

KIDS COUNT Indicator Brief
Reducing Infant Mortality

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The decline in infant mortality in the United States over the last half century represents a public health triumph, the accrued benefit of long-term progress in sanitation, antibiotics, neonatology and health care access for families living in poverty. The infant mortality rate (the death rate for infants during the first year of life) decreased steadily from 1960 to 2000, dropping from 26.0 to 6.9 deaths per 1,000 live births. The years from 1995 to 2000 alone saw a 9 percent decrease in the infant mortality rate. But between 2000 and 2006, progress slowed, and the rate dropped only slightly, from 6.9 to 6.7 deaths per 1,000 live births (KIDS COUNT Data Center, 2009).

While the historic trendline is positive, three findings should constitute a wake-up call for Americans concerned about outcomes for babies and what they tell us about the well-being of our society as a whole.

- **Over time, the U.S. has made slower progress than most other industrialized countries in reducing infant mortality.** This stems largely from disparities among various racial and ethnic groups (Yazbak, 2005). While infant mortality rates have improved for all reported U.S. racial and ethnic groups since 1995, Non-Hispanic black babies were 2.4 times more likely than Non-Hispanic white babies to die before their first birthdays in 2006 (Annie E. Casey Foundation, 2009). The infant mortality rate for African-American children in 2006 is on par with countries such as Bosnia and Herzegovina, Romania, and Vietnam (Annie E. Casey Foundation, 2009).
- **Since 2000, progress has stalled.** In 2000, the U.S. infant mortality rate was 6.9 deaths per 1,000 live births; in 2006, it declined slightly to 6.7 (KIDS COUNT Data Center, 2009).
- **Progress in reducing risk has benefited infants mainly after the first month of life.** There has been less improvement in newborns' chances of surviving the first days and weeks of life. In 2005, about two-thirds of all infant deaths occurred during the first month (Mathews & MacDorman, 2008).

In short, despite the wide range of expertise that has been brought to bear on reducing infant mortality across the nation, the first year of life remains a time of considerable risk for many babies. Although the U.S. spends more on health care than any other country, our infant mortality rate remains higher than that of most other industrialized nations. In some Scandinavian (Sweden, Norway, Finland) and East Asian (Japan, Hong Kong, Singapore) countries, the infant mortality rate is at least half of the U.S. rate (below 3.5 deaths per 1,000 live births). As of 2004, the last year for which world rankings are available, the U.S. shared 29th place with Poland and Slovakia (Kung et al., 2008).

Why has progress stalled? Congenital malformations and sudden infant death syndrome (SIDS) continue to be significant causes of infant mortality, but recent years have seen advances in addressing these risk factors (Mathews & MacDorman, 2008). In contrast, low-birthweight and preterm delivery have proven to be more difficult barriers to overcome.

Between 2000 and 2005, the rate of low-birthweight babies and the rate of preterm births each increased by more than 9 percent. During the same period, the percentage of infant deaths related to preterm birth rose from 34.6 percent to 36.5 percent. The percentage of preterm births varies across U.S. cities and states (Annie E. Casey Foundation, 2008b).

The earliest preterm newborns are least likely to survive. In 2005, the 2 percent of infants who were born very early (after less than 32 weeks of gestation) represented 55 percent of all infant deaths. However, later preterm births also place newborns at risk. In 2005, the infant mortality rate for “late” preterm infants (34-36 weeks of gestation) was three times higher than the rate for term infants (36-41 weeks of gestation).

Because prevention efforts have not achieved the hoped-for results, researchers and policymakers have begun to shift from a narrow focus on prenatal and infant care to a broader emphasis on women’s health. A recent report from Trust for America’s Health asserts that widespread chronic disease epidemics such as obesity and diabetes are taking a toll on America’s infants, especially those who are African American, urban, and poor (Levi, Cimonis & Johnson, 2008). Narrow strategies cannot produce the advances that are needed to protect our youngest and most vulnerable citizens.

This *KIDS COUNT Indicator Brief* describes four strategies that are essential to any plan aimed at further reducing the infant mortality rate:

- **Take a Lifespan Approach to Maternal and Infant Health**
- **Ensure Timely Prenatal Care for All Women**
- **Address Racial and Ethnic Disparities in Infant Mortality**
- **Sustain Efforts to Prevent Infant Mortality After the First Month of Life.**

- **Take a Lifespan Approach to Maternal and Infant Health.**

Typically, efforts to improve infant health in the U.S. have focused on timely, appropriate care during pregnancy and delivery. While these services remain keys to giving babies a good start in life, they do not sufficiently address the maternal health problems that often underlie infant mortality. There is growing consensus that prevention efforts need to begin well before conception, especially for those mothers at greatest risk of poor pregnancy outcomes. Several months of medical attention cannot overcome many years of disadvantage and poor health. Women also need good care between pregnancies.

Make infant and maternal health a priority of health care reform. Good maternal health requires diagnosis and management of chronic diseases well before conception. But lack of health insurance keeps women from getting the care needed to maintain their own health and improve their chances for healthy pregnancies. Before pregnancy, women

qualify for Medicaid only if they have extremely low incomes—well below the poverty line (68 percent of the Federal poverty line for working women, and under 41 percent for those who do not work). Once they become pregnant, women are held to a less stringent requirement (185 percent) (Kaiser Family Foundation, 2009). As a result, many low-income women can obtain health coverage only after they become pregnant. Moreover, women who qualify for Medicaid only after a confirmed pregnancy test often experience delays in enrollment and referral to a provider (Levi, Cimonis & Johnson, 2009).

Provide effective monitoring and treatment of chronic diseases in women. Chronic diseases in the mother, including obesity, hypertension, diabetes, and asthma, have been associated with poor birth outcomes. There is growing evidence that periodontal disease, which affects many women of childbearing age, can increase the odds of preterm delivery. The time before conception is the optimal point at which these conditions can be identified and managed in order to improve a woman's chances of giving birth to a healthy child. Such measures might also lessen black/white discrepancies in infant mortality, since African American women are more prone to suffer from some conditions that affect birth outcomes, such as high blood pressure (Johnson et al., 2008).

Provide health education and preconception counseling. Health education should occur as part of school health curricula or as part of regular medical checkups. Every contact between a woman of childbearing years and a health provider is an opportunity to provide information and screen for reproductive health risks, optimizing her chances for eventual healthy pregnancies (Levi, Cimonis & Johnson, 2008). Because crucial aspects of development occur during the early weeks of pregnancy, before many women realize that they are pregnant, expectant mothers need information about behaviors that can affect their babies even before they conceive (Johnson et al., 2008). Contraception counseling should also be part of a responsible health education program. A 2006 study reported that half of all pregnancies are unintended, including 40 percent of pregnancies among white women, 69 percent among blacks, and 54 percent among Hispanics. Teen pregnancies are even more likely to be unintended (Finer & Henshaw, 2006). These data affect infants' life chances since women with unwanted pregnancies are significantly more likely than other expectant mothers to engage in behaviors associated with poor birth outcomes, such as smoking, drinking, and using illicit drugs. They are more likely to wait until the third trimester to begin prenatal care (Orr, James & Reiter, 2008).

Increase awareness among prospective parents that good decision-making begins before their babies are born. They need to understand how alcohol, nicotine, illicit drugs, and some medicines can compromise their babies' well-being. They also need to know about positive behaviors that can promote their babies' health, including good nutrition. For example, some birth defects involving the brain and central nervous system, including anencephaly and spina bifida, may be prevented when the mother takes a vitamin that includes folic acid prior to and early in her pregnancy (March of Dimes, 2008).

- **Ensure Timely Prenatal Care for all Women.**

Infants of mothers who began receiving prenatal care in the first trimester have much better life chances than those whose mothers began later or receive no prenatal care at all. Moreover, prenatal care is valuable as a link to other services, such as nutritional services. African American and Hispanic women are less likely to receive timely prenatal care than other expectant mothers (Annie E. Casey Foundation, 2008c). Very young women are also less likely to receive timely prenatal care: one in three teen mothers (ages 15 to 19) receives no prenatal care during the first trimester of pregnancy (National Center for Health Statistics, 2003).

Address the barriers to prenatal care. A key to reducing infant mortality is to address the barriers that stand between low-income women and adequate prenatal care. Racial and ethnic minorities tend to live in medically underserved areas, and many African American and Hispanic families lack a regular source of care, making do with outpatient clinics or hospital emergency rooms in times of crisis (U.S. Department of Health and Human Services, 2001). Nevertheless, according to a study by the Agency for Health Care Policy and Research, low-income pregnant women are more likely to seek and be satisfied with prenatal care if they can avoid long waiting time, see providers who explain procedures, and have access to ancillary services, especially substance abuse services and childbirth education. Increasingly, health professionals have also begun to understand the need for “culturally competent providers” and the availability of medical personnel who speak the patient’s primary language.

Fully implement and enhance Medicaid policies and other programs that provide health care to women of childbearing age. Medicaid offers excellent coverage for preventive and primary health care, but does not work for families as well as it should. Many eligible people, particularly minority families, are not enrolled (Rosenbaum & Johnson, 2000). The Trust for America’s Health recommends state expansion of Medicaid coverage in order to provide better coverage for women living in poverty. States should have the authority to cover women without a federal waiver, and should allow Medicaid benefits to follow women for 24 months after they give birth (Levi, Cimons & Johnson, 2008). To reach all families at risk, it also urges expansion of federal programs such as Healthy Start Infant Mortality Reduction Program, Community Health Centers, Title X Family Planning and Title V Maternal and Child Health Block Grant.

Focus on timing and content of prenatal care. Research shows that it is not just the number of prenatal visits that counts, but also the timing and content of those visits. Promising approaches include: reviewing medical records to assess the content of prenatal care in high-risk communities; providing case management services to women during and after pregnancy; and identifying and serving women who have previously had a poor birth outcome (Levi, Cimons & Johnson, 2008).

Help women make behavioral changes. In 2005, the infant mortality rate for infants of mothers who smoked was 74 percent higher than the rate for nonsmokers (Mathews & MacDorman, 2008). Programs that discourage teens and young women from starting to smoke, smoking cessation programs for pregnant women, and insurance coverage for smoking cessation treatments for pregnant women can help to reduce the number of low-

birthweight infants and prevent infant mortality. Promising prevention strategies include: public education campaigns; restriction of advertising to young people; reduced access; increased cigarette taxes; and restricted smoking in public places (Ringel & Evans, 2001).

- **Address Racial and Ethnic Disparities in Infant Mortality**

In recent decades, the infant mortality rate has improved significantly for all reported racial and ethnic groups, for all socioeconomic categories, and for all categories of maternal education. Nevertheless, significant disparities persist. In 2006, the infant mortality rate (per 1000 live births) was 13.3 for Non-Hispanic blacks, 8.2 for American Indians, 5.6 for Non-Hispanic whites, 5.5 for Hispanics, and 3.6 for Asian and Pacific Islanders (KIDS COUNT Data Center, 2009).

Expand access to high-quality neonatal intensive care. Disparities in preterm births have proven very difficult to understand or overcome. In 2005, the preterm-related infant mortality rate was more than three times higher for black mothers than for white mothers (Mathews & MacDorman, 2008). Some argue that narrowing racial disparities in birth outcomes will require a sharper focus on disparities in the quality of care available to preterm infants (Howell, 2008). Progress in understanding and preventing preterm and low birthweight (LBW) birth has been slow; progress in helping preterm and LBW newborns survive has been more rapid. But infants' chances of survival often hinge on the technology and expertise available at local hospitals. As things stand, hospitals serving a high proportion of minority patients have higher than expected mortality rates for infants born at very low birthweights (Morales et al., 2005). Access to state-of-the-art care can also improve survival rates for infants born with congenital anomalies, especially heart defects.

Increase understanding of racial and ethnic disparities. Racial and socioeconomic disparities in rates of preterm birth and infant mortality are among the most widely recognized but least understood aspects of infant and maternal health. In particular, the persistent black/white differential requires intensive study. At any age, and at any income, education or socioeconomic level, an African American mother is more than twice as likely to lose her infant as a white woman. Compared with white babies, black infants are at greater risk for three leading causes of infant mortality: congenital malformations, low birthweight, and sudden infant death syndrome (SIDS) (Mathews & MacDorman, 2008).

Researchers need a better understanding of disparities among Hispanics with different ancestral roots. In 2006, the mortality rate for U.S.-born infants of Hispanic origin was: 7.7 for Puerto Ricans; 5.7 for Mexicans; 2.8 for Central and South Americans; and 5.3 for Cubans (Heron et al., 2009).

Illuminate the relationship between low birthweight and infant mortality. Low birthweight (LBW) is considered to be the most important factor explaining the black/white differential in the infant mortality rate (Howell, 2008). Despite a large body of literature showing that low birthweight is a risk factor for infant mortality, there is little consensus about why babies are born too soon or too small. In recent years, some

researchers have suggested that a tendency to focus on low birthweight, per se, may leave unexplored some underlying factors that compromise fetal development (Wilcox, 2002; Basso, Wilcox & Weinberg, 2006). If they are right, strategies that focus primarily on increasing birthweight may not be sufficient to reduce the infant mortality rate. Researchers may need to distinguish more rigorously between LBW births that are “compromised during fetal development” and LBW births that are otherwise “normal” (Gage et al., 2008, p. 9).

Increase understanding of economic and educational factors. Infants in all socioeconomic categories have better odds of survival today than they did in past decades. However, babies in households near or below the poverty line continue to face greater risks than infants born to more affluent families. Moreover, a recent study shows that disparities based on household income have increased substantially since 1985. The greatest disparities were observed for infants born at normal birth weights and for those whose deaths that occurred during the postneonatal period (one month to one year).

The gap in infant mortality based on mothers’ years of formal education has also widened significantly over the same period. Maternal education appears to be an increasingly important predictor of infant survival. Researchers observe that key risk factors for infant mortality, including smoking during pregnancy, delayed or no prenatal care, and lack of health care coverage, vary substantially with socio-economic status and maternal education (Singh & Kogan, 2007).

Support research that takes into account the multiple factors that affect infant mortality. Research is needed to develop better methods and provide a more subtle understanding of pathways to infant mortality—one that takes multiple factors into account (Singer & Ryff, 2001). Case in point: Infant mortality rates vary with maternal age, with the highest 2005 death rates documented for infants of the youngest mothers—those under age 15 (16.4 per 1,000 live births), and the oldest mothers—aged 40 and over (7.9 per 1,000 live births) (Mathews & MacDorman, 2008). At the same time, maternal age needs to be considered in relation to other factors, such as previous childbearing, race/ethnicity, maternal education, and the infant’s gender and birth weight. For example, repeated childbearing for adolescent mothers is associated with significantly higher infant mortality (Gage et al., 2008).

Support research that links environmental and cultural factors with individual characteristics. Economic differences do not fully explain the persistent high infant mortality rates of African Americans and other minority groups (Hearst, Oakes & Johnson, 2008). Effective policies and interventions require more nuanced understandings of how risk factors interact. There is growing consensus among researchers that individual-level characteristics do not fully account for these disparities. Some argue that health in general, and birth outcomes in particular, are rooted in social inequalities and neighborhood effects (Hearst, Oakes & Johnson, 2008; Culhane & Io, 2003). Studies of neighborhood effects are especially important, since more than 300 communities in the U.S. have rates at least one and one-half times the national average of infant mortality, and some have as high as three times the overall rate. In New York City,

the infant mortality rate is seven times higher in the minority community of Central Harlem than in the predominantly White neighborhood of the Upper West Side (Howell, 2008). Researchers have begun exploring the complex relationship between birth outcomes, on one hand, and complex contextual factors (such as racial segregation or community disorder) on the other, but acknowledge that it is “difficult to disentangle contextual effects from the characteristics of individuals” (Hearst, Oakes & Johnson, 2008).

Data on birth outcomes for immigrants are another key piece of the environment puzzle and needs closer study. Studies show that infants born in the U.S. are less likely to die during their first year if their mothers were born elsewhere (outside the 50 states and District of Columbia) (Mathews & MacDorman, 2008). Researchers have not yet teased out all of the environmental, cultural, and socioeconomic factors that underlie this finding.

- **Sustain efforts to prevent infant mortality after the first month of life.**

After the first month, babies continue to need prompt, appropriate care. Illness and SIDS continue to claim the lives of babies throughout the first year.

Sustain efforts to promote breastfeeding, especially among African American mothers. Breast milk provides optimal nutrition for infants and is associated with decreased infant mortality (Ip, Chung & Raman et al., 2007). Sustained efforts to promote breastfeeding are therefore a key strategy for narrowing the infant mortality gap. In recent years, public information campaigns have proven effective, leading to a sharp increase in breastfeeding rates among African Americans (from 36 percent in 1993-94 to 65 percent in 2005-06). Despite this increase, African Americans are still significantly less likely than white mothers to breastfeed their infants (McDowell, Wang & Kennedy-Stephenson, 2008). Prenatal education efforts and public information campaigns need to be grounded in an understanding of why breastfeeding rates are lower for some groups of infants, including those with younger mothers and those in low-income households. Public information and policymaking efforts should also target employers and seek to overcome change workplace policies that impede women’s ability to choose breastfeeding.

Ensure access to well-baby and sick-baby care. Well-baby check-ups can provide early detection and treatment of influenza and pneumonia, which can be fatal for infants (Centers for Disease Control and Prevention, 2005). Efforts are needed to see that all uninsured children receive the health coverage to which they are entitled through the State Child Health Insurance Program (SCHIP) or Medicaid.

Sustain SIDS public education campaigns and intensify information campaigns for child care providers. A dramatic downturn in the rate of death from SIDS (sudden infant death syndrome) illustrates the power of effective public education efforts. Based on research showing that tummy sleeping greatly increases the risk of SIDS, the American Academy of Pediatrics recommended, in 1992, that parents and other caregivers put healthy babies to sleep on their backs, later adding warnings about the

risks of unnecessary soft bedding and soft objects in cribs; the hazards of adults sleeping with an infant in the same bed; and the importance of educating child care providers about SIDS prevention (American Academy of Pediatrics, 2005). In 1994, a national “Back to Sleep” education campaign was launched. Between 1992 and 2005, the rate of SIDS deaths in the U.S. was cut in half.

Despite this progress, SIDS continues to be the leading cause of death for babies from 1 to 12 months of age. Sustained efforts are needed to inform new parents; at the same time, it is crucial to inform child care providers of SIDS risks, since one in five SIDS deaths occurs while infants are in non-parental care and at present one-quarter of licensed providers say they have never heard of the relationship between SIDS and sleep position (American Academy of Pediatrics, 2008). Public education efforts are especially important in rural and minority communities where SIDS rates are high. In 2005, American Indian/Alaskan Native infants were twice as likely to die of SIDS as white infants. Black infants were 1.8 times as likely to succumb to SIDS as white babies (Mathews & MacDorman, 2008).

Expand programs for the prevention of child abuse and neglect. Child abuse and neglect kill hundreds of infants every year—and not all cases are reported (Gaudiosi, 2006). As the occurrence of cases of true SIDS has decreased, the proportion of unexplained infant deaths attributable to fatal child abuse may be increasing. Estimates of the incidence of infanticide among cases designated as SIDS range from 1 to 5 percent (American Academy of Pediatrics, 2006). Preventing child abuse requires intensive efforts to address domestic violence, provide help and emergency care for distraught parents, and educate teen parents and single mothers on babies’ needs and vulnerabilities. Among the most tragic cases of infant mortality involve babies who are abandoned by desperate new parents. Across the country, lawmakers and prosecutors are weighing changes in laws that they hope will reduce these cases of infant mortality. Laws vary, but are generally designed to allow parents to avoid prosecution for child abandonment by leaving their babies in safe places such as hospital emergency rooms (Whitaker, 2000). There is growing recognition that prevention requires partnerships among all of the adults who come into contact with babies, including child care providers (Seibel et al., 2006).

Reducing the infant mortality rate should be high on the national agenda. Indeed, social scientists often use infant mortality—the rate at which babies die before their first birthday—as an overall indicator of a nation’s quality of life. In part, they see infant mortality as a good yardstick for gauging large trends in children’s and women’s health, the quality and availability of medical care, public health practices, and the overall economy. At the same time, by using infant survival as their standard, researchers also reflect what most people feel intuitively: that a population’s well-being has to be judged in terms of the welfare of its youngest and most vulnerable members.

References

- Annie E. Casey Foundation 2009. *2009 KIDS COUNT Data Book*. Baltimore, MD.
- Annie E. Casey Foundation 2008a. Race disparity persists in infant mortality rates, mirroring sharp decline in women's health, according to new report from Trust for America's health. Press release, June 12. Accessed at <http://healthyamericans.org/newsroom/releases/release061208b.pdf>.
- Annie E. Casey Foundation 2008b. *2008 KIDS COUNT Data Book*. Baltimore, MD.
- Annie E. Casey Foundation 2008c. *The right start for America's newborns*. Baltimore, MD. Accessed at www.kidscount.org/datacenter/rightstart.jsp.
- American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome. 2005. The changing concept of sudden infant death syndrome. *Pediatrics* 116(5):1245-1255, November.
- American Academy of Pediatrics Committee on Child Abuse and Neglect. 2006. Distinguishing sudden infant death syndrome from child abuse fatalities. *Pediatrics* 118 (1):421-427, July.
- American Academy of Pediatrics. 2008. Reducing the risk of SIDS. Training powerpoint available at www.healthychildcare.org/PPT/SIDSfinal.ppt - 2008-10-16.
- Basso, O, Wilcox, A.J., Weinberg, C.R. 2006. Birth weight and mortality: Causality or confounding? *American Journal of Epidemiology* 164(4):303-311.
- Centers for Disease Control and Prevention. 2005. Guidance for prevention and control of influenza in the peri- and postpartum settings. Accessed at <http://www.CentersforDiseaseControlandPrevention.gov/flu/professionals/infectioncontrol/peri-post-settings.htm>.
- Culhane, J. & Elo, I. 2003. Neighborhood context and reproductive health. *American Journal of Obstetrics and Gynecology* 192(5):S22 - S29.
- Finer, L.B. & Henshaw, S.K. 2006. Disparities in rates of unintended pregnancy in the United States, 1994 and 2001. *Perspectives on Sexual and Reproductive Health* 38(2):90-96.
- Gage, T.B., Fang, F., O'Neill, E. & Stratton, H. 2008. Maternal age and infant mortality: A test of the Wilcox-Russell hypothesis. *American Journal of Epidemiology* (Advance access, November 21, 2008).
- Gaudiosi, J.A. 2006. *Child maltreatment*. Washington, D.C.: U.S. Department of Health and Human Services.

Hearst, M.O., Oakes, M. & Johnson, P.J. 2008. The effect of racial residential segregation on black infant mortality. *American Journal of Epidemiology* 168(11):1247-1254.

Heron, M., Hoyert, D.L., Murphy, S.L., Xu, J., Kochanek, K.D., Tejada-Vera, B. 2009. Deaths: Final data for 2006. *National Vital Statistics Report* 57(14), April.

Howell, E., Hebert, P. & Chatterjee, S. 2008. Black/white differences in very low birth weight neonatal mortality rates among New York City hospitals. New York: The Commonwealth Fund. Accessed at: [http://www.commonwealthfund.org/~media/Files/Publications/In the Literature/2008/Mar/Black White Differences in Very Low Birth Weight Neonatal Mortality Rates Among New York CityHospit/Howell_blackwhitedifneonat_Pediatrics_1110_itl.pdf.pdf](http://www.commonwealthfund.org/~media/Files/Publications/In%20the%20Literature/2008/Mar/Black%20White%20Differences%20in%20Very%20Low%20Birth%20Weight%20Neonatal%20Mortality%20Rates%20Among%20New%20York%20CityHospit/Howell_blackwhitedifneonat_Pediatrics_1110_itl.pdf.pdf)

Ip, S., Chung, M., Raman, G., Chew, P., Magula, N., DeVine, D., Trikalinos, T. & Lau, J. 2007. *Breastfeeding and maternal and infant health outcomes in developed countries*. Agency for Healthcare Research and Quality. Accessed at: <http://www.ahrq.gov/downloads/pub/evidence/pdf/brfout/brfout.pdf>.

Kaiser Family Foundation. 2009. Median Medicaid/CHIP income eligibility thresholds, 2008. Accessed at: <http://facts.kff.org/chart.aspx?ch=941>.

KIDS COUNT Data Center. 2009. Accessed at <http://datacenter.kidscount.org>.

Kung, H., Hoyert, D.L., Xu, J. & Murphy, S.L. 2008. Deaths: Final data for 2005. *National Vital Statistics Reports*, 56 (10), April 24. Accessed at: http://www.cdc.gov/nchs/data/nvsr/nvsr56/nvsr56_10.pdf.

Levi, J., Cimon, M., Johnson, K. 2008. *Healthy women, healthy babies*. Washington, DC: Trust for America's Health. Accessed at: <http://healthyamericans.org/reports/files/BirthOutcomesLong0608.pdf>.

Mathews, T.J. & MacDorman, M.F. 2008. Infant mortality statistics from the 2005 period linked birth/infant death data set. *National Vital Statistics Reports* 57(2), July 30. Accessed at: http://www.cdc.gov/nchs/data/nvsr/nvsr57/nvsr57_02.pdf.

Mathews, T.J., Menacker, F & MacDorman, M.F. 2003. Infant Mortality Statistics from the 2001 Period Linked Birth/Infant Death Data Set. *National Vital Statistics Reports* 52(2), September 15. Accessed at: http://www.cdc.gov/nchs/data/nvsr/nvsr52/nvsr52_02.pdf.

McDowell, M., Wang, C., Kennedy-Stephenson, J. 2008. Breastfeeding in the United States: Findings from the National Health and Nutrition Examination Survey, 1999-2006. National Center for Health Statistics 5. Accessed at: http://www.cdc.gov/nchs/data/nvsr/nvsr52/nvsr52_02.pdf.

Morales, L.S., Staiger, D., Horbar, J.D., et al. 2005. Mortality among very low-birthweight infants in hospitals serving minority populations. *American Journal of Public Health* 95(12): 2206–2212.

Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services. 2000. *Healthy people 2010*. Washington, D.C.: U.S. Department of Health and Human Services.

Orr, S.T., James, S.A. & Reiter, J.P. 2008. Unintended pregnancy and prenatal behaviors among urban, black women in Baltimore, Maryland: the Baltimore preterm birth study. *Annals of Epidemiology* 18(7):545-51, July.

Ringel, WN and Evans, Js. 2001. Cigarette taxes and smoking during pregnancy. *American Journal of Public Health* 91(11):1851.

Rosenbaum, S. & Johnson. K. 2000. *What is possible: Making Medicaid and SCHIP work for families*. New York, NY: Carnegie Corporation of New York.

Seibel, N., Britt, D., Gillespie, L.G. & Parlakian, R. 2006. *Preventing child abuse and neglect: Parent-provider partnerships in child care*. Washington, DC: Zero to Three.

Singer, R.H. & Ryff, C.D.. Eds. 2001. *New horizons in health: An integrative approach*. Washington. DC: National Academy Press.

U.S. Department of Health and Human Services. Office of Minority Health. (2000). *Racial and Ethnic Disparities in Infant Mortality*. www.omhrc.gov.

Singh, G.K. & Kogan, M.D. 2007. Persistent socioeconomic disparities in infant, neonatal, and postneonatal mortality rates in the United States, 1969-2001. *Pediatrics* 119(4):e928-e939.

U.S. Department of Health and Human Services. Office of Minority Health. 2001. *Eliminating racial and ethnic disparities in health*. Washington, D.C.: Author.

Whitaker, B. 2000. Deaths of unwanted babies bring plea to help parents. *The New York Times*, March 6, p. 1.

Wilcox, A.J. 2002. *The analysis of birth weight and infant mortality: An alternative hypothesis*. Durham, NC: Epidemiology Branch, National Institute of Environmental Health Sciences.

Yazbak, F.E. 2005. The infant mortality rate: An index of a nation's health. www.whale.to/a/yabak89.html.

Online resources

Back to Sleep Campaign to Prevent SIDS

www.nichd.nih.gov/sids/

Eunice Kennedy Shriver National Institute of Child Health and Human Development

www.nichd.nih.gov

March of Dimes Foundation

www.marchofdimes.com

National Center on Birth Defects and Developmental Disabilities

[/www.cdc.gov/ncbddd/index.html](http://www.cdc.gov/ncbddd/index.html)

National Center for Chronic Disease Prevention and Health Promotion

www.cdc.gov/nccdphp/

National Center for Education in Maternal and Child Health

www.ncemch.org

National Healthy Start Association

www.healthystartassoc.org

National Healthy Mothers, Healthy Babies Coalition

www.hmhb.org

National Sudden and Unexpected Infant/Child Death & Pregnancy Loss Resource Center

www.sidscenter.org

Office of Minority Health Resource Center (U.S. Department of Health & Human Services)

www.omhrc.gov

Trust for America's Health

www.healthyamericans.org