

Texas Birth Defects MONITOR

A Semi-Annual Data and Research Update
Texas Department of State Health Services
Birth Defects Epidemiology and Surveillance Branch



VOLUME 10, NUMBER 2, December 2004

From the Director

Research Priorities

In November 2004, researchers from the ten Centers for Birth Defects Research and Prevention gathered in San Antonio for three days to discuss setting research priorities, critical methodological issues, and progress from ongoing studies. As one of the original centers in the National Birth Defects Prevention Study (NBDPS), we in Texas are proud to be a part of this enormous effort to identify and prevent the complex causes of birth defects.

The Texas Center is in a unique position to contribute to our understanding of what causes birth defects, especially because of the 1200-mile shared border between Texas and Mexico. Health disparities between Texans living along the border with Mexico and those living in non-border areas, have long been a concern for public health officials, as well as for those who live and work in the border counties. The majority of border residents are Hispanic and data from this area can be compared to other populations to isolate geographic versus ethnic and other factors. Since 1997, the Texas Center has contributed information about birth defects cases as well as from healthy "control" families to the NBDPS. The study area for Texas is currently the area known as the Lower Rio Grande Valley, which encompasses Gulf Coast industrial cities such as Corpus Christi, as well as Cameron County.

The Center's staff and collaborators have expertise in the epidemiology of neural tube defects and their associated risk factors, demographic and environmental risk factors for birth defects, survey research, and human and molecular genetics.

In addition to participating in NBDPS, the Texas Center is conducting other research projects and activities, including the following:

- Studying the interaction of metabolic, genetic, and environmental risk factors for certain birth defects of the brain and spinal cord.
- Examining the link between risk factors such as maternal diabetes, obesity, and dieting behaviors for neural tube defects.

- Studying the relationship between certain environmental factors and birth defects, such as:
 - Hazardous waste sites
 - Air pollution
 - Pesticides
 - Water disinfection byproducts
- Conducting and analyzing results from the Texas Women's Health Survey and the Behavioral Risk Factor Surveillance System
- Analyzing the patterns and risk factors associated with oral clefts and clubfoot in Texas.

I was particularly pleased that our Center was represented at this meeting by such a distinguished group of collaborators from around the state, including representatives from the following:

- Texas A&M University, Public Policy Research Institute
- Texas A&M University System Health Science Center
 - Institute of Biotechnology
 - School of Rural Public Health
- University of Texas Health Science Center at Houston
 - School of Public Health
 - Medical School
- Baylor College of Medicine - Houston
- University of Texas Southwestern Medical Center at Dallas
- Texas State University - San Marcos
- Texas Office for the Prevention of Developmental Disabilities
- Texas Department of State Health Services, Health Screening Branch

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Registry

Evaluation of Referral Brochure Mailing

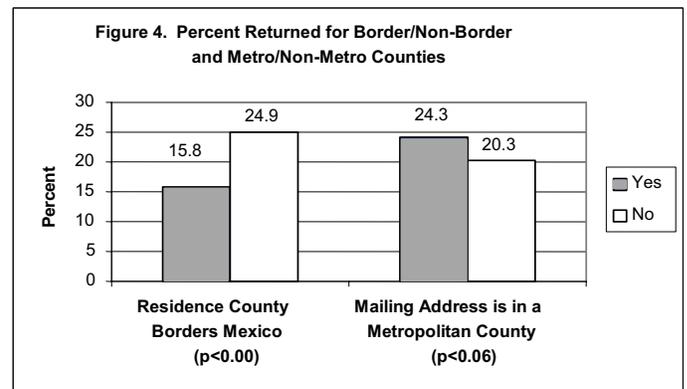
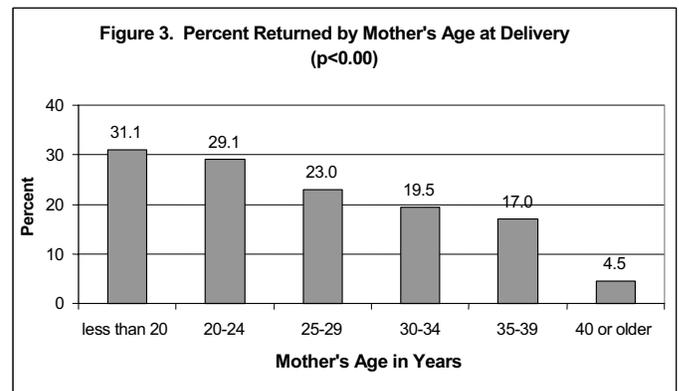
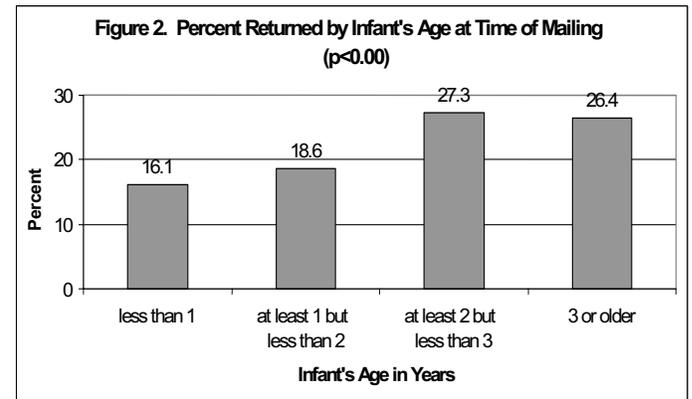
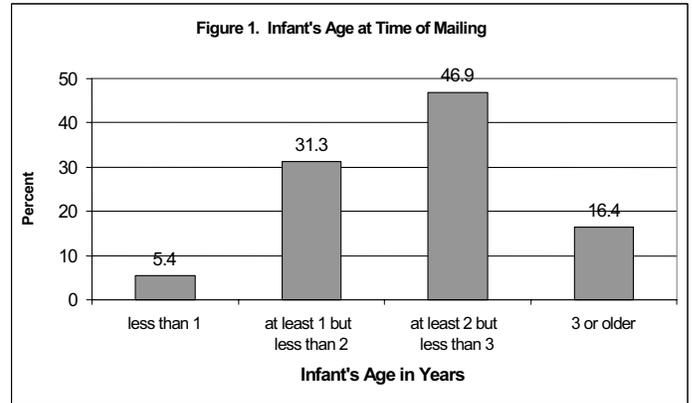
Background: An important aspect of birth defects registries is connecting families to available services. In November 2003, the Texas Birth Defects Registry began mailing brochures listing resources for families of children with birth defects to mothers of liveborn infants recently added to the Texas Birth Defects Registry. In an effort to distribute the brochures only to appropriate families, the brochures are *not* sent in the following situations:

- The child has a fatal birth defect, such as anencephaly or bilateral renal agenesis
- Hospital medical records indicate the child died
- A death certificate was found for the child
- The child is a conjoined twin (because this is such a high profile birth defect that the families are presumed to surely be receiving available services)
- The child has any of the newborn screening disorders (because the Newborn Screening and Case Management program provides follow-up to these families)
- The child has a minor birth defect or a defect that is likely to be repaired very early in life, and the condition is not likely to result in long-term consequences or developmental delays
- Hospital medical records indicate the child was to be placed for adoption or in foster care (because the registry collects information on the mother who gave birth to the child but generally does not have information on adoptive or foster parents)

Since we began mailing the brochures, 36% of cases added to the birth defects registry have met the criteria to be sent the brochure. Brochures were sent to just over 4500 Texas families during the first year of mailings (Nov. 2003-Oct. 2004).

This analysis covers brochures postmarked November 14, 2003 through June 16, 2004, and returned through July 12, 2004. During this time, brochures were mailed to 2,897 mothers. We calculated the percent of brochures returned according to the infant's age at the time of mailing; mother's age, race/ethnicity, education, marital status, residence in a Texas county bordering Mexico, and whether the mother's mailing address was in a metropolitan or non-metropolitan county.

We found that only 5.4% of infants were less than 1 year old at the time of mailing, 31.3% were at least 1 but less than 2 years old, 46.9% were at least 2 but less than 3, and 16.4% were 3 years or older (Figure 1). Overall, 23.8% of mailings were returned as undeliverable, ranging from 16.1% returned for infants less than 1, to 27.3% returned for infants at least 2 but less than 3 years old ($p < 0.00$) (Figure 2).



The percent returned was highest among younger mothers and decreased with increasing maternal age, ranging from 31.1% for mothers less than 20 years old at the time of delivery to 4.5% for mothers 40 and older ($p<0.00$) (Figure 3). When stratified by infant's age, this pattern remained for all infant age groups except infants less than 1.

The percent returned also varied by mother's race/ethnicity, with 20.9% returned among Hispanic mothers, 25.2% among non-Hispanic white mothers, and 30.0% among African American mothers ($p<0.00$).

Brochures were less likely to be returned for mothers with more than high school education (21.5% returned), compared to mothers with high school (26.8%) or less than high school education (27.2%) ($p<0.00$). Brochures were also less likely to be returned for married mothers (23.8% returned) than unmarried mothers (28.1%) ($p<0.02$).

Brochures mailed to addresses in non-metropolitan counties were less likely to be returned (20.3% returned) than those sent to metropolitan counties (24.3%) ($p<0.06$). The percent returned was much lower for mothers living in Texas counties bordering Mexico (15.8% returned) than mothers living in non-border counties (24.9%) ($p<0.00$) (Figure 4).

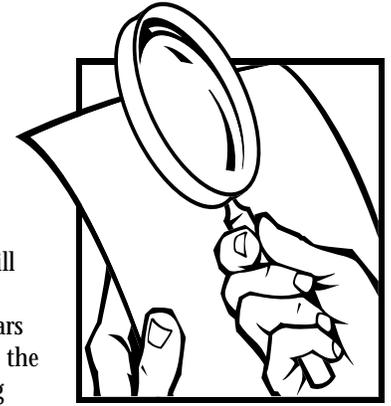
Overall, 76% of informative brochures mailed to mothers of children recently added to the Texas Birth Defects Registry were not returned as undeliverable, and are presumed to have been received by the families. Brochures mailed before the child's second birthday were significantly less likely to be returned than brochures mailed after the child's second birthday. This emphasizes the importance of timely birth defects surveillance data in fulfilling the crucial role of linking families to services.



Follow Up on Selected Birth Defect Cluster Investigations

Part of the mission of the Texas Birth Defects Epidemiology and Surveillance Branch is to investigate concerns of elevated birth defect occurrence throughout the State. Such "clusters" can occur

for many reasons, but are often due to random variation. For example, if overall 3 cases of a birth defect occur in Houston overall per year, in some years only 1 case will occur and in other years 6 cases will occur. Astute parents or clinicians may notice the years with the 6 cases and contact the health department regarding such apparent "clusters".



Looking at birth defect occurrence over a longer period of time helps to smooth out the impact of this variation and help us determine if there is true cause for concern.

Investigation protocols have been developed to focus attention on those situations that are most likely to provide fruitful results. The Birth Defects Epidemiology and Surveillance Branch uses one such protocol. Its stages include what initial information to request from the person reporting the possible cluster, checking how rare the reported cluster might be, verifying reported cases and finding new cases using the Texas Birth Defects Registry, checking the rarity using all the found and verified cases, and if warranted, conducting a study to try to find what caused the cluster. Rigorous criteria (such as statistical significance) must be met for an investigation to proceed to the next step.

As of June 15, 2004, there were 87 cluster investigations either underway or completed by the Branch. Of those, 22 investigations had been closed according to our protocol even though their excess occurrence was statistically significant (that is, unlikely to have arisen by chance alone). Those 22 were examined by an intern to see if the birth defect of concern continued to remain high in the time since each investigation had been closed.

Considering all the different birth defects, there were 122 comparisons of birth defect occurrence in an investigation area versus in the State. At the 95% confidence level, we would expect 5% of the 122 comparisons, or roughly 6 comparisons to be 'statistically significant' due to chance. We found two comparisons that were statistically significant.

We found that anencephaly remained significantly elevated in Laredo (Webb County) among 1998-2001 deliveries. During that period, its rate was 2.6 times higher than the State rate. The Birth Defects Epidemiology and Surveillance Branch will continue to carefully monitor this birth defect there. Hydrocephaly remained significantly elevated in Carson County, but was based on only two cases. No other defects remained significantly high since the close of its investigation.

For more information about birth defect cluster investigations or for a copy of this report, contact Peter Langlois, 512-458-7232, Peter.Langlois@dshs.state.tx.us.

Description	Defects by singleton births				Defects by twin births				Defects by multiple births			
	Count	prev **	LCL	UCL	Cou	prev**	LCL	UCL	Co	prev	LCL	UCL
Central Nervous System:												
anencephaly*	160	1.53	1.29	1.76	12*	4.31	2.23	7.53	1	7.30	0.18	40.67
hydrocephaly*	693	6.61	6.12	7.1	60*	21.56	16.45	27.75	2	14.6	1.77	52.74
Cardiac and Circulatory:												
transposition of the great vessels*	505	4.82	4.40	5.24	24*	8.62	5.53	12.83	0	0.00	0	26.93
tetralogy of Fallot*	317	3.02	2.69	3.36	17*	6.11	3.56	9.78	0	0.00	0	26.93
ventricular septal defect*	4330	41.3	40.07	42.53	229*	82.29	71.63	92.95	15*	109.00	61.28	180.59
atrial septal defect*	3935	37.53	36.36	38.71	237*	85.16	74.32	96.01	37*	270.00	190.16	372.26
pulmonary valve atresia or stenosis*	678	6.47	5.98	6.95	46*	16.53	12.1	22.05	1	7.30	0.18	40.67
patent ductus arteriosus^	4491	42.84	41.59	44.09	87^	31.26	25.04	38.56	2	14.6	1.77	52.74
Gastrointestinal:												
pyloric stenosis	2021	19.28	18.44	20.12	67	24.08	18.66	30.58	8*	58.40	25.21	115.06
stenosis or atresia of Ig intestine, rectum, or anal canal*	501	4.78	4.36	5.20	27*	9.70	6.39	14.12	0	0.00	0.00	26.93
Genitourinary:												
hypospadias or epispadias*	2947	28.11	27.10	29.13	141*	50.67	42.3	59.03	3	21.9	4.52	63.99
renal agenesis or dysgenesis*	494	4.71	4.30	5.13	31*	11.14	7.57	15.81	0	0.00	0.00	26.93
obstructive genitourinary defect*	2069	19.74	18.89	20.59	106*	38.09	30.84	45.34	8*	58.40	25.21	115.06
Musculoskeletal:												
reduction defects of the upper limbs*	394	3.76	3.39	4.13	24*	8.62	5.53	12.83	1	7.30	0.18	40.67
reduction defects of the lower limbs*	181	1.73	1.47	1.98	17*	6.11	3.56	9.78	0	0.00	0.00	26.93
Other:												
Infants and fetuses with any monitored birth defect*	35090	334.71	331.21	338.21	1570	564.2	536.30	592.10	120*	876.00	719.19	1032.6
KEY:												
*statistically significantly higher than the singleton prevalence	**cases per 10,000 live births											
^statistically significantly lower than the singleton prevalence	NOTE: 948 individuals not matched to a BVS certificate											

Twins and More—Risk Factor for Birth Defects?

The table above shows rates of birth defects among deliveries in Texas in 1999-2001 by plurality. For each column, the prevalence was calculated by counting the number of cases among singleton, twin, or multiple births, and dividing by the number of live births that were singletons, twins, or multiples respectively. Statistically significantly higher prevalence for twins and/or higher order multiples were observed for the several defects or defect groups, as shown in the table above.

Only patent ductus arteriosus was found to be statistically significantly lower in twin multiple order births 31.26/10,000 live births (95%CI 25.04-38.56) than for singletons 42.84/10,000 (95%CI 41.59-44.09).

Studies have found certain birth defects to occur more commonly in pregnancies involving more than one fetus than among singletons. These include neural tube defects, intestinal atresia pyloric stenosis, cardiovascular malformations and Pierre-Robin sequence.

The data above give a “snapshot” of birth defects that have been higher or lower among multiples in Texas. Although they are not adjusted for confounding factors such as assisted reproductive technology (ART), monozygotic/dizygotic fetuses, or maternal demographic characteristics, these data provide an interesting look at the ways in which prevalence of birth defects can vary depending on the number of fetuses present. Because twinning is highly associated

with ART, and the number of ART procedures performed in the U.S. each year (CDC), the rate of birth defects among multiple pregnancies deserves further attention.

Additional Information on Twins and Birth Defects

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Focus on: Upper Limb Defects

In this section of the Texas Birth Defects Monitor, we will focus each issue on the patterns and prevalence of a particular birth defect or group of defects. In this issue, we take a look at Upper Limb Reduction Defects.

Reduction defects of the upper limbs are the congenital absence of a portion of the upper limb. There are two general types of these defect: transverse and longitudinal. Transverse defects appear like amputations, or like missing segments of the limb. Longitudinal defects are missing rays of the limb (for example, a missing radius and thumb). These anomalies often occur in combination with other major defects.

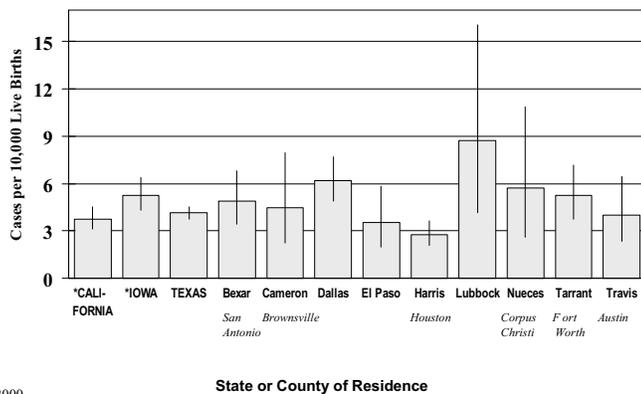
In Texas, upper limb reduction defects occur about four times for every 10,000 live births, or about 220 cases per year. However, some variation in rates can be seen among Texas regions (See

Figures 1 and 2), although these variations should be interpreted with caution to do possible differences in facility diagnosis and coding, or regional ascertainment methods. In addition, the results are not adjusted for possible confounders such as maternal age and ethnic make-up of the regions.

Risk factors associated with congenital missing limbs include maternal pre-pregnancy diabetes, exposure to certain anti-epileptic drugs, chorionic villus sampling, retinoid drugs, parental occupational exposure to agricultural chemicals, and parental smoking. There may be some protective effect of adequate preconception folic acid intake.

Upper limb reduction defect references available upon request. Contact Amy Case, MAHS at 512-458-7232 or amy.case@dshs.state.tx.us.

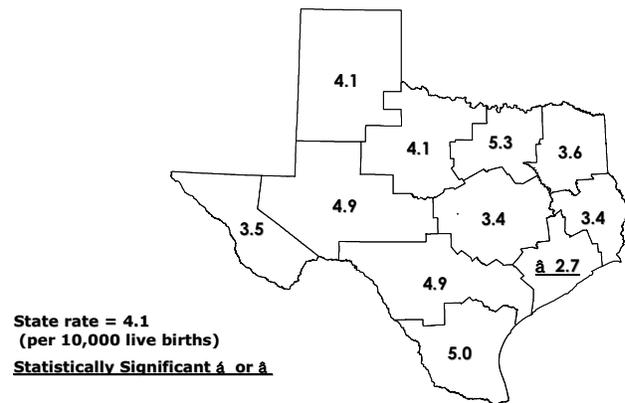
Figure 1: Upper Limb Reduction Defects Texas, 1999-2001



*1996-2000

State or County of Residence

Figure 2: Upper Limb Reduction Defects, 1999-2001



The Utility of Vital Records Data in Identifying Birth Defects

Although certain information about birth defects is collected on the birth certificate, most states, including Texas, now rely on a separate or supplemental system for ascertaining these data. The analysis below illustrates reasons for this practice. We chose to examine several birth defects that are considered to be readily diagnosed at the time of delivery: anencephaly, spina bifida / meningocele, omphalocele, gastroschisis, cleft palate alone, and cleft lip with or without cleft palate.

For the specific birth defects examined, 36-42% of Registry cases had their defect reported on their birth or fetal death certificate (the vital records). Of all the vital records with those specific defects checked, 41-86% had the same defects already identified in the Registry.

We also examined the vital records field that indicated the presence of 'any congenital anomaly'. The results follow.

Table: Comparison of birth defect cases with an indication on their vital record as having a congenital anomaly and of cases found in the Texas Birth Defects Registry.

Vital records indicated 'any congenital anomaly'?	Case with any congenital anomaly in the Texas Birth Defects Registry?		Total
	Yes	No	
Yes	3,857	3,089	6,946
No	21,066	688,319	
Total	24,923		

Vital records would be a poor replacement for the current Texas Birth Defects Registry based on active surveillance. If the Registry relied solely upon the vital records for finding cases, it would identify only 3,857/24,923 or 15% of the total Registry cases. Of the 6,946 vital records indicating the presence of a birth defect, 3,857 or 56% were found in the Registry. Further study is planned to determine if the remaining 44% of those 6,946 vital records are false positives or a potentially useful additional source of Registry case ascertainment.

Research Center

New Study Booklet

National Birth Defects Prevention Study (NBDPS)

NBDPS is the largest population-based study ever conducted on the causes of birth defects. It will provide information about environmental and genetic factors that contribute to birth defects and will serve as a mechanism for identifying new factors that are harmful to developing babies. The study is comprised of three components. First, through existing surveillance systems, CDBRP is identifying and collecting information on "cases"-infants who have any of the major birth defects included in the study.

Second, CDBRP is interviewing the infants' mothers using a computer-assisted telephone interview. Interviews include questions about pregnancy and medical history, occupational and environmental exposures, lifestyle, diet, and medication use.

Third, CDBRP is collecting cheek cells from the infants and their parents in order to identify genetic factors. Cheek cells are collected by brushing a swab across the inside wall of the mouth. Researchers will study the DNA (genetic material) from these cheek cells to identify whether certain genes increase the risk of or cause a particular birth defect. A portion of the DNA that is collected from the families will be stored in a specimen bank at CDC.

A booklet describing the study in detail and including Texas local studies will be available in Spring 2005; to obtain copies of this booklet, contact Amy Case, 512-458-7232, amy.case@dshs.state.tx.us.

Prevention

Hyperthermia Risk Affirmed

For many years, health care providers have cautioned pregnant women to avoid prolonged exposure to any source that

would raise internal body temperatures to 102 or higher. A recent Texas study examined the association

of hyperthermia and neural tube defects (NTDs) among women who resided on the Texas-Mexico border. Researchers from the Texas Department of State Health Services, using data from the Texas Neural Tube Defects Project, found that first-trimester hyperthermia, whether from an external source such as hot tubs or electric blankets, or from maternal fever, had about a three-fold risk of having a child with an NTD when compared with mothers who did not report such exposures.

In addition, the study found that when women took fever-reducing medications, it reduced some of the risk. Other studies have shown that taking folic acid can ameliorate the effect of hyperthermia. Thus, women who could become pregnant should avoid prolonged exposure to hot conditions, manage febrile illness effectively and take 400 mcg of folic acid daily to reduce the risk of neural tube defects.

For additional information about the study referenced above, contact Lucina Suarez, Ph.D., Texas Department of State Health Services, 512-458-7111, Ext. 6351.

An excellent handout on reducing the risk of hyperthermia can be obtained by the Organization of Teratology Information Services at 866-626-6847 or http://ctispregnancy.org/CTIS_fact_sheet.htm

Living with Birth Defects

HHSC Releases Survey of Former CHIP Recipients

In December 2004, the Texas Health and Human Services Commission released the results of a survey of families that recently disenrolled from the Children's Health Insurance Program (CHIP). The Commission contracted with the Institute for

Child Health Policy at the University of Florida to survey 500 families to learn more about the reasons for their disenrollment. The survey found that:

- 47 percent of disenrollees obtained other health insurance.
- 31 percent of disenrollees obtained Medicaid coverage.
- 11 percent obtained employer-based coverage.
- 5 percent obtained coverage through other sources, such as the military.
- 93 percent of families strongly or somewhat agreed with the statement, "CHIP has made the renewal forms easy to fill out."
- About 80 percent of families reported the renewal process was "about as easy as it could be."
- The most common reasons for disenrollment were:
 - Child switched to Medicaid (31 percent)
 - Did not complete the renewal process (29 percent)
 - Obtained other insurance (27 percent)

Of the 29 percent who did not complete the renewal process, the most common reasons listed were:

- Forgot or did not get around to doing the paperwork (17.4 percent)
- Planning on getting other insurance (15 percent)
- On the CHIP cost-sharing requirements:
- More than 94 percent of families said they felt better paying part of the cost of their children's health-care coverage.
- More than 90 percent of families said the premium was the right amount or too low.
- 80 percent of families said they never or rarely had difficulty paying the monthly premium.
- The survey is available on the Internet at www.hhsc.state.tx.us/chipreport120304_DisenrollSurvey.html.

Announcements

Mountain States Genetics Network Region 6 Receives HRSA Grant

Texas Joins Region 6 Initiative To Establish A Regional Genetics Collaborative

As of October 1, 2004 the Mountain States Genetics Network (MSGN) has been funded with a Federal HRSA grant to establish a regional genetics collaborative for Region 6, which now includes Texas and also covers Arizona, Colorado, Montana, New Mexico, Utah and Wyoming. The Mountain States Genetics Foundation, a 501 (c) (3) organization with headquarters in Denver, will administrate the grant and coordinate the Mountain States Regional Network programs.

The grant is designed to support:

- A national coordinating center (the Mountain States Genetics Network);
- Regional genetic service and newborn screening collaboratives, including birth defects registry and surveillance programs;
- Increasing the screening capacity of newborn screening programs to improve early identification of infants with hyperbilirubinemia.

In reorganizing the country into regions, the Genetics Branch for the first time has assigned Texas to Region 6. However, MSGN has a strong history with Texas through collaboration with previous TEXGENE programs, and via the Sickle Cell Consortium led by Dr. Peter Lane. The new grant will now provide an additional funding resource for common identified needs for Texas as part of Region 6.

As the newest member of the Mountain States Genetics Network, MSGN is delighted to have Texas as part of the region and looks forward to working with its genetics stakeholders. Initial collaborations will include two focus groups in Texas to determine needs and priorities, and coordination of Texas' participation in the MSGN Annual Meeting to be held on July 14-16, 2005 in Denver.

The website can be found at www.mostgene.org. For more information or suggestions for participation, contact Joyce Hooker at joycehooker@mostgene.org.



March of Dimes: Newborn Screening

March of Dimes supports comprehensive newborn screening for specific conditions when there is a documented benefit to the child and there is a reliable test that enables early detection from newborn blood spots or other means. March of Dimes state chapters and their partners work closely with governors, state legislators, and health departments to improve state newborn screening programs.

March of Dimes strongly commends a recent American College of Medical Genetics report for advancing the field of newborn screening, defining a uniform panel for newborn screening, and providing a policy framework for the states. Based on the findings of this report, March of Dimes has expanded its policy on newborn screening and now recommends that every state to screen every baby for at least 30 disorders. These disorders meet the March of Dimes inclusion criteria, and include all of the nine metabolic tests plus hearing screening contained in the organization's previous policy.

Texas currently screens for 8 of the 30 disorders now recommended by March of Dimes. A technology known as Tandem Mass Spectrometry would enable detection of an additional 19 disorders in the panel

For more information, visit the March of Dimes Web site at marchofdimes.com or its Spanish Web site at nacersano.org.

FREE Pregnancy Exposure/Risk Counseling From the Texas Teratogen Information Service Free service for all pregnant women in Texas!

The Texas Teratogen Information Service is here to provide you with information on having a healthy baby. Birth defects are one of the many concerns facing an expecting mother. Your unborn baby's health can be harmed by exposures to things such as alcohol, cigarette smoking, drugs, and some medications. These substances are called teratogens. For answers to your questions contact the Texas Teratogen Information Service, a non-profit organization for pregnant and nursing women. It is funded by the Texas Department of Health and located at the University of North Texas in Denton. For more information please call toll free at

1-800-733-4727.

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Calendar

April 15 - 16, 2005 5th Annual Southern States Knowledge in Nursing Conference: Advancing Knowledge of Minority Women & Children's Health, San Antonio. 210-567-5850

April 24-26 Texas Public Health Association, Odessa. Contact: Terri S. Pali at txpha@aol.com.
www.charityadvantage.com/texaspha/2005ANNUALCONFERENCE.asp

June 5 - June 7 Texas Health Information Management Association Annual Meeting & Convention, Austin. Contact: 512-878-1961,
txhima@grandecom.net

July 14-16 Mountain States Genetics Network Annual Meeting, Denver. Contact: (303) 978-0125 or
joycehooker@mostgene.org

October 18-22: Annual Educational Conference, Texas Environmental Health Association, Round Rock. Contact Ginger Shafer at teha@countrynet.net.

June 21-22 National Summit on Preconception Care, Atlanta. Contact: Keshia Jones, 404-320-1818 Ext. 224.

June 21-24 63rd Annual Meeting, US-Mexico Border Health Association, Laredo. Web site: <http://www.usmbha.org/english/annual/index.htm>.

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