

The Texas Birth Defects Monitor



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From the Director

Children's Health Act of 2000—Public Law No: 106-310

On October 17, 2000, President Clinton signed into law the Children's Health Act of 2000, formally entitled "To amend the Public Health Service Act with respect to children's health." This bill consists of 17 sections, each of which address a different concern related to children's health. For our purposes, the relevant sections include:

Birth Defects Prevention: Folic Acid Promotion—Directs the Secretary of Health and Human Services to carry out a program, directly or through grants or contracts, for professional and public education and training, research, and epidemiological activities regarding folic acid and birth defects. Authorizes appropriations.

Birth Defects Prevention: National Center on Birth Defects and Developmental Disabilities - Establishes a National Center on Birth Defects and Developmental Disabilities to: (1) collect, analyze, and make available data on birth defects; (2) operate centers to conduct applied epidemiological research on prevention of those defects; and (3) provide birth defect

prevention information and education to the public. No appropriations authorized.

Fragile X Research Breakthrough—mandates the establishment (through the National Institutes of Health) of at least three centers for Fragile X research. Authorizes appropriations for these activities.

Pediatric Research Initiative—Requires the Director of the National Institute of Child Health and Human Development to support activities to increase: (1) the number and size of institutional training grants to pediatric departments of medical schools and to children's hospitals; and (2) the number of career development awards for health professionals who are in pediatric specialties or subspecialties and intend to build careers in pediatric basic and clinical research. Authorizes appropriations.

Pregnant Mothers and Infants Health Protection—Requires the Secretary of the U.S. Health and Human Services (HHS) to collect data on prenatal smoking and alcohol and illegal drug usage, to conduct applied epidemiological research, to support and conduct educational and cessation programs, and to provide information and educa-

tion to the public on the prevention and implications of prenatal and postnatal smoking and alcohol and illegal drug usage. Authorizes appropriations.

Safe Motherhood Monitoring and Prevention Research—Authorizes the Secretary to: (1) establish a national monitoring and surveillance program to identify and promote the investigation of deaths and severe pregnancy complications; (2) expand the Pregnancy Risk Assessment Monitoring System to provide surveillance and collect data in each State; and (3) expand the Maternal and Child Health Epidemiology Program to provide technical support, financial assistance, or the time-limited assignment of senior epidemiologists to maternal and child health programs in each State. Authorizes appropriations.

It is encouraging to see much-needed attention to the prevention of birth defects at the national level. I anticipate many state-level opportunities in the next few years as this Act is operationalized. However, I hope to see funds authorized for CDC's newly established Center on Birth Defects and Developmental Disabilities.

Registry Update

Birth Defects Registry Report Now Available: Report of Birth Defects Among 1996-1997 Deliveries allows for first cross-regional rate comparisons

This report presents information on selected birth defects among deliveries during 1996 and 1997 to women who lived in areas of the state where the Texas Birth Defects Registry was active. For 1996 deliveries, the birth defects registry was active in Public Health Region 6, which includes Houston and Galveston, and Region 11, which includes the Lower Rio Grande Valley, Corpus Christi, and Laredo. For 1997 deliveries, the registry was active in Region 2 (Abilene and Wichita Falls), Region 3 (Dallas-Fort Worth), Region 8 (San Antonio), Region 9 (Midland-Odessa and San Angelo), Region 10 (El Paso and Big Bend), and Region 11.

Continued on page 2

Continued from page 1

This report includes information in the Texas Birth Defects Registry as of November 23, 1999.

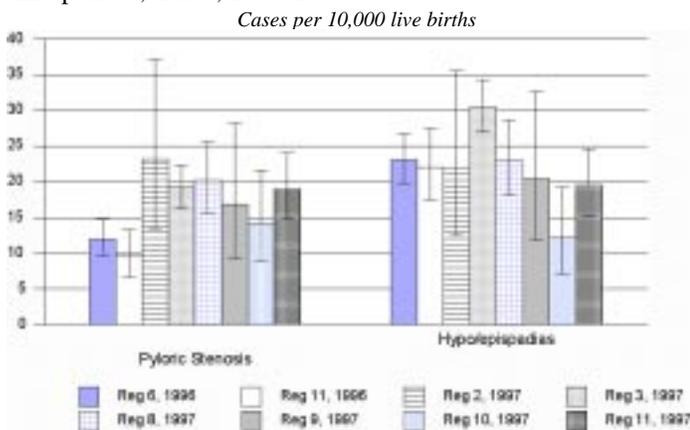
There were 300,431 live births to residents of the areas covered by the Texas Birth Defects Registry during 1996 and 1997. A total of 9,636 cases was detected with one or more of the birth defects monitored in 1996 and 1997. Of these, 9,300 were live born, corresponding to 3.1 percent of all live births in the registry coverage area. In addition to live births, 150 cases were detected among later fetal deaths (20 weeks' gestation or 500 grams) and 159 cases among induced pregnancy terminations that did not result in a live birth (also 20 weeks or 500 grams). There were 27 cases with other or unspecified pregnancy outcomes.

The three most common birth defects were heart defects: patent ductus arteriosus; atrial septal defect; and ventricular septal defect. Rounding out the ten leading birth defects were hypospadias or epispadias; obstructive genitourinary defect; pyloric stenosis; Down syndrome; cleft lip with or without cleft palate; hydrocephaly; and cleft palate alone (without cleft lip). The prevalence of cleft lip with or without cleft palate (11.52 cases per 10,000 live births) was almost twice the prevalence of cleft palate alone (5.99 cases per 10,000 live births).

For a copy of this report, contact the Texas Birth Defects Monitoring Division at 512-458-7232 or amy.case@tdh.state.tx.us. The report is also available on our web site, www.tdh.state.tx.us/tbdmd/index.htm.

See also the related report in this issue's insert "Impact of including induced pregnancy terminations before 20 weeks gestation on birth defect rates."

Selected birth defects with significant variation among regions/time periods, Texas, 1996-1997



Research Center

The National Birth Defects Prevention Study

In 1996, the Centers for Disease Control and Prevention (CDC) awarded the Texas Birth Defects Monitoring Division (TBDMD) a five-year cooperative agreement to conduct research into the causes of birth defects. TBDMD established the Texas Birth Defects Research Center to manage the annual award of \$800,000 and to fund initiatives that provide epidemiologic information that can be used to prevent birth defects from occurring in Texas and nationally.

Currently, the TBDRC funds are dedicated to 1) conducting Texas population-based birth defects studies and prevention projects, 2) contributing eligible cases and controls to the National Birth Defects Prevention Study, and 3) enhancing limited aspects of the Texas Birth Defects Registry.

The Texas Birth Defects Research Center is conducting the National Birth Defects Prevention Study (NBDPS) in collaboration with established Centers in the states of Arkansas, California, Georgia, Iowa, Massachusetts, New Jersey, and New York. The NBDPS, the largest study ever conducted on the causes of birth defects, will provide information about the environmental and genetic factors that contribute to birth defects and will identify factors associated with either protecting or harming fetal development.

Peter Langlois, Ph.D., Mark Canfield, Ph.D. (principal investigators), and Dawna Wright, M.P.H., (project manager), determined the original geographic area and sampling framework for the study. A standardized study protocol was approved by the Texas Department of Health Institutional Review Board before implementation of the NBDPS.

The study consists of three components:

1. Field staff members from the existing birth defects surveillance system routinely visit delivery facilities to identify and abstract the medical records of case infants (those who have received a diagnosis of any of the 30 covered major defects delivered after September 30, 1997). Staff also identify control infants, who do not have a birth defect. TBDMD staff Mathias Forester and Beverly Taylor enter and store the clinical information of case and control infants in a central database. Dr. Angela Scheuerle, clinical geneticist, reviews, classifies and approves the eligibility of infants for participation in the remaining components of the study.

2. Next, a one-hour computer-assisted telephone interview (CATI) with the mothers of case and control infants is conducted. The TBDRC contracts with the Public Policy Research Institute at Texas A & M University (PPRI) to contact, enroll and conduct interviews with the women. PPRI interviewers mail an invitational letter and other enclosures that explain the components of the study to women. The letter includes a \$20 money order. The telephone interview that follows informed consent of the women contacted includes carefully constructed and sensitively worded

questions about pregnancy and medical history, diet, medication use, lifestyle habits, home and work environments, water consumption, and demographics. Interviewers maintain confidentiality and maintain the rights of the mothers to withdraw from the study or to refuse to answer any of the interview questions. All materials and interviews are available in both English and Spanish.

3. The final component of the study involves collecting cheek cells from case and control infants and their parents to identify genetic markers related to birth defects. Once a woman has completed the interview, the PPRI staff members mail a cheek cell collection kit with a \$20 money order to her household. The kit includes a sheet of instructions for using the cytobrushes to collect cheek cells from inside the wall of the mouth of the parents and the infant. Studies of the DNA from those cheek cells will identify whether a specific gene may increase the risk or cause a specific kind of birth defect. TBDRC sends DNA for long-term storage at the CDC specimen bank for future studies.

Progress and Accomplishments:

Since 1998, 1644 cases and 432 control records have been entered into the Texas clinical database.

Initially, interviewers found that 30% of mothers eligible for participation in the study were non-responsive, had moved or were difficult to locate. Many women had returned to Mexico since the child's delivery. The additional time required to trace and find up-to-date contact information caused many cases to become age ineligible (more than 15 months having passed since the delivery date). Participation rates ranged from 26% to 35%, compared with a goal of at least 75%.

Recognizing the need for higher participation rates in Texas and other state Centers, the CDC and state investigators worked together to design strategies to address the problem. These strategies included narrowing the geographic area of the study from 254 to 106 counties; modifying abstraction procedures; expanding the age eligibility for interviewing cases and controls from within 15 months of delivery to within 24 months; and including a monetary incentive for women when they are initially contacted. In addition, PPRI doubled the number of staff dedicated to tracing, processing new contact information, and locating hard-to-find women.

The TBDRC has also established a toll-free number **(1-888-844-4633)** which study participants can call if they have any questions about participation or the study itself.

The strategies appear to have been very successful. As of December 1, 2000, the average age of eligible cases entered into NBDPS is approximately eight months, with an average contacting and locating period of 12 months. Interviewers have completed 646 case and 241 control interviews with women. The participation rate is 61% for case interviews and 59% for control interviews, an accomplishment that encourages us to increase our participation rate goal to 65% or greater. With the average completion of 40 interviews per month, by September 30, 2001, the research team aims to

contribute more than one thousand case and control interviews to the central NBDPS database stored at CDC. The cheek cell collection rate is around 62% for case mothers and 41% for control mothers. We anticipate the return rate of cheek cell kits to improve over time as well.

Additional information about the Texas Birth Defects Research Center and the National Birth Defects Prevention Study, including a list of birth defects eligible for the National Birth Defects Prevention Study and proposed analyses of the National Birth Defects Prevention Study Database, can be obtained by contacting Dawna Wright, MPH at 512-458-7232 or dawna.wright@tdh.state.tx.us.

Next issue: *Future Plans for Reporting Research Findings*

Regional Bulletin

Region 2/3

Region 2/3 Birth Defects Monitoring Division has moved into a permanent location at 1301 South Bowen Road, Arlington, 76013. After the March tornado that destroyed the building where the program had been headquartered, temporary space was found for them in a supply warehouse in the Fort Worth location of the Texas Department of Transportation. Another bright note: Region 2/3 Birth Defects welcomes a new surveillance specialist-Valarie Mitchell.

Staff Highlights

Jean Birdwell is a Surveillance Specialist in Public Health Region 2/3 (north-central Texas, including Dallas/Ft. Worth). She responded to questions about her background, how she got into birth defects surveillance, and what she feels is important about the work we do and challenges we face.

"I have completed some college courses however most of my education is from my employment working in a hospital in Florida for approximately seven years. Most of my medical education comes from participating in terminology classes and seminars sponsored by the hospital. Working in the business office the duties were varied: interviewing and admitting patients, working with medical staff in placing patients in the proper areas, coding their admission diagnosis, billing insurance, and researching any inquiries that an insurance company or patient requested. A lot of our time

was spent researching and determining if patient really received the medication and procedures listed on his statement.”

“I was working for one of the programs sponsored by the Department of Human Services when I realized how much I missed working in the medical field. I then took a class in Medical Terminology and Physiology at a local community college. When the Region 2/3 was added to TBDMD, I was excited when I heard about the goals of the Program and immediately applied. The prospect of being able to participate in such a program that could perhaps help determine what caused certain birth defects was certainly something that appealed to me.”

“When anyone asks what I do, I tell them that I work for the Texas Birth Defects Monitoring Division and it is our responsibility to travel to hospitals and birthing clinics reviewing medical records, identifying and collecting data concerning birth defects. The data is then forwarded to the Research Center in Austin to be used to help determine causes of birth defects. It is very interesting and also challenging.”

“The most important contribution that TBDMD makes to public health and the state is to provide accurate information regarding birth defects, making the public aware of the known causes of birth defects whether environmental, genetic, lifestyle or nutritional. Also, to make the data collected available to researchers and physicians.”

“One of our most significant future challenges is not only to collect this data accurately, but to make sure this data is used by educators, physicians, environmental health authorities and researchers. Collecting the information is not enough, we must make it count!”

“I like knowing that what I am doing may be helping to make a difference in someone’s life. I love children and if what I do even helps prevent one birth defect it will be worth it. When others realize that I represent the Birth Defects program and start asking questions as to “what can I do to prevent having a birth defect child?”, it’s great to be able to tell them “Take folic acid, don’t drink, don’t do drugs, see your doctor regularly and follow his instructions! Know what medications are safe for you. Some things you can’t control. These things are some that you can control. It will be worth it when you have a healthy baby in your arms.”

Announcements

The TBDMD website has a new feature: **The Birth Defect Risk Factor Series**. This summarizes the latest research findings about the factors associated with specific birth defects. The page currently links to information about 11 defects, and will be updated regularly.

The **Texas Department of Health Genetics Division** can now be found at <http://www.tdh.state.tx.us/genetics/home.htm>. Information offered on this site includes: Syndromes & Diseases; Resources Provider List; Financial Information; Legislation; Human Genome Project; Frequently Asked Questions; Contracts; Professional Resources; Publications; and Definitions

Texas Department of Health’s **Spatial Approaches to Health Outcomes (SAHO)** utilizes geographic information systems (GIS) to analyze and map spatial relationships using health data. GIS is a collection of hardware, software, geographic data, and personnel designed to efficiently capture, manage, integrate, manipulate, analyze, and display spatially referenced data. Data capture is the process of getting data into a format that can be used by a GIS, and includes global positioning system (GPS) data, digitizing, geocoding, image processing, and linking attribute data in spreadsheets or tables. Once data has been captured, GIS allows for the management, integration, and manipulation of spatial data for further analysis.

Examples of the work SAHO has done include, mapping locations of disease cases and health clinics, as well as determining residential proximity to pollution sites.

If you have questions or want further information about the use of GIS with public health data, contact SAHO at: 512-458-7729; Email: gis@exch.tdh.state.tx.us; www.tdh.state.tx.us/gis

The **Centers for Birth Defects Research and Prevention** has published a newsletter which is distributed to National Birth Defects Prevention Study (NBDPS) participants. The newsletter profiles state Research Centers, goals of the NBDPS, steps to take for healthier babies, and referral and support sources. More information can be obtained from Beverly Taylor, Texas Birth Defects Research Center, 1-888-844-4633, e-mail beverly.taylor@tdh.state.tx.us.

Calendar

- January 2001 *National Birth Defects Prevention Month*
- Tuesday, January 9, 2001, 77th Texas Legislature convenes
- April 2001 *Alcohol Awareness Month*

- April 10-12, 2001, *Nursing Leadership Conference 2001*, Lubbock. Contact Jay Todd at jay.todd@tdh.state.tx.us or 512/458-7771.
- May 21-23, 2001 *Partnering in Communities to Reduce Health Disparities* Priester National Extension Health

Conference, Dallas, Texas Contact r-hoffman@tamu.edu

- March 2002, *Texas Birth Defects Biennial Conference*, Dallas/Ft. Worth. Contact Amy Case, phone: 512-458-7232, e-mail: amy.case@th.state.tx.us

Reading List

For a more complete listing of recent articles, contact Matt Forrester at 512-458-7232, e-mail mathias.forrester@tdh.state.tx.us

Folic Acid and Neural Tube Defects: Researchers in Texas reported a modest (not statistically significant) reduction in NTD risk with periconceptional folic acid or dietary folate use among Mexican-American women. A potential explanation for this small reduction in risk was that few women in the study consumed multivitamins during the periconceptional period. [Am J Epidemiol 2000;152:1017-1023]

Prenatal Diagnosis and Birth Defects: Investigators in Texas reported that one-third of the infants/fetuses with selected defects were prenatally diagnosed. Prenatal diagnosis rates were lower for African American and Hispanic women. [Fetal Diagn Ther 2000;15:348-354]

Prenatal Diagnosis of Fetal Anomalies: Researchers in New Jersey reported prenatal diagnosis of 60% of potentially detectable birth defect cases. The rate of prenatal diagnosis depended on the type of specialist. [J Matern Fetal Med 2000;9:219-223]

Birth Defects and Maternal Obesity and Diabetes: Researchers in Boston reported that obese women without diabetes and diabetic women who were not obese did not have an increased risk of having an infant with a major birth defect, although each group of women had higher rates of particular types of defects. Women who were both obese and diabetic had a higher risk of having an infant with a major defect than nonobese, nondiabetic women. [Epidemiology 2000;11:689-694]

Birth Defects and Socioeconomic Inequities: Investigators in Great Britain found increased risk for all nonchromosomal birth defects with increasing socioeconomic deprivation. Certain defects demonstrated a similar association, while others did not. [Arch Dis Child 2000;82:349-352]

Birth Defects and Nuclear Industry Employment: Researchers in Great Britain report that preconceptional paternal or maternal exposure to low-level ionizing radiation did not increase risk for birth defects. [Lancet 2000;356:1293-1299]

Birth Defects and Gulf War Veterans: Inves-

tigators using data from the Hawaii birth defects surveillance system found no increased risk of 48 major birth defects among infants born to Gulf War veterans. However, the results need to be interpreted with caution because of the small number of cases in each birth defect category. [Teratology 2000;62:195-204]

Nonchromosomal Birth Defects and Maternal Age: Researchers using cases with structural birth defects but no known chromosomal abnormalities identified through a hospital in Texas reported an increased risk for structural birth defects with increased maternal age. Specific defects included cardiac defects, clubfoot, and diaphragmatic hernia. [Obstet Gynecol 2000;96:701-706]

Birth Defects and Infant Mortality: Researchers using statistical data collected by the World Health Organization found that infant mortality attributable to birth defects declined between 1950 and 1994 while at the same time accounted for an increasing proportion of all infant mortality. Moreover, infant mortality rate attributable to birth defects was inversely proportional to a country's relative wealth. [J Epidemiol Community Health 2000;54:660-666]. Accompanying editorial [J Epidemiol Community Health 2000;54:644]

Birth Defects Registry and Vital Records Linkage: This study in Texas evaluated the utility of linking records in a birth defects registry to vital records using six variables. There was a high degree of successful matches, particularly for live births. The variables used for matching differed in their usefulness in the matching process. [Journal of Registry Management 2000;27:93-97]

Epidemiology of Holoprosencephaly: Examination of holoprosencephaly cases identified through a birth defects surveillance program in Hawaii confirmed the influence of various demographic factors on holoprosencephaly risk reported by other studies. [Ped Perinatal Epidemiol 2000;14:61-63]

Epidemiology of Congenital Hypothyroidism: Researchers examined the impact of various factors on risk of congenital hypothyroidism in California. Risk was found to be affected by birth weight, maternal race/ethnicity, and infant gender. [Teratology 2000;62:36-41]

Neural Tube Defects in South Carolina: Research in South Carolina reported a de-

cline in the NTD prevalence in 1992-1998. At the same time, there was increased periconceptional folic acid use among women of childbearing age. [Pediatrics 2000;106:677-683] Commentary [Pediatrics 2000;106:825-827]

Neural Tube Defects and Maternal Height and Body Mass Index: Researchers in California found increased risk of NTDs with increasing maternal prepregnancy body mass index and with decreasing maternal height. Maternal body mass index and height were not found to influence risk for conotruncal defects, limb defects, or oral clefts. [Paediatr Perinat Epidemiol 2000;14:234-239]

NTDs and Prenatal Diagnosis: Investigators in Hawaii reported that various diagnostic and demographic factors can influence the prenatal diagnosis and elective termination of NTDs. [Fetal Diagn Ther 2000;15:146-151]

Limb Defects and Other Birth Defects: Researchers using data from the International Clearinghouse for Birth Defects Monitoring Systems found that specific types of limb defects were associated with distinct sets of other major birth defects. [Am J Med Genet 2000;93:110-116]

Trisomy 21 and Parental Origin: Researchers in France found that approximately 10 percent of prenatally diagnosed cases of trisomy 21 were of paternal origin. This proportion is higher than that observed in studies that investigated parental origin among liveborn cases of trisomy 21. The increased proportion of paternally-derived trisomy 21 cases did not appear to be related factors leading to selective loss of trisomy 21 fetuses resulting from paternal nondisjunction. [Hum Genet 2000;106:340-344].

Down Syndrome and Folate Metabolism Polymorphisms: Researchers found that polymorphisms in the methylenetetrahydrofolate reductase (MTHFR) and methionine synthase reductase (MTRR) genes were linked to Down syndrome risk. The presence of polymorphisms in both genes combined resulted in a greater Down syndrome risk than the presence of either separately. [Am J Hum Genet 2000;67:623-630]

Birth Defects and Folic Acid Antagonists: Investigators at Boston University reported that folic acid antagonists may increase the risk of cardiovascular defects, oral clefts, and urinary tract defects. [N Engl J Med 2000;343:1608-1614]

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More information can be found at:
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Special Report from the Texas Birth Defects Registry

Impact of including induced pregnancy terminations before 20 weeks gestation on birth defect rates

The Texas Birth Defects Registry collects data on congenital anomalies detected among the following pregnancy outcomes:

- ! live births of any gestation
- ! fetal deaths of at least 20 weeks gestation or 500 grams birth weight
- ! induced pregnancy terminations of at least 20 weeks gestation or 500 grams birth weight.

These pregnancies are referred to as 'cases'. The registry also collects information on birth defects found among pregnancy terminations induced prior to 20 weeks gestation in the facilities we access. These pregnancies, however, do not meet the definition of a case. To date, statistics published by the registry have included only cases. The rationale for excluding birth defects identified among terminations induced prior to 20 weeks gestation from published rates has been uncertainty about the completeness and consistency of ascertainment of these cases, due to the hospital-based focus of our surveillance. We do not routinely conduct surveillance activities in facilities where elective terminations before 20 weeks gestation are performed nor in facilities providing prenatal diagnostic services. However, advances in prenatal diagnosis have allowed some birth defects to be identified earlier in pregnancy, and a portion of those pregnancies are electively terminated before 20 weeks gestation.

To assess the impact of including birth defects detected among induced terminations prior to 20 weeks of gestation, we compared the number and rate of birth defects among 1996 and 1997 deliveries combined, tabulated in two ways: (A) using registry records that meet our case definition [cases]; and (B) using cases plus those birth defects we have detected among induced terminations prior to 20 weeks gestation [cases + terminations <20 weeks]. The denominator for all calculations was the number of live births. We examined the 50 major birth defects shown in our *Texas Birth Defects Registry Report of Birth Defects Among 1996 and 1997 Deliveries*. This analysis builds on an earlier study conducted using 1995 data, when the scope of the registry was limited to 23 major categories of birth defects in two regions of the state (1).

When birth defects detected among induced terminations before 20 weeks gestation were included, the number of cases and rate per 10,000 live births increased by 5 percent or more for 9 of the 50 conditions examined (see Table, reverse side). The conditions were anencephaly, spina bifida without anencephaly, encephalocele, Patau syndrome (trisomy 13), Edwards syndrome (trisomy 18), Down syndrome, omphalocele, gastroschisis, and anophthalmia. The greatest impact was observed for anencephaly. The number of anencephaly cases increased by 28.9 percent when we included pregnancy terminations prior to 20 weeks gestation. For 13 conditions, adding birth defects detected among terminations at less than 20 weeks gestation increased the number of cases by less than 5 percent. There was no effect for 28 of the 50 conditions examined, because there were no terminations before 20 weeks gestation in the registry for these conditions.

Next we compared rates and 95% confidence intervals for cases plus terminations before 20 weeks gestation with rates and confidence intervals for cases alone. The rate of anencephaly among cases plus terminations before 20 weeks gestation was statistically significantly higher than the rate among cases alone (3.56 versus 2.76 per 10,000 live births). Anencephaly was the only condition for which including terminations before 20 weeks gestation had a statistically significant impact on the rate, based on these data. As we collect more data over time, confidence intervals will narrow and we may find other conditions for which including terminations prior to 20 weeks gestation results in a statistically significant increase in the rate.

These findings demonstrate that with its current case definition, data published by the Texas Birth Defects Registry are somewhat incomplete for those congenital anomalies that are more commonly detected and electively terminated before 20 weeks gestation. However, for many defect categories, excluding terminations prior to 20 weeks gestation from published rates has little or no impact. One limitation of this analysis is that the Registry may not be adequately identifying birth defects in pregnancies terminated before 20 weeks gestation. A special study is currently ongoing to determine whether the Registry is missing information by not collecting data in prenatal diagnostic facilities. Nevertheless, these types of analyses can provide at least minimum estimates of the impact of pregnancy terminations prior to 20 weeks gestation on birth defect rates. –*Mary Ethen, M.P.H.*

¹ Waller DK, Pujazon MA, Canfield MA, Scheurele AE, Byrne JLB. Frequency of Prenatal Diagnosis of Birth Defects in Houston, Galveston and the Lower Rio Grande Valley of Texas, 1995. *Fetal Diagnosis and Therapy* 2000;15:348-354.

Table: Impact of including induced pregnancy terminations before 20 weeks gestation on birth defect rates, ranked by percent of change, Texas, 1996-1997

Defect	A. Cases ¹			B. Cases + Terminations <20 wks ²			% Change
	Number	Rate ³	95% Confidence Interval for Rate	Number	Rate	95% Confidence Interval for Rate	
Anencephaly ⁴	83	2.76	2.20 - 3.42	107	3.56	2.92 - 4.30	28.9
Encephalocele	29	0.97	0.65 - 1.39	35	1.16	0.81 - 1.62	20.7
Patau syndrome (includes trisomy 13, translocations, and mosaics)	27	0.90	0.59 - 1.31	32	1.07	0.73 - 1.50	18.5
Omphalocele	59	1.96	1.49 - 2.53	68	2.26	1.76 - 2.87	15.3
Spina bifida without anencephaly	134	4.46	3.74 - 5.28	151	5.03	4.26 - 5.89	12.7
Edwards syndrome (includes trisomy 18, translocations, and mosaics)	79	2.63	2.08 - 3.28	88	2.93	2.35 - 3.61	11.4
Anophthalmia	15	0.50	0.28 - 0.82	16	0.53	0.30 - 0.86	6.7
Down syndrome (includes trisomy 21, translocations, and mosaics)	355	11.82	10.62 - 13.11	376	12.52	11.28 - 13.85	5.9
Gastroschisis	101	3.36	2.74 - 4.08	106	3.53	2.89 - 4.27	5.0
Reduction defects of the upper limbs	123	4.09	3.40 - 4.88	127	4.23	3.52 - 5.03	3.3
Endocardial cushion defect	100	3.33	2.71 - 4.05	103	3.43	2.80 - 4.16	3.0
Reduction defects of the lower limbs	39	1.30	0.92 - 1.77	40	1.33	0.95 - 1.81	2.6
Stenosis or atresia of large intestine, rectum, or anal canal	123	4.09	3.40 - 4.88	126	4.19	3.49 - 4.99	2.4
Hydrocephaly	221	7.36	6.42 - 8.39	226	7.52	6.57 - 8.57	2.3
Agensis, aplasia, or hypoplasia of the lung	134	4.46	3.74 - 5.28	137	4.56	3.83 - 5.39	2.2
Holoprosencephaly	45	1.50	1.09 - 2.00	46	1.53	1.12 - 2.04	2.2
Renal agenesis or dysgenesis	141	4.69	3.95 - 5.53	144	4.79	4.04 - 5.64	2.1
Hypoplastic left heart syndrome	70	2.33	1.82 - 2.94	71	2.36	1.85 - 2.98	1.4
Cleft lip with or without cleft palate	346	11.52	10.34 - 12.80	350	11.65	10.46 - 12.94	1.2
Stenosis or atresia of small intestine	95	3.16	2.56 - 3.87	96	3.20	2.59 - 3.90	1.1
Obstructive genitourinary defect	502	16.71	15.28 - 18.24	504	16.78	15.34 - 18.31	0.4
Ventricular septal defect	1309	43.57	41.25 - 45.99	1312	43.67	41.34 - 46.09	0.2
Microcephaly	171	5.69	4.87 - 6.61	171	5.69	4.87 - 6.61	0.0
Microphthalmia	70	2.33	1.82 - 2.94	70	2.33	1.82 - 2.94	0.0
Cataract	31	1.03	0.70 - 1.46	31	1.03	0.70 - 1.46	0.0
Aniridia	2	0.07	0.01 - 0.24	2	0.07	0.01 - 0.24	0.0
Anotia or microtia	84	2.80	2.23 - 3.46	84	2.80	2.23 - 3.46	0.0
Common truncus	19	0.63	0.38 - 0.99	19	0.63	0.38 - 0.99	0.0
Transposition of the great vessels	144	4.79	4.04 - 5.64	144	4.79	4.04 - 5.64	0.0
Tetralogy of Fallot	87	2.90	2.32 - 3.57	87	2.90	2.32 - 3.57	0.0
Atrial septal defect	1423	47.37	44.94 - 49.89	1423	47.37	44.94 - 49.89	0.0
Pulmonary valve atresia or stenosis	145	4.83	4.07 - 5.68	145	4.83	4.07 - 5.68	0.0
Tricuspid valve atresia or stenosis	72	2.40	1.88 - 3.02	72	2.40	1.88 - 3.02	0.0
Ebstein anomaly	13	0.43	0.23 - 0.74	13	0.43	0.23 - 0.74	0.0
Aortic valve stenosis	68	2.26	1.76 - 2.87	68	2.26	1.76 - 2.87	0.0
Patent ductus arteriosus	1628	54.19	51.60 - 56.88	1628	54.19	51.60 - 56.88	0.0
Coarctation of the aorta	145	4.83	4.07 - 5.68	145	4.83	4.07 - 5.68	0.0
Choanal atresia or stenosis	36	1.20	0.84 - 1.66	36	1.20	0.84 - 1.66	0.0
Cleft palate alone (without cleft lip)	180	5.99	5.15 - 6.93	180	5.99	5.15 - 6.93	0.0
Tracheoesophageal fistula / esophageal atresia	70	2.33	1.82 - 2.94	70	2.33	1.82 - 2.94	0.0
Pyloric stenosis	482	16.04	14.64 - 17.54	482	16.04	14.64 - 17.54	0.0
Hirschsprung disease	39	1.30	0.92 - 1.77	39	1.30	0.92 - 1.77	0.0
Biliary atresia	17	0.57	0.33 - 0.91	17	0.57	0.33 - 0.91	0.0
Hypospadias or epispadias	720	23.97	22.25 - 25.78	720	23.97	22.25 - 25.78	0.0
Bladder exstrophy	5	0.17	0.05 - 0.39	5	0.17	0.05 - 0.39	0.0
Congenital hip dislocation	169	5.63	4.81 - 6.54	169	5.63	4.81 - 6.54	0.0
Craniosynostosis	81	2.70	2.14 - 3.35	81	2.70	2.14 - 3.35	0.0
Diaphragmatic hernia	66	2.20	1.70 - 2.79	66	2.20	1.70 - 2.79	0.0
Fetal alcohol syndrome or other alcohol related birth defects	2	0.07	0.01 - 0.24	2	0.07	0.01 - 0.24	0.0
Possible/probable FAS or other alcohol related birth defects	18	0.60	0.36 - 0.95	18	0.60	0.36 - 0.95	0.0

Table Notes:

1. Birth defects detected among live births of any gestation, fetal deaths of at least 20 weeks gestation or 500 grams birth weight, and induced pregnancy terminations of at least 20 weeks gestation or 500 grams birth weight
2. Birth defects detected among live births of any gestation, fetal deaths of at least 20 weeks gestation or 500 grams birth weight, and induced pregnancy terminations of any gestation
3. Cases per 10,000 live births
4. Statistically significant difference between rate A (excluding induced terminations before 20 weeks gestation) and rate B (including induced terminations before 20 weeks gestation) for this defect