Mortality Among Children With Sickle Cell Disease Identified by Newborn Screening During 1990-1994—California, Illinois, and New York

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1 table omitted

SICKLE CELL disease (SCD) is an autosomal recessive disorder characterized by production of abnormal (sickle) hemoglobin, resulting in anemia, susceptibility to pneumococcal and other infections, pain, stroke, and multiple organ dysfunctions. The most common types include hemoglobin SS (homozygous) disease, sickle cell–hemoglobin C disease, and the sickle beta-thalassemia syndromes. A randomized controlled trial published in 1986 indicated that daily oral penicillin prophylaxis reduced the incidence of serious infection in young children with SCD and led to widespread adoption of newborn screening programs for SCD. To study the effectiveness and utilization of prevention programs among large populations of infants with SCD, several newborn screening programs in the United States are now attempting to determine rates of complications and actual use of early medical interventions (e.g., penicillin prophylaxis and pneumococcal vaccination). This report focuses on recent mortality in California, Illinois, and New York. In California and Illinois, mortality from all causes among black children born during 1990-1994 with SCD was slightly less than overall mortality for all black children born in the same time period.

All newborns in California, Illinois, and New York are screened for hemoglobinopathies. Health departments implemented screening programs in New York in 1975, Illinois in 1989, and California in 1990. For this investigation, SCD was defined as any clinically significant sickle hemoglobinopathy in an infant born during 1990-1994. In California and Illinois, identifying variables from SCD databases were matched with computerized records of state-specific death certificates for 1990-1995. In New York, all SCD-related deaths among children aged <3 years listed in state vital records for 1990-1994 were matched with the state SCD database. Additional follow-up extending through 1997 was available in California and Illinois: local physicians (i.e., through surveys) and public health nurses informed the respective state health department about the circumstances of SCD-related deaths; such information was not available in New York. Mortality rates per person-year were calculated assuming complete death ascertainment through December 31, 1994, in New York and through December 31, 1995, in California and Illinois.

During 1990-1994, a total of 2487 children with presumed or confirmed SCD were identified by the three newborn screening programs. Excluding two deaths of children presumably born in other states, 27 deaths were reported among children with SCD; 20 death certificates provided causes that included SCD or other conditions related to SCD. The median age at death for the 20 infants who had SCD-related deaths was 22 months (range: 2-53 months). Mortality rates for each state were similar. In California and Illinois, where mortality for all causes was ascertained, by the end of 1995 the cumulative mortality rate was 1.5 per 100 black children with SCD born during 1990-1994. The equivalent cumulative mortality rate for all black children born during this period in California and Illinois was 2.0 per 100 black newborns, based on approximate age-coded data in national multiple-cause mortality files.

Mortality data was available until the third birthday for the subgroup of 768 children with presumed or confirmed hemoglobin SS disease born during 1990-1991 in New York and during 1990-1992 in California and Illinois. Of these 768 children, 1.0% died as a result of SCD-related causes during the first 3 years of life (0.35 per 100 person-years, based on 2258 person-years [95% confidence interval = 0.15-0.70 per 100 person-years]). The rate of compliance with penicillin prophylaxis was unknown; an investigation of risk factors is being conducted to analyze this and other factors in relation to death and other serious complications. Information about risk factors will be obtained through parental and physician surveys, and ascertainment of deaths outside the three states would not have been ascertainment. Underascertainment of deaths also could have occurred through errors in matching or reporting of vital statistics. This study was population-based, and mortality rates were relatively stable because of the large number (2487) of young children with SCD.

In Maryland, the mortality rate for black children with SCD was comparable to, or lower than, the mortality rate for all black children during 1985-1994. Underascertainment of SCD among severely ill neonates could account for this finding, but ill children in neonatal intensive-care units usually are screened for SCD. In California, Illinois, New York, and Maryland, comprehensive medical care and

**CDC Editorial Note:** The findings in this report indicate low mortality rates for children with SCD born during the early 1990s in geographic areas in which infants with the condition are identified soon after birth. Early diagnosis is an important component of comprehensive medical care for affected children. In a study of U.S. death certificates for 1968-1992, mortality among black children aged 1-4 years who had SCD declined significantly. This trend occurred at the same time as the establishment of newborn screening programs, more comprehensive care and parental education, widespread acceptance of penicillin prophylaxis after publication of the randomized trial in 1986, and new vaccinations.

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2 tables, 2 figures omitted

A TOTAL of 641,086 cases of acquired immunodeficiency syndrome (AIDS) had been reported to CDC through December 1997. Of these, 1783 (0.3%) occurred in American Indians and Alaskan Natives (AI/ANs). AI/ANs represent <1% of the total U.S. population (272 million persons) and are characterized diversely, comprising many tribes—of which 557 are federally recognized. Each tribe has its own traditions and culture.

This report* (1) describes characteristics of AI/ANs with AIDS reported to CDC through 1997; (2) summarizes trends in AIDS incidence among AI/ANs from 1986 to 1996; and (3) for the 25 states in which surveillance was conducted during 1994-1997 for human immunodeficiency virus (HIV) and AIDS, compares the characteristics of AI/ANs who had reported HIV infection (without AIDS) with those of AI/ANs who had AIDS. These findings, which highlight the characteristics of AI/ANs for whom HIV or AIDS had been diagnosed, can assist in the development of targeted prevention strategies.

Trends in AIDS incidence among AI/ANs aged ≥13 years were evaluated using estimated incidence of AIDS-opportunistic illness (AIDS-OI) adjusted for reporting delays, unreported risk/exposure, and changes in 1993 in the AIDS case definition for persons aged ≥13 years. Trends in estimated incidence of AIDS-OI were analyzed by 6-month interval of diagnosis for January 1986-December 1996 (i.e., the most recent date for which AIDS-OI incidence could be estimated reliably). Estimated AIDS-OI incidence rates per 100,000 population by sex, race/ethnicity, and year of diagnosis were calculated using Bureau of Census population estimates for 1986-1996. For the 25 states in which HIV case surveillance was conducted during 1994-1997 (i.e., the years for which comparable data were available by sex, age, and HIV-exposure mode), characteristics of AI/ANs who had HIV (without AIDS) were compared with those who had AIDS.

Characteristics of AI/ANs Who Had AIDS

Of the cumulative total of 1783 AI/ANs reported with AIDS to CDC through December 1997, 1756 (98%) were aged ≥13 years. Compared with the total number of persons with reported cases of AIDS in the United States, a higher percentage of AI/ANs with AIDS were aged 20-29 years (25% versus 17%, respectively), and a lower percentage were aged 40-49 years (21% versus 25%). More than half (53%) of AI/ANs with AIDS resided in five states at the time of their AIDS diagnosis: California (25%), Oklahoma (11%), Washington (7%), Arizona (6%), and Alaska (4%). The five metropolitan statistical areas with the highest percentages of AI/ANs with AIDS were San Francisco, California (6%); Los Angeles-Long Beach, California (6%); Seattle-Bellevue-Everett, Washington (4%); Tulsa, Oklahoma (4%); and San Diego, California (3%). Compared with all persons who have AIDS, a lower proportion of AI/ANs resided in rural areas with populations <50,000 (19% versus 6%, respectively).

The risk/exposure group characteristics of AI/ANs were similar to those of all persons with AIDS in the United States; the most frequently reported mode of HIV exposure was sex who have sex with men (MSM) for 49% of AI/ANs with AIDS and for 48% of all AIDS patients. However, a larger percentage of AIDS cases in AI/ANs were associated with MSM who also were injecting-drug users (IDUs) (MSM/IDUs) in comparison with AIDS cases in all patients (14% versus 3%; a smaller percentage of AIDS cases in AI/ANs were associated with only injecting-drug use in comparison with AIDS cases in all patients (20% versus 25%).

Trends in AIDS-OI Incidence

The estimated number of AIDS-OI cases among AI/ANs aged ≥13 years increased steadily from 1986 (30 cases) through 1994 (200 cases), then stabilized during 1995-1996. In 1996, the estimated AIDS-OI incidence rate was 10 cases per 100,000 population for AI/ANs; this rate was similar to the rate for non-Hispanic whites (11 per 100,000). The rate was seven times higher for non-Hispanic blacks (76 per 100,000) and three times higher for Hispanics (34 per 100,000) than for AI/ANs.

As in other racial/ethnic groups, estimated AIDS-OI incidence rates per 100,000 population for AI/ANs increased during the surveillance period and differed substantially by sex. In 1990, the rate was four times higher for men (22 per 100,000) than for women (five per 100,000). Rates for men decreased slightly from 1994 to 1996 (from 25 to 22 per 100,000). Among men, the proportion of AIDS-OI cases by risk/exposure category was stable during 1994-1996: for MSM, the range was 53%-58%; for IDUs, 16%-19%; and for MSM/IDUs, 14%-20%. Among women, the number of AIDS-OI cases each year was small, although the proportion of cases that occurred in women and were attributed to heterosexual contact increased slightly.

Comparison of AI/ANs Who Had HIV Infection (Without AIDS) with AI/ANs Who Had AIDS

During 1994-1997, 25 states that conducted surveillance for both HIV and AIDS reported 267 cases of HIV (without AIDS) and 327 cases of AIDS in AI/ANs aged ≥13 years. The percentage distribution of selected characteristics of AI/ANs who had HIV (without AIDS) was compared with the percentage of AI/ANs who had AIDS. A higher percentage of HIV (without AIDS) cases occurred in women (53% versus 21%); in adolescents (5% versus 1%); and in persons aged 20-29 years (40% versus 21%). A higher percentage of AIDS cases occurred in MSM (41% of AIDS cases
versus 30% of HIV [without AIDS] cases), and a lower percentage occurred in persons whose exposure category was heterosexual contact (13% of AIDS cases versus 18% of HIV [without AIDS] cases). The risk/exposure was not reported for 20% of AI/ANs who had HIV (without AIDS) and 12% of AI/ANs who had AIDS.

The percentage of patients for whom HIV infection was diagnosed in a hospital setting was similar for AI/ANs and non-AI/ANs (30% versus 29%, respectively). However, AI/ANs with HIV were less likely to have had the infection diagnosed by private physicians (13%) than non-AI/ANs (20%). Reported by: State and local health depts. Div of HIV/AIDS Prevention-Surveillance and Epidemiology, National Center for HIV, STD and TB Prevention; and an EIS Officer, CDC.

CDC Editorial Note: The incidence of AIDS among AI/ANs increased through the early 1990s and leveled off during 1995-1996. Compared with all persons with AIDS in the United States, AIDS among AI/ANs was geographically clustered in selected areas in the West and in smaller cities and rural areas. AI/ANs who had AIDS were relatively younger than all persons with AIDS. The higher percentage of AI/ANs aged 13-29 years who had HIV (without AIDS) suggests that these persons were infected more recently than AI/ANs who had AIDS. These HIV and AIDS surveillance data should be used by public health officials and HIV prevention community planning groups as a basis for public health programs directed at AI/ANs to prevent HIV transmission, particularly in states that have reported the largest numbers of AI/ANs with HIV/AIDS.

The AI/AN population is disproportionately affected by many of the social and behavioral factors associated with increased risk for HIV infection. The AI/AN population is relatively young (median age: 24.2 years) in comparison with the U.S. population (median age: 32.9 years). The AI/AN population is disadvantaged socioeconomically; 31.6% live below poverty level, compared with 13.1% for all races in the United States; 16.2% of AI/AN men and 13.4% of AI/AN women are unemployed, compared with 6.4% of men and 6.2% of women in the total U.S. population. AI/ANs also have high rates of sexually transmitted diseases. During 1984-1988, AI/ANs in the 13 states in which the AI/AN population was >20,000 had more than twice the average rate of gonorrhea and syphilis cases compared with non-AI/ANs. AI/AN adolescents residing on reservations have high rates of drug use compared with non-AI/AN adolescents. These factors emphasize the multiple challenges of developing HIV-risk reduction interventions for this population.

During 1995-1996, the incidence of AIDS-OI leveled among AI/ANs. This leveling may reflect (1) the overall decline in the growth rate of the AIDS epidemic in the United States, which has been attributed to a decline in the rate of new HIV infections, and (2) delays in AIDS-OI incidence among HIV-infected AI/ANs who are receiving anti-retroviral therapy and OI prophylaxis. AIDS-OI incidence also has leveled among other racial/ethnic minorities (i.e., non-Hispanic blacks and Hispanics). To maximize opportunities to benefit from new treatment advances, timely access to HIV counseling and testing, early access to care, and treatment services are critical. These surveillance findings suggest that HIV-infected AI/ANs, who disproportionately reside in rural areas (including reservations), may have reduced access to facilities for HIV diagnosis and treatment, and medical and public health staff in these areas may have less experience with the currently recommended practices for HIV prevention and care.

AI/ANs who had AIDS were more than twice as likely to be classified in the MSM/IDU risk category compared with all persons who had AIDS in the United States. In addition, HIV surveillance data reflect more recent HIV transmission among AI/ANs who were young, who were female, and who engaged in high-risk sex or drug-use behaviors. These surveillance findings highlight the need for a variety of HIV-prevention strategies for AI/ANs and the importance of early access to HIV-testing and care services for this population.

One limitation of these data was the possible underrepresentation of the impact of the HIV/AIDS epidemic among AI/ANs because of misclassification of AI/ANs to other racial/ethnic populations (i.e., previous reports have indicated high rates of misclassification of AI/ANs to non-Hispanic white or Hispanic categories). Because information about tribal affiliation of AI/ANs is not collected, efforts to develop culturally appropriate prevention messages are limited. States in which the AI/AN population is large can benefit from enhanced surveillance efforts that supplement HIV/AIDS surveillance data and collect information about socioeconomic status, education, cultural affiliation, HIV-related risk behaviors, and access to health care.

Despite potential biases of self-selection for HIV testing and overrepresentation of groups targeted for voluntary screening, HIV surveillance data represent persons at an earlier stage in the course of HIV disease than those represented by AIDS surveillance data. HIV surveillance data can facilitate identification of priority groups in need of HIV-prevention and care services. Prevention planning groups at the community level should direct HIV-prevention efforts for AI/ANs to target specific risk behaviors, taking into account the cultural diversity and traditional beliefs of AI/ANs in both rural and urban communities.

References 10 available.

* Single copies of this report will be available until March 6, 1999, from the CDC National AIDS Clearinghouse, P.O. Box 6003, Rockville, MD 20849-6003; telephone (800) 435-5231 or (301) 518-0495.

Administration of Zidovudine During Late Pregnancy and Delivery to Prevent Perinatal HIV Transmission—Thailand, 1996-1998

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Worldwide, approximately 500,000 infants are perinatally infected with human immunodeficiency virus (HIV) each year, most of whom are born in developing countries. In 1994, a clinical trial in the United States and France demonstrated that zidovudine (ZDV) administered orally five times a day to HIV-infected pregnant women starting at 14-34 weeks’ gestation, intravenously during labor, and orally to their newborns for 6 weeks reduced the risk for perinatal HIV transmission by two thirds. In 1994, this regimen was recommended as standard care in the United States; however, because of its
complexity and cost, this regimen has not been implemented in most developing countries, and no other intervention had been efficacious in reducing perinatal HIV transmission. In 1996, the Ministry of Public Health of Thailand and Mahidol University, in collaboration with CDC, initiated a randomized, placebo-controlled trial of a simpler and less expensive regimen of ZDV to prevent perinatal HIV transmission. This report describes primary trial results, which indicate that a short-term antenatal regimen of ZDV reduced the risk for perinatal HIV transmission by approximately half.

HIV-infected pregnant women gave written informed consent for participation and were randomly selected at each of two study hospitals in Bangkok to receive either ZDV or a placebo. The ZDV regimen consisted of 300 mg orally twice a day from 36 weeks’ gestation until onset of labor and 300 mg every 3 hours from onset of labor until delivery. All women were provided infant formula and counseled not to breastfeed, consistent with national guidelines for HIV-infected women in Thailand. The planned sample size was 392 women, selected to provide 80% power to detect a 50% lower transmission rate in the ZDV group compared with a transmission rate of 24% in the placebo group. The study endpoint was the HIV-infection status of the infant at age 6 months, determined by results of polymerase chain reaction (PCR) testing for HIV DNA performed on blood specimens obtained at birth, 2 months, and 6 months. The proportion of children found to be infected by age 6 months in each treatment group was estimated by using the Kaplan-Meier method. The null hypothesis of no treatment effect was tested by using a normally distributed Z statistic computed from these estimates. As a result of two interim evaluations of treatment efficacy for data and safety monitoring in July 1997 and January 1998, the critical value of the Z statistic for rejecting the null hypothesis of no treatment effect at the end of the study was 2.05. The trial protocol was approved by human subjects committees in Thailand and at CDC, and the conduct of the trials was monitored by a data and safety monitoring board at the U.S. National Institutes of Health, which included a senior health official from the United States because it is less expensive (i.e., later start in pregnancy, shorter duration, and no infant treatment). If implementation of a short-term regimen results in a lower risk for mother-infant HIV transmission in populations where HIV-infected women routinely breastfeed, this trial demonstrates that a shorter regimen of ZDV given only during pregnancy can substantially reduce perinatal transmission.

Although this trial was not designed to compare the short-term ZDV regimen to the longer regimen, the decrease in transmission rate (51%) using the shorter regimen is less than the 66% decrease with the longer regimen. The smaller treatment effect could result from the shorter duration of treatment, oral rather than intravenous administration during labor, lack of treatment for the infant, different study populations, random variation, or a combination of these factors. However, this clinical trial demonstrates that a shorter regimen of ZDV given only during pregnancy can substantially reduce perinatal transmission.

Reasons are unknown for the lower transmission rate in the placebo group (18.6%) than in untreated women (24.2%) studied in the same hospitals during 1993-1994. The lower than expected background transmission rate highlights the importance of having included a randomized, concurrently enrolled, untreated control group. Had the test regimen been inactive, a transmission rate of 18.6% may have suggested some efficacy when compared with historical data.

CDC has sponsored another placebo-controlled trial of the same regimen of ZDV in collaboration with the Ministry of Public Health in Côte d’Ivoire in West Africa, where most HIV-infected women breastfeed their infants. Because the trial in Thailand demonstrated that the short-term regimen is efficacious in reducing transmission around the time of birth, and because preliminary data from the trial in Côte d’Ivoire have shown the regimen to be safe in this population, enrollment in the placebo group of the Côte d’Ivoire trial has been stopped. All women enrolled in the study are being offered the short-term ZDV regimen. Because breastfeeding is associated with postnatal HIV transmission from mothers to infants, follow-up of enrolled infants will continue to determine whether the short-term ZDV regimen results in an overall lower risk for mother-infant HIV transmission in populations where HIV-infected women routinely breastfeed.

To implement these findings, ministries of health, donor agencies, and other international agencies should develop policies and practices to strengthen access to prenatal care, testing and counseling for HIV infection, and provision of ZDV for HIV-infected pregnant women. Operational research is needed to optimize provision of this intervention to HIV-infected women in resource-limited settings. Further evaluation is needed of the effect of breastfeeding on the efficacy of this regimen.

References are available.
Self-Assessed Health Status and Selected Behavioral Risk Factors Among Persons With and Without Health-Care Coverage—United States, 1994-1995

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2 tables omitted

PERSONS WITHOUT health-care coverage are more likely to have poor health and be at greater risk for chronic disease outcomes than persons who have health-care coverage.1 In the United States, the number of persons and the proportion of the population without health-care coverage has increased each year since 1987.2 State-specific surveillance of health-care coverage can be used to identify subgroups of the population who lack such coverage and may be at increased risk for poor health. To determine state-specific estimates of the prevalence of self-assessed health status and risk factors for chronic disease by health-care coverage status among adults aged 18-64 years, CDC analyzed data from the 1994 and 1995 Behavioral Risk Factor Surveillance System (BRFSS). This report summarizes the results of that analysis and indicates that adults without health-care coverage were more likely than those with health-care coverage to have poor health status, to be current smokers, and to be less physically active.

BRFSS is a state-based, random-digit-dialed telephone survey of the noninstitutionalized U.S. population aged ≥18 years. The 1995 BRFSS was conducted in the 50 states and the District of Columbia and was used to determine self-reported health-care coverage status and the selected risk factors of cigarette smoking, physical inactivity, and self-assessed health status among adults aged 18-64 years. To assess health-care coverage status, respondents were asked “Do you have any kind of health-care coverage, including health insurance, prepaid plans such as HMOs, or governmental plans such as Medicare?” Smoking was assessed by asking “Have you smoked at least 100 cigarettes in your entire life?” and “Do you smoke cigarettes now?” Current smokers were persons who reported having smoked ≥100 cigarettes during their lifetime and who smoke now. Physical inactivity was assessed by asking the respondent “During the past month, did you participate in any physical activities or exercises such as running, calisthenics, golf, walking, or for exercise?” Persons were considered inactive during their leisure time if they answered no to this question. For the purpose of this report, the estimates for health status reflect the proportion of persons indicating either fair or poor health status. Data from the 50 states were weighted to represent state populations and used to produce point estimates; 95% confidence intervals were calculated using SUDAAN.

During 1995, the prevalence of health-care coverage varied among states and ranged from 76.9% (Louisiana) to 93.3% (Hawaii) (median: 87.0%). The median prevalence of fair-to-poor self-assessed health status was 9.0% among persons with health-care coverage and 13.8% among those without coverage; state-specific prevalences among those with coverage ranged from 5.3% (Nebraska) to 17.3% (West Virginia), and among those without coverage, from 5.0% (New Jersey) to 27.9% (Kentucky).

The median prevalence of smoking among those with health-care coverage was 22.8%, compared with 39.3% among those without coverage. The median prevalence of physical inactivity was 25.1% among those with health-care coverage, compared with 31.2% among those without coverage.

References

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