIC) program that provides nutritional support and education to poverty-level families that include pregnant and postpartum women and their preschool children. WIC makes referrals to doctors, dietitians, and smoking-cessation counselors.

Although **Marion County** saw an increase in low-birthweight rates in the mid-1990's, recent efforts have pushed this figure back to its 1995 level. A PSUPP coordinator works with pregnant women at the county health department's Action Center as well as other prenatal clinics in Marion County. In fiscal year 2002, PSUPP data showed that 50 percent of the PSUPP clients using cigarettes quit and 100 percent of their newborns were full term.

Resources for Low-Birthweight Prevention

Prenatal Substance Use Prevention Program (PSUPP): <http://www.in.gov/isdh/programs/mch/psupp.htm> or call 1-800-433-0746.

Maternal and Child Health (MCH) block grant awarded by the Indiana State Department of Health (ISDH): <http://www.in.gov/isdh/programs/mch/app.doc> or 1-317-233-1241

The Indiana Perinatal Network (IPN): <http://www.indianaperinatal.org> or 1-800-433-0746

The Early Start Program: 1-317-233-1249 or visit the Provider Resources section at <http://www.indianaperinatal.org>

Hoosier Healthwise: <http://www.in.gov/fssa/hoosierhealthwise/> or call 1-800-889-9949

The March of Dimes: <http://www.modimes.org/prematurity/prematurity.asp>

¹⁷ Percent change indicates how much change has occurred between 1995 and 2000. The percent changes shown were calculated using three-year averages. For example, 1995 (the baseline year) represents an average of data from 1994, 1995, and 1996.

The Big Picture

While the “war” against preterm birth and low birthweight gains ground, it seems that the battleground constantly changes. Progress made with teens may be masked by the higher number of multiple births and babies born to women aged 35 and older. There is a growing concern regarding substance abuse in all sectors of our communities and the effects of birth outcomes in our state. Continuing efforts to reduce the risk factors associated with low-birthweight babies (e.g., teen pregnancies, lack of prenatal care, smoking) will reduce the rates in Indiana, but it will not make the problem go away. New research suggests going beyond single factors and looking at the complex interplay between biological (e.g., age, race), behavioral (e.g., harmful habits), and psychosocial (e.g., stress, social support, access to health care) risk factors¹⁰. Until we can address and understand these complex relationships, too many of our tiniest citizens will face short- and long-term developmental challenges.

ACTION

Decreasing the number of low-birthweight Hoosier infants is a responsibility shared by parents-to-be, healthcare professionals, communities, and state and local policy makers.

Parents-to-be can...

- plan pregnancy and be in the best health possible prior to conception.
- attend childbirth classes and make a commitment to eat healthy, exercise appropriately, and abstain from tobacco, alcohol, and other drugs.

Hospitals, clinics, and physicians can...

- offer pregnancy tests and education on the negative effects of drug use, sexually transmitted diseases, diabetes, and other conditions that are harmful to fetuses.

- offer prenatal care and childbirth education classes as a part of routine care.
- become more skillful at screening women for alcohol, tobacco, and other drug use and advise them to enter treatment programs if they cannot stop use on their own.
- communicate with patients in culturally competent ways.
- ensure pregnant women are receiving needed food, medical care, and safe shelter.
- help women to make informed decisions about the use of assisted reproductive technologies by educating them on the increased odds of low birthweight and multiple births.

Communities can...

- provide a range of programs aimed at educating citizens about the heightened risk factors linked to unplanned pregnancies, teen pregnancies, substance abuse, and vaginal infections.
- increase the cultural competence of physicians and caregivers.
- establish networks among service providers to ensure all pregnant women receive prenatal care during their first trimester.
- establish networks among grassroots and faith-based organizations best suited to disseminate information and serve at-risk women.

Policy makers can...

- ensure that healthcare programs are adequate, available, and accessible.

How is Your County Faring on Low-Birthweight Risk Factors?

Visit the Kids Count in Indiana database at <http://www.iyi.org/> to obtain information specific to your county or to compare your county to the rest of the state. The Kids Count in Indiana database allows you to map data, as well as graph comparisons between risk factors and identify trends.

Interested in national trends? The Annie E. Casey Foundation's KIDS COUNT now offers several interactive, easy-to-use databases that allow visitors to create free, customized data reports. You can generate custom profiles, line graphs, maps, and rankings, and download raw data. Access KIDS COUNT data at <http://www.aecf.org/kidscount/data.htm>.

Still want more information? Check out IYI's other resources:

Other Indiana Youth Institute Resources

IYI'S WEB SITE - WWW.IYI.ORG

- A growing source of reliable information to youth workers, including new reports, county data on Indiana youth, and IYI's entire catalog of library materials that can be borrowed online.
- IYI's Kids Count database contains indicators such as:
 - Percent of low-birthweight babies
 - Percent of mothers who reported smoking during pregnancy
 - Percent of mothers who received first trimester prenatal care
 - Teen birth rate
- IYI's Web site also features summaries of recent information culled from journal articles, newspapers, books, and government sources. Links to the full-text reports are provided.

- Can't find the data you need on our Web site? An IYI staff member is available to answer data-related questions and provide custom research.

VIRGINIA BEALL BALL LIBRARY

- An outstanding 6,000-volume collection of materials on healthy youth development, youth service delivery, nonprofit management, and fund raising. All materials can be borrowed free through IYI's Web site or through our toll-free main number. IYI's librarian is available to answer reference questions.

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