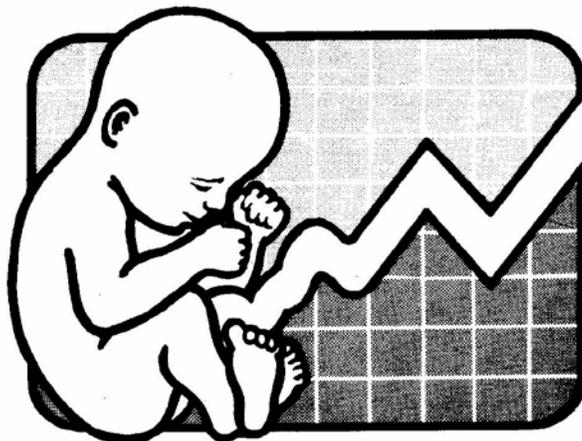




2003 - 2007
Arizona Birth Defects
Monitoring Program Report





Janice K. Brewer

Governor
State of Arizona

Will Humble

Director
Arizona Department of Health Services

Dear Residents of Arizona,

We are pleased to present you with the 'Arizona Birth Defects Monitoring Program Report' covering the years from 2003 to 2007. The results from this monitoring program illuminate opportunities for increased prevention and treatment of birth defects, which will enable us to work towards our vision of providing leadership for a healthier Arizona.

We thank all the individuals who contributed to and produced this informative report. We sincerely hope that the information in this report helps you, our partners, in your work to improve the health of all Arizonans.



2003 - 2007
ARIZONA BIRTH DEFECTS MONITORING
PROGRAM REPORT

Arizona Birth Defects Monitoring Program
Office of Health Registries
Bureau of Public Health Statistics
Arizona Department of Health Services

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August 12, 2010

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TABLE OF CONTENTS

| | |
|--|----|
| Executive Summary | 1 |
| The Importance of Arizona’s Birth Defects Registry | 4 |
| Methods..... | 7 |
| Case Definition | 8 |
| Interpreting the Data | 9 |
| State Profile of Defects | 11 |
| Neural Tube Defects | 37 |
| Race/Ethnicity..... | 39 |
| Maternal Age | 41 |
| County Patterns for Sentinel Defects..... | 42 |

Tables

| | |
|--|----|
| Table 1-A. Congenital Anomalies by Race/Ethnicity - Arizona, 2003 | 13 |
| Table 1-B. Congenital Anomalies by Race/Ethnicity - Arizona, 2004..... | 15 |
| Table 1-C. Congenital Anomalies by Race/Ethnicity - Arizona, 2005..... | 17 |
| Table 1-D. Congenital Anomalies by Race/Ethnicity - Arizona, 2006 | 19 |
| Table 1-E. Congenital Anomalies by Race/Ethnicity - Arizona, 2007..... | 21 |
| Table 2-A. Birth Defects by County of Residence, 2003 | 23 |
| Table 2-B. Birth Defects by County of Residence, 2004 | 24 |
| Table 2-C. Birth Defects by County of Residence, 2005 | 25 |
| Table 2-D. Birth Defects by County of Residence, 2006 | 26 |
| Table 2-E. Birth Defects by County of Residence, 2007..... | 27 |
| Table 3. Congenital Anomalies by Year, 1991 – 2007..... | 28 |
| Table 4. Neural Tube Defects - Incidence Rates by County, 1991 – 2007..... | 43 |
| Table 5. Gastroschisis - Incidence Rates by County, 1991 – 2007..... | 44 |
| Table 6. Omphalocele - Incidence Rates by County, 1991 – 2007..... | 45 |
| Table 7. Heart Defects - Incidence Rates by County, 1991– 2007..... | 46 |

TABLE OF CONTENTS

Figures

| | |
|--|----|
| Figure 1. Trends of Selected Congenital Anomalies, Incidence Rates, 1991 – 2007..... | 31 |
| Figure 2. Neural Tube Defects, Incidence Rates, 1991 – 2007 | 37 |
| Figure 3. Spina Bifida Incidence Rates by Race/Ethnicity, 2003 – 2007..... | 39 |
| Figure 4. Abdominal Wall Defect Incidence Rates by Race/Ethnicity, 2003 – 2007 | 40 |
| Figure 5. Gastroschisis Incidence Rates by Maternal Age Groups, 2003 – 2007 | 41 |

Appendices

| | |
|---|----|
| Appendix A. Definitions of Reported Birth Defects | 47 |
| Appendix B. ICD-9 and CDC/BPA Codes Defining Conditions in Report | 50 |
| Appendix C. Precision of Diagnosis Codes | 51 |
| Appendix D. Exclusion List..... | 52 |
| Appendix E. Race and Ethnicity..... | 53 |
| Appendix F. References..... | 54 |

EXECUTIVE SUMMARY

The Arizona Birth Defects Monitoring Program (ABDMP) is a population-based registry which provides information on the occurrence of birth defects throughout the state of Arizona. This report includes information about the occurrence of 32 categories of structural birth defects diagnosed in children born to Arizona residents from 2003-2007 (see Appendix A for the definitions of birth defects reported by the ABDMP). The specific birth defects included in this report are significant because they require medical or surgical intervention, considerably affect the child's appearance, and/or seriously affect the health and development of the child.¹

General Conclusions

- There were 5,129 infants born with reportable birth defects from 2003-2007 (an average of 1,026 infants/year).
- One out of every 100 babies born in Arizona was diagnosed before their first birthday with one or more of these reportable birth defects.
- There were 2,796 stillbirths from 2003-2007; five out of every 100 stillborns had a reportable birth defect.
- The most common birth defects were Down syndrome (Trisomy 21), cleft lip with and without cleft palate, pulmonary valve atresia and stenosis, cleft palate without cleft lip, gastroschisis, and coarctation of aorta.

Findings of Significance

Neural Tube Defects

- There were 280 infants born with neural tube defects (NTDs) in this five year period. Neural tube defects often cause paralysis, severe mental retardation, or death. Evidence shows that 50% to 70% of these kinds of birth defects can be prevented if all women of childbearing age take 400 mcg of folic acid daily, starting before they become pregnant.^{2,3,4}
- On average, there was about 47% decrease in NTD-affected pregnancies in the United States from 1991-2006⁵. There was a 35% decline in NTD rates during the same time period in Arizona. This decrease is associated with the Food and Drug

Administration's mandate that all cereal grains be fortified with folic acid starting in 1998.⁶

- However, intrauterine diagnosis and selective termination of affected pregnancies was hypothesized as one of the important contributors to the declining incidence of NTDs⁷
- Many more NTDs may be prevented if the following actions are taken:
 - Develop and implement strategies to increase the percentage of women of childbearing age consuming 400 mcg of folic acid daily.
 - Encourage primary health care providers to discuss the importance of folic acid intake with all women of childbearing age.
 - Encourage obstetricians to ensure that women scheduling their first appointment for prenatal care are instructed to start or continue taking a prenatal vitamin containing folic acid daily.
 - Encourage all corn flour producers to fortify their products with folic acid.
 - Encourage the federal government to increase the level of folic acid fortification in wheat products.
 - Continue programs that provide low income women of childbearing age and their spouses with folic acid education and that distribute multivitamins containing folic acid to women.
 - Ensure all women receive adequate preconceptional and prenatal healthcare to provide education on behaviors to minimize the risk of birth defects.
- The report shows a two-fold elevation in the rate of NTDs in Gila county, 1991-2007. We recommend that targeted promotion of folic acid supplements intake occur in Gila county.

Gastroschisis and Heart Defects

- The rate of gastroschisis among Native Americans (10 per 10,000 live births) was significantly higher than the rates for Whites and Hispanics (about 5 per 10,000 live births).
- The rate of gastroschisis for births to mothers less than 20 years of age (13 per

10,000 live births) was significantly higher than the state rate (5 per 10,000 live births). Gastroschisis was associated with significantly younger maternal age than omphalocele and this is in agreement with the finding that the younger the maternal age, the higher is the risk of gastroschisis.⁸

- An unexplained elevated gastroschisis rate, 1991-2007, is noted in Mohave county.
- The heart defect rate for Gila County (52 per 10,000 live births) was significantly higher than that of the state (34 per 10,000 live births). Folic acid fortification of grain products was reported to have a preventive effect on heart defects⁹.

Birth defects affect thousands of families in the state of Arizona. The Arizona Birth Defects Monitoring Program plays a vital role in accurately identifying birth defects that occur throughout the state and provides this data to state and community leaders and health care professionals so that they can plan, implement, and evaluate programs for prevention and treatment of birth defects in Arizona.

THE IMPORTANCE OF ARIZONA'S BIRTH DEFECTS REGISTRY

Introduction

Birth defect surveillance programs in the United States were first established in response to concerns over environmental pollutants and the finding that severe birth defects were associated with pregnant women who, without knowing the harmful effects on the fetus, used medications such as thalidomide. At present, birth defect surveillance programs are being used to monitor trends in birth defect rates over time, evaluate birth defect prevention programs, and facilitate research efforts to identify the etiology of birth defects.^{10,11}

The Arizona Birth Defects Monitoring Program (ABDMP) is a population-based registry which provides information on the occurrence of 32 categories of birth defects. These specific birth defects are monitored at the recommendation of the National Birth Defects Prevention Network and Centers for Disease Control and Prevention. They were selected because of a combination of factors: they require medical or surgical intervention, they considerably affect the child's appearance, they seriously affect the health and development of the child, they have a significant public health impact, their frequency of occurrence, and/or the level of existing knowledge on their etiology and risk factors.¹² The ABDMP provides ongoing surveillance to monitor trends in the occurrence of these birth defects and detect the onset of possible problems.^{13,14,15} The information is used to plan and evaluate birth defect prevention efforts and to direct allocation of resources for health services. Such a registry is necessary because other systems for reporting birth defects, such as birth certificates and hospital discharge data, tend to be inaccurate or incomplete due to under-reporting of cases, lack of specificity of the type of birth defect, and/or incomplete demographic data.¹⁶

To provide accurate and current information for health planning and prevention activities, in 2003 the ABDMP entered into a five-year Cooperative Agreement with the Centers for Disease Control and Prevention to develop a Rapid Reporting System (RRS) for birth defects. The goal of the RRS was to identify infants born in Arizona with anencephaly, encephalocele, spina bifida, cleft lip, or cleft palate within six months of birth and to provide families of living children with information and resources for follow-up medical and social services. Through this

goal the ABDMP hopes to increase the percentage of children with these birth defects who receive coordinated, multi-disciplinary follow-up services to minimize the long-term disabilities associated with their condition. This program also increased the number of families of children with birth defects receiving support from other families of children with similar difficulties. Furthermore, this rapid reporting system enabled the Arizona Department of Health Services Folate Committee to track trends in neural tube defect (NTD) occurrence and evaluate the efficacy of programs educating the public on folic acid for NTD prevention. In 2010, the ABDMP received another 5-year grant from the CDC.

Economic Cost

Birth defects are expensive, both in their costs in human productivity and monetary resources. They remain the leading cause of infant mortality in both Arizona and the United States. Arizona and national data show that between 2003 and 2007, 23% of infant deaths were due to a birth defect. In comparison, 14% of infant deaths in 2007 were attributed to low birth weight and 6% were attributed to SIDS.^{17,18} Birth defects are also the fifth leading cause of years of potential life lost.¹⁹ Although many infants with birth defects survive beyond their first birthday, many require special medical services, education and rehabilitation services, vocational training and/or custodial care. Lifetime costs for these services is estimated to be \$75,000 to over \$500,000 per child.²⁰ These costs contribute to a lifetime of hardship for these children, their families, and our communities.

Known Causes of Birth Defects

Genetic and environmental factors can cause birth defects. There are three major categories of known causes of birth defects. The first category is “chromosomal errors,” such as Down syndrome. The second is “environmental factors,” such as maternal alcohol consumption, which may cause fetal alcohol syndrome. The third category is “maternal illness, infections, or medical conditions,” such as German measles, which may cause congenital rubella. In spite of research efforts in identifying the etiology of birth defects, the causes of most birth defects remain unknown. This is suspected to be because most birth defects are caused by complex combinations of genetic and environmental factors that are very difficult to identify – particularly in studies of relatively rare conditions.^{21, 22, 23}

Interventions

Although the causes of birth defects are largely unknown, there are many important steps women can take to minimize the risk of such defects. For example, maternal intake of the B-vitamin folic acid has been shown to be necessary for proper fetal development. Several prospective case-controlled studies have shown that the consumption of 400 mcg of folic acid daily starting prior to conception and through the first trimester has reduced the incidence of neural tube defects (NTDs) by at least 50%.²⁴ There is also research that shows that folic acid may reduce the incidence of certain types of heart defects, urinary tract defects, and oral clefts.^{25,26,27} A considerable amount of research still needs to be undertaken to augment our knowledge of birth defects, their etiology, and their impact on different subpopulation groups. If Arizona is to ensure the well-being of its children, it is essential that the surveillance and documentation of the occurrence of birth defects in the state be undertaken and made available to the public and researchers.

METHODS

The ABDMP is a statewide, population-based, active ascertainment program, pursuant to Arizona Revised Statute §36-133, which mandates the surveillance of chronic diseases, including birth defects. The funding for the ABDMP comes from appropriations of the Arizona State Legislature, monies collected through the Arizona Newborn Screening Program, and federal funds from the Maternal Child Health Block Grant and a Cooperative Agreement with the Centers for Disease Control and Prevention (CDC). Trained ABDMP staff members collect data from 46 hospitals. Ascertainment procedures used by the ABDMP are nearly identical to those used by the U.S. Centers for Disease Control's Metropolitan Atlanta Congenital Defects Program, the gold standard for birth defect registries internationally.²⁸

Hospital case-finding sources include the Hospital Discharge Database, disease indices from hospitals, and birth and fetal death certificates. All records for children up to one year of age with recorded birth defects become part of this listing of possible cases. The medical records of possible cases are reviewed to determine which records meet the case definition. An abstract (case report) of the medical record is completed for each reportable case. If the nature of a defect diagnosed in the first year of life is more precisely diagnosed later in the child's life and this information is contained in the chart at the time of our review, then the more precise diagnosis is used. ABDMP staff then assigns a six-digit classification code to each reportable defect. The classification system is CDC's modification of the British Pediatric Association (BPA) Classification of Disease. BPA coding is an extension of the World Health Organization's International Classification of Disease, 9th Revision, Clinical Modification (ICD-9-CM) (See Appendix B for a list of BPA codes used by the ABDMP). The abstracts of cases identified from multiple sources are compared, merged, and added to the registry. For example, to identify children born with birth defects in the year 2007, the ABDMP staff reviewed 4,411 medical records. 2,958 of these medical records contained information concerning 1,400 infants that met the case definition (many of whom were identified in medical records at more than one hospital or clinic).

CASE DEFINITION

The following are the criteria for inclusion in the Birth Defects Monitoring Program case file:

- A. The mother's place of residence at the time of birth must be in Arizona.
- B. The child must have a birth defect that is reported by the ABDMP (see Appendix B for the list of reported birth defects).
- C. The health care provider must have had a high level of confidence in the diagnosis (defined as a precision of diagnosis code of eight or greater, as explained in Appendix C.)
- D. The defect must be diagnosed, or signs and symptoms of a potential defect recognized, within the first year of life.
- E. The child must have an Arizona-issued birth or fetal death certificate.
- F. The date of birth (or delivery for stillbirths > 19 weeks of gestational age) must be on or after January 1, 1986.
- F. For a list of exclusions, see Appendix D.

Due to the need to collect and report data on birth defects in a more timely manner, effective January 2005, the ABDMP reduced the number of reportable conditions from 44 categories of birth defects to 32 categories. The list of 32 categories includes many of the major congenital anomalies recommended by The International Clearinghouse for Birth Defects Monitoring Systems and the Centers for Disease Control and Prevention (CDC). The 32 categories of birth defects still permit the ABDMP to compare its rates with other registries for the major birth defect categories. The reduced list of reportable defects applies to data collected on births 2005 and later.

The data for the ABDMP Report (for 2003-2007 cases) has been analyzed using the 32 birth defect categories as defined by the CDC. (See Appendix B.) . Of note, the data for previous reports contained analysis that used the 44 birth defect categories defined by the ABDMP.

INTERPRETING THE DATA

The tables and figures presented in this report represent data collected on birth defects in Arizona for the period 2003 to 2007. Each table presents the reported counts, rates, and confidence intervals on selected congenital anomalies. Below is an explanation of how counts, rates, and confidence intervals were calculated.

Counts

The counts, sometimes called cases, represent the number of children who, in the first year of life, were diagnosed with at least one reportable birth defect within the defect category. Children born with more than one reportable defect, as often occurs, may be counted in more than one category.

Rates

Incidence rates of birth defects were calculated by dividing the number of children (cases) with a particular reportable defect by the total number of live births (and in some cases live births plus fetal deaths) for the specific year of interest, and then multiplying by 10,000. Most tables and figures show rates that are calculated by including live births and fetal deaths in the numerator and only live births for the denominator (the inclusion of fetal deaths in the denominator does not change the rates significantly). For example:

$$\frac{110 \text{ live borns or stillborns with Down syndrome born in the year 2000}}{84,866 \text{ live births in the year 2000}} * 10,000 = 12.96 \text{ cases of Down syndrome per 10,000 live births}$$

Confidence Intervals

The confidence intervals shown in the tables and figures are provided to give information about the estimate of the rate. Confidence intervals presented in this report are 95 percent Poisson confidence intervals. The confidence intervals indicate that the true rate should be contained in this interval 95 percent of the time. For example, Down syndrome in the year 2007 occurs at a rate of 8.28 per 10,000 births. The lower and upper bounds of the point estimate of this rate are 6.52 and 10.04, respectively. Thus, one can say that 95 percent of the time the true rate of Down syndrome is between 6.52 and 10.04 cases per 10,000 live births and fetal deaths. The following

formula was use to calculate the confidence intervals. Confidence Interval = Rate \pm 1.96($\sqrt{\text{var}}$)
where var = (Rate/Population x10,000).

Small Numbers and a Note Of Caution

While the intent of these data is to provide useful information on birth defects in Arizona, it is equally important not to mislead data users. Rates, confidence intervals, and any other analyses based on fewer than 10 reported cases cannot be considered statistically stable and are not shown for local areas.

Tests of Significance

Z tests were used to determine whether there were statistically significant differences in the rates between groups and areas. The state rate was used as the standard rate in these tests.

STATE PROFILE OF DEFECTS

The Arizona Birth Defects Monitoring Program (ABDMP) has been in operation since 1986. This is the thirteenth report of data compiled by the ABDMP in its mission to collect, analyze, and disseminate information on children with birth defects. Currently, the ABDMP has data from 1986 through 2007 for all the major reportable birth defects conditions.

Tables and Figures

Table 1-A (pages 11-12) presents data on the 32 categories of birth defects collected by the ABDMP among live born and stillborn infants born statewide, analyzed by race/ethnicity, for 2003. Tables 1-B (pages 13-14), 1-C (pages 15-16) and 1-D (pages 17-18), 1-E (pages 19-20) present similar data for 2004, 2005, 2006 and 2007. Tables 2-A (page 17), 2-B (page 18), 2-C (page 19), 2-D and 2-E (page 20) display the number of live born and stillborn infants with all reportable birth defects and the average number of defects among live born and stillborn infants analyzed by county of maternal residence for 2003, 2004, 2005, 2006 and 2007. Table 3 (pages 22-24) display the number of cases and the rates of the 44 categories of anomalies by year for 1990 through 2007. The series of graphs in Figure 1 (pages 25-34) display the trends for 1991 through 2007 for the same categories of defects.

Neural Tube Defects

Figure 2 (page 35) shows neural tube defects rates (combining data for anencephaly, encephalocele, and spina bifida) for 1991-2007.

Race/Ethnicity

Spina bifida, gastroschisis, and omphalocele rates have been stratified by race and ethnicity in Figure 3 (page 36) and Figure 4 (page 37).

Maternal Age

Figure 5 (page 38) compares rates of gastroschisis occurring in 2003-2007 among different maternal age groups.

County Profiles

Tables 4-7 (pages 39-42) present aggregated data on the number of infants with neural tube defects, gastroschisis, omphalocele, and heart defects born between 1991 to 2007 in each county.

Table 1 – A
Arizona Birth Defects Monitoring Program
Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2003
Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL^c</u> | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|--|--------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Amniotic bands | 10 | 1.10 | 7 | 1.80 | 0 | 0.00 | 1 | 3.31 | 2 | 3.40 | 0 | 0.00 |
| Anencephalus | 20 | 2.20 | 10 | 2.57 | 8 | 2.05 | 0 | 0.00 | 1 | 1.70 | 1 | 2.54 |
| Aniridia | 24 | 2.64 | 0 | 0.00 | 7 | 1.79 | 2 | 6.62 | 3 | 5.10 | 12 | 30.48 |
| Anophthalmia/microphthalmia | 24 | 2.64 | 7 | 1.80 | 10 | 2.56 | 2 | 6.62 | 3 | 5.10 | 2 | 5.08 |
| Anotia/microtia | 16 | 1.76 | 3 | 0.77 | 8 | 2.05 | 0 | 0.00 | 4 | 6.80 | 1 | 2.54 |
| Aortic valve stenosis | 33 | 3.64 | 16 | 4.12 | 14 | 3.58 | 0 | 0.00 | 3 | 5.10 | 0 | 0.00 |
| Biliary atresia | 1 | 0.11 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 2.54 |
| Bladder exstrophy | 3 | 0.33 | 1 | 0.26 | 1 | 0.26 | 0 | 0.00 | 0 | 0.00 | 1 | 2.54 |
| Choanal atresia | 13 | 1.43 | 7 | 1.80 | 3 | 0.77 | 0 | 0.00 | 2 | 3.40 | 1 | 2.54 |
| Cleft lip with and without cleft palate | 106 | 11.68 | 45 | 11.59 | 34 | 8.70 | 1 | 3.31 | 18 | 30.61 | 8 | 20.32 |
| Cleft palate without cleft lip | 59 | 6.50 | 19 | 4.89 | 33 | 8.44 | 0 | 0.00 | 1 | 1.70 | 6 | 15.24 |
| Coarctation of aorta | 40 | 4.41 | 17 | 4.38 | 16 | 4.09 | 3 | 9.93 | 3 | 5.10 | 1 | 2.54 |
| Common truncus | 11 | 1.21 | 6 | 1.54 | 3 | 0.77 | 0 | 0.00 | 1 | 1.70 | 1 | 2.54 |
| Congenital cataract | 10 | 1.10 | 3 | 0.77 | 2 | 0.51 | 2 | 6.62 | 1 | 1.70 | 2 | 5.08 |
| Diaphragmatic hernia | 22 | 2.42 | 8 | 2.06 | 9 | 2.30 | 1 | 3.31 | 2 | 3.40 | 2 | 5.08 |
| Down syndrome (Trisomy 21) | 116 | 12.78 | 48 | 12.36 | 46 | 11.76 | 2 | 6.62 | 10 | 17.00 | 10 | 25.40 |
| Ebstein anomaly | 4 | 0.44 | 3 | 0.77 | 0 | 0.00 | 0 | 0.00 | 1 | 1.70 | 0 | 0.00 |
| Encephalocele | 13 | 1.43 | 7 | 1.80 | 4 | 1.02 | 1 | 3.31 | 1 | 1.70 | 0 | 0.00 |
| Esophageal atresis/tracheoesophageal fistula | 26 | 2.86 | 15 | 3.86 | 6 | 1.53 | 1 | 3.31 | 2 | 3.40 | 2 | 5.08 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories

Table 1 – A (continued)
Arizona Birth Defects Monitoring Program
Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2003
Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL^c</u> | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|---|--------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Fetus or newborn affected by maternal alcohol use | 7 | 0.77 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 6 | 10.20 | 1 | 2.54 |
| Gastroschisis | 39 | 4.30 | 15 | 3.86 | 15 | 3.84 | 1 | 3.31 | 4 | 6.80 | 4 | 10.16 |
| Hirschsprung disease (congenital megacolon) | 13 | 1.43 | 4 | 1.03 | 5 | 1.28 | 1 | 3.31 | 0 | 0.00 | 3 | 7.62 |
| Hypoplastic left heart syndrome | 20 | 2.20 | 14 | 3.60 | 6 | 1.53 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Omphalocele | 59 | 6.50 | 16 | 4.12 | 28 | 7.16 | 1 | 3.31 | 11 | 18.70 | 3 | 7.62 |
| Pulmonary valve atresia and stenosis | 77 | 8.48 | 29 | 7.47 | 32 | 8.18 | 2 | 6.62 | 7 | 11.90 | 7 | 17.78 |
| Reduction deformity, lower limbs | 15 | 1.65 | 9 | 2.32 | 4 | 1.02 | 1 | 3.31 | 0 | 0.00 | 1 | 2.54 |
| Reduction deformity, upper limbs | 31 | 3.41 | 17 | 4.38 | 7 | 1.79 | 1 | 3.31 | 5 | 8.50 | 1 | 2.54 |
| Spina bifida without anencephalus | 40 | 4.41 | 14 | 3.60 | 21 | 5.37 | 1 | 3.31 | 1 | 1.70 | 3 | 7.62 |
| Tetralogy of Fallot | 39 | 4.30 | 16 | 4.12 | 17 | 4.35 | 0 | 0.00 | 4 | 6.80 | 2 | 5.08 |
| Transposition of great arteries | 38 | 4.19 | 14 | 3.60 | 15 | 3.84 | 0 | 0.00 | 3 | 5.10 | 6 | 15.24 |
| Patau syndrome (Trisomy 13) | 17 | 1.87 | 9 | 2.32 | 5 | 1.28 | 2 | 6.62 | 1 | 1.70 | 0 | 0.00 |
| Edwards syndrome (Trisomy 18) | 24 | 2.64 | 14 | 3.60 | 4 | 1.02 | 1 | 3.31 | 1 | 1.70 | 4 | 10.16 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories

Table 1 – B
Arizona Birth Defects Monitoring Program
Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2004
Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL^c</u> | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|--|--------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Amniotic bands | 7 | 0.75 | 2 | 0.51 | 4 | 0.98 | 0 | 0.00 | 1 | 1.63 | 0 | 0.00 |
| Anencephalus | 15 | 1.61 | 8 | 2.04 | 5 | 1.22 | 0 | 0.00 | 2 | 3.27 | 0 | 0.00 |
| Aniridia | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Anophthalmia/microphthalmia | 14 | 1.50 | 8 | 2.04 | 5 | 1.22 | 0 | 0.00 | 0 | 0.00 | 1 | 2.52 |
| Anotia/microtia | 23 | 2.46 | 5 | 1.27 | 10 | 2.45 | 0 | 0.00 | 7 | 11.44 | 1 | 2.52 |
| Aortic valve stenosis | 29 | 3.11 | 11 | 2.80 | 15 | 3.67 | 0 | 0.00 | 0 | 0.00 | 3 | 7.56 |
| Biliary atresia | 4 | 0.43 | 2 | 0.51 | 1 | 0.24 | 1 | 3.11 | 0 | 0.00 | 0 | 0.00 |
| Bladder exstrophy | 2 | 0.21 | 2 | 0.51 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Choanal atresia | 12 | 1.28 | 10 | 2.55 | 2 | 0.49 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Cleft lip with and without cleft palate | 113 | 12.10 | 45 | 11.46 | 44 | 10.78 | 2 | 6.22 | 16 | 26.14 | 6 | 15.12 |
| Cleft palate without cleft lip | 67 | 7.17 | 30 | 7.64 | 28 | 6.86 | 3 | 9.33 | 3 | 4.90 | 3 | 7.56 |
| Coarctation of aorta | 59 | 6.32 | 30 | 7.64 | 22 | 5.39 | 1 | 3.11 | 2 | 3.27 | 4 | 10.08 |
| Common truncus | 8 | 0.86 | 4 | 1.02 | 2 | 0.49 | 0 | 0.00 | 0 | 0.00 | 2 | 5.04 |
| Congenital cataract | 17 | 1.82 | 5 | 1.27 | 9 | 2.20 | 1 | 3.11 | 2 | 3.27 | 0 | 0.00 |
| Diaphragmatic hernia | 19 | 2.03 | 8 | 2.04 | 10 | 2.45 | 0 | 0.00 | 0 | 0.00 | 1 | 2.52 |
| Down syndrome (Trisomy 21) | 120 | 12.85 | 49 | 12.48 | 53 | 12.98 | 3 | 9.33 | 6 | 9.80 | 9 | 22.69 |
| Ebstein anomaly | 10 | 1.07 | 5 | 1.27 | 4 | 0.98 | 0 | 0.00 | 1 | 1.63 | 0 | 0.00 |
| Encephalocele | 9 | 0.96 | 2 | 0.51 | 4 | 0.98 | 2 | 6.22 | 0 | 0.00 | 1 | 2.52 |
| Esophageal atresis/tracheoesophageal fistula | 21 | 2.25 | 12 | 3.06 | 4 | 0.98 | 2 | 6.22 | 2 | 3.27 | 1 | 2.52 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories

Table 1 – B (continued)
Arizona Birth Defects Monitoring Program
Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2004
Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL^c</u> | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|---|--------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Fetus or newborn affected by maternal alcohol use | 4 | 0.43 | 0 | 0.00 | 1 | 0.24 | 0 | 0.00 | 3 | 4.90 | 0 | 0.00 |
| Gastroschisis | 57 | 6.10 | 29 | 7.38 | 18 | 4.41 | 0 | 0.00 | 7 | 11.44 | 3 | 7.56 |
| Hirschsprung disease (congenital megacolon) | 12 | 1.28 | 10 | 2.55 | 1 | 0.24 | 1 | 3.11 | 0 | 0.00 | 0 | 0.00 |
| Hypoplastic left heart syndrome | 15 | 1.61 | 10 | 2.55 | 4 | 0.98 | 0 | 0.00 | 0 | 0.00 | 1 | 2.52 |
| Omphalocele | 13 | 1.39 | 4 | 1.02 | 6 | 1.47 | 1 | 3.11 | 0 | 0.00 | 2 | 5.04 |
| Pulmonary valve atresia and stenosis | 94 | 10.06 | 43 | 10.95 | 35 | 8.57 | 1 | 3.11 | 8 | 13.07 | 7 | 17.65 |
| Reduction deformity, lower limbs | 6 | 0.64 | 2 | 0.51 | 1 | 0.24 | 2 | 6.22 | 1 | 1.63 | 0 | 0.00 |
| Reduction deformity, upper limbs | 23 | 2.46 | 7 | 1.78 | 9 | 2.20 | 3 | 9.33 | 4 | 6.54 | 0 | 0.00 |
| Spina bifida without anencephalus | 31 | 3.32 | 11 | 2.80 | 14 | 3.43 | 1 | 3.11 | 5 | 8.17 | 0 | 0.00 |
| Tetralogy of Fallot | 41 | 4.39 | 17 | 4.33 | 18 | 4.41 | 1 | 3.11 | 3 | 4.90 | 2 | 5.04 |
| Transposition of great arteries | 46 | 4.93 | 22 | 5.60 | 18 | 4.41 | 1 | 3.11 | 2 | 3.27 | 3 | 7.56 |
| Patau syndrome (Trisomy 13) | 13 | 1.39 | 8 | 2.04 | 4 | 0.98 | 1 | 3.11 | 0 | 0.00 | 0 | 0.00 |
| Edwards syndrome (Trisomy 18) | 25 | 2.68 | 12 | 3.06 | 7 | 1.71 | 3 | 9.33 | 2 | 3.27 | 1 | 2.52 |
| Fetus or newborn affected by maternal alcohol use | 4 | 0.43 | 0 | 0.00 | 1 | 0.24 | 0 | 0.00 | 3 | 4.90 | 0 | 0.00 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories

Table 1 – C
Arizona Birth Defects Monitoring Program
Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2005
Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL^c</u> | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|--|--------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Amniotic bands | 9 | 0.94 | 3 | 0.76 | 5 | 1.19 | 0 | 0.00 | 1 | 1.59 | 0 | 0.00 |
| Anencephalus | 11 | 1.15 | 4 | 1.01 | 4 | 0.95 | 1 | 2.90 | 1 | 1.59 | 1 | 2.36 |
| Aniridia | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Anophthalmia/microphthalmia | 10 | 1.04 | 2 | 0.50 | 7 | 1.66 | 0 | 0.00 | 0 | 0.00 | 1 | 2.36 |
| Anotia/microtia | 16 | 1.67 | 6 | 1.51 | 6 | 1.42 | 0 | 0.00 | 3 | 4.77 | 1 | 2.36 |
| Aortic valve stenosis | 17 | 1.77 | 9 | 2.27 | 6 | 1.42 | 0 | 0.00 | 2 | 3.18 | 0 | 0.00 |
| Biliary atresia | 1 | 0.10 | 0 | 0.00 | 1 | 0.24 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Bladder exstrophy | 2 | 0.21 | 1 | 0.25 | 1 | 0.24 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Choanal atresia | 7 | 0.73 | 2 | 0.50 | 4 | 0.95 | 0 | 0.00 | 1 | 1.59 | 0 | 0.00 |
| Cleft lip with and without cleft palate | 124 | 12.94 | 51 | 12.86 | 43 | 10.20 | 0 | 0.00 | 20 | 31.78 | 10 | 23.57 |
| Cleft palate without cleft lip | 65 | 6.79 | 31 | 7.82 | 26 | 6.17 | 1 | 2.90 | 6 | 9.53 | 1 | 2.36 |
| Coarctation of aorta | 47 | 4.91 | 24 | 6.05 | 16 | 3.80 | 0 | 0.00 | 3 | 4.77 | 4 | 9.43 |
| Common truncus | 6 | 0.63 | 3 | 0.76 | 2 | 0.47 | 0 | 0.00 | 1 | 1.59 | 0 | 0.00 |
| Congenital cataract | 10 | 1.04 | 2 | 0.50 | 6 | 1.42 | 1 | 2.90 | 0 | 0.00 | 1 | 2.36 |
| Diaphragmatic hernia | 23 | 2.40 | 9 | 2.27 | 8 | 1.90 | 0 | 0.00 | 4 | 6.36 | 2 | 4.71 |
| Down syndrome (Trisomy 21) | 131 | 13.67 | 50 | 12.61 | 61 | 14.47 | 3 | 8.70 | 9 | 14.30 | 8 | 18.86 |
| Ebstein anomaly | 10 | 1.04 | 7 | 1.77 | 1 | 0.24 | 0 | 0.00 | 1 | 1.59 | 1 | 2.36 |
| Encephalocele | 7 | 0.73 | 2 | 0.50 | 4 | 0.95 | 1 | 2.90 | 0 | 0.00 | 0 | 0.00 |
| Esophageal atresis/tracheoesophageal fistula | 13 | 1.36 | 2 | 0.50 | 8 | 1.90 | 0 | 0.00 | 2 | 3.18 | 1 | 2.36 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories.

Table 1 – C (continued)
 Arizona Birth Defects Monitoring Program
 Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2005
 Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL^c</u> | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|---|--------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Fetus or newborn affected by maternal alcohol use | 2 | 0.21 | 1 | 0.25 | 0 | 0.00 | 0 | 0.00 | 1 | 1.59 | 0 | 0.00 |
| Gastroschisis | 47 | 4.91 | 15 | 3.78 | 23 | 5.46 | 0 | 0.00 | 6 | 9.53 | 3 | 7.07 |
| Hirschsprung disease (congenital megacolon) | 17 | 1.77 | 8 | 2.02 | 4 | 0.95 | 3 | 8.70 | 1 | 1.59 | 1 | 2.36 |
| Hypoplastic left heart syndrome | 29 | 3.03 | 16 | 4.03 | 12 | 2.85 | 0 | 0.00 | 1 | 1.59 | 0 | 0.00 |
| Omphalocele | 5 | 0.52 | 2 | 0.50 | 2 | 0.47 | 1 | 2.90 | 0 | 0.00 | 0 | 0.00 |
| Pulmonary valve atresia and stenosis | 56 | 5.85 | 15 | 3.78 | 32 | 7.59 | 2 | 5.80 | 5 | 7.95 | 2 | 4.71 |
| Reduction deformity, lower limbs | 10 | 1.04 | 5 | 1.26 | 3 | 0.71 | 1 | 2.90 | 1 | 1.59 | 0 | 0.00 |
| Reduction deformity, upper limbs | 29 | 3.03 | 10 | 2.52 | 15 | 3.56 | 0 | 0.00 | 3 | 4.77 | 1 | 2.36 |
| Spina bifida without anencephalus | 33 | 3.44 | 13 | 3.28 | 14 | 3.32 | 3 | 8.70 | 1 | 1.59 | 2 | 4.71 |
| Tetralogy of Fallot | 41 | 4.28 | 9 | 2.27 | 24 | 5.69 | 2 | 5.80 | 4 | 6.36 | 2 | 4.71 |
| Transposition of great arteries | 36 | 3.76 | 19 | 4.79 | 14 | 3.32 | 1 | 2.90 | 2 | 3.18 | 0 | 0.00 |
| Patau syndrome (Trisomy 13) | 7 | 0.73 | 1 | 0.25 | 5 | 1.19 | 0 | 0.00 | 1 | 1.59 | 0 | 0.00 |
| Edwards syndrome (Trisomy 18) | 20 | 2.09 | 7 | 1.77 | 10 | 2.37 | 1 | 2.90 | 1 | 1.59 | 1 | 2.36 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories.

Table 1 – D
Arizona Birth Defects Monitoring Program
Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2006
Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL^c</u> | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|--|--------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Amniotic bands | 6 | 0.59 | 4 | 0.93 | 0 | 0.00 | 0 | 0.00 | 2 | 3.14 | 0 | 0.00 |
| Anencephalus | 11 | 1.08 | 1 | 0.23 | 8 | 1.78 | 0 | 0.00 | 1 | 1.57 | 1 | 2.54 |
| Aniridia | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Anophthalmia/microphthalmia | 7 | 0.69 | 1 | 0.23 | 4 | 0.89 | 0 | 0.00 | 2 | 3.14 | 0 | 0.00 |
| Anotia/microtia | 13 | 1.27 | 3 | 0.70 | 7 | 1.56 | 0 | 0.00 | 3 | 4.71 | 0 | 0.00 |
| Aortic valve stenosis | 17 | 1.67 | 7 | 1.63 | 8 | 1.78 | 1 | 2.59 | 0 | 0.00 | 1 | 2.54 |
| Biliary atresia | 3 | 0.29 | 0 | 0.00 | 1 | 0.22 | 1 | 2.59 | 1 | 1.57 | 0 | 0.00 |
| Bladder exstrophy | 1 | 0.10 | 0 | 0.00 | 1 | 0.22 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Choanal atresia | 8 | 0.78 | 3 | 0.70 | 5 | 1.11 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Cleft lip with and without cleft palate | 106 | 10.39 | 43 | 10.00 | 40 | 8.92 | 3 | 7.76 | 13 | 20.43 | 7 | 17.77 |
| Cleft palate without cleft lip | 71 | 6.96 | 28 | 6.51 | 33 | 7.36 | 2 | 5.18 | 4 | 6.29 | 4 | 10.15 |
| Coarctation of aorta | 31 | 3.04 | 18 | 4.18 | 9 | 2.01 | 0 | 0.00 | 2 | 3.14 | 2 | 5.08 |
| Common truncus | 4 | 0.39 | 1 | 0.23 | 1 | 0.22 | 1 | 2.59 | 0 | 0.00 | 1 | 2.54 |
| Congenital cataract | 9 | 0.88 | 4 | 0.93 | 2 | 0.45 | 0 | 0.00 | 2 | 3.14 | 1 | 2.54 |
| Diaphragmatic hernia | 17 | 1.67 | 8 | 1.86 | 7 | 1.56 | 1 | 2.59 | 1 | 1.57 | 0 | 0.00 |
| Down syndrome (Trisomy 21) | 102 | 10.00 | 42 | 9.76 | 42 | 9.36 | 3 | 7.76 | 9 | 14.14 | 6 | 15.23 |
| Ebstein anomaly | 4 | 0.39 | 1 | 0.23 | 2 | 0.45 | 0 | 0.00 | 1 | 1.57 | 0 | 0.00 |
| Encephalocele | 4 | 0.39 | 1 | 0.23 | 2 | 0.45 | 0 | 0.00 | 1 | 1.57 | 0 | 0.00 |
| Esophageal atresia/tracheoesophageal fistula | 16 | 1.57 | 9 | 2.09 | 6 | 1.34 | 0 | 0.00 | 1 | 1.57 | 0 | 0.00 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories.

Table 1 – D (continued)
Arizona Birth Defects Monitoring Program
Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2006
Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL</u> ^c | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|---|---------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Fetus or newborn affected by maternal alcohol use | 2 | 0.20 | 1 | 0.23 | 0 | 0.00 | 0 | 0.00 | 1 | 1.57 | 0 | 0.00 |
| Gastroschisis | 53 | 5.19 | 22 | 5.11 | 20 | 4.46 | 0 | 0.00 | 11 | 17.28 | 0 | 0.00 |
| Hirschsprung disease (congenital megacolon) | 5 | 0.49 | 1 | 0.23 | 4 | 0.89 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Hypoplastic left heart syndrome | 20 | 1.96 | 4 | 0.93 | 9 | 2.01 | 2 | 5.18 | 2 | 3.14 | 3 | 7.62 |
| Omphalocele | 15 | 1.47 | 6 | 1.39 | 6 | 1.34 | 1 | 2.59 | 0 | 0.00 | 2 | 5.08 |
| Pulmonary valve atresia and stenosis | 66 | 6.47 | 28 | 6.51 | 29 | 6.46 | 1 | 2.59 | 7 | 11.00 | 1 | 2.54 |
| Reduction deformity, lower limbs | 6 | 0.59 | 1 | 0.23 | 3 | 0.67 | 1 | 2.59 | 1 | 1.57 | 0 | 0.00 |
| Reduction deformity, upper limbs | 23 | 2.25 | 8 | 1.86 | 9 | 2.01 | 1 | 2.59 | 4 | 6.29 | 1 | 2.54 |
| Spina bifida without anencephalus | 26 | 2.55 | 9 | 2.09 | 12 | 2.67 | 3 | 7.76 | 2 | 3.14 | 0 | 0.00 |
| Tetralogy of Fallot | 37 | 3.63 | 17 | 3.95 | 15 | 3.34 | 0 | 0.00 | 5 | 7.86 | 0 | 0.00 |
| Transposition of great arteries | 35 | 3.43 | 13 | 3.02 | 16 | 3.57 | 0 | 0.00 | 4 | 6.29 | 2 | 5.08 |
| Patau syndrome (Trisomy 13) | 8 | 0.78 | 2 | 0.46 | 3 | 0.67 | 0 | 0.00 | 2 | 3.14 | 1 | 2.54 |
| Edwards syndrome (Trisomy 18) | 17 | 1.67 | 5 | 1.16 | 9 | 2.01 | 0 | 0.00 | 2 | 3.14 | 1 | 2.54 |
| Edwards syndrome (Trisomy 18) | 17 | 1.67 | 5 | 0.49 | 9 | 0.88 | 0 | 0.00 | 2 | 0.20 | 1 | 0.10 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories.

Table 1 – E
Arizona Birth Defects Monitoring Program
Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2007
Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL^c</u> | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|--|--------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Amniotic bands | 4 | 0.29 | 1 | 0.24 | 1 | 0.22 | 1 | 2.40 | 0 | 0.00 | 0 | 0.00 |
| Anencephalus | 16 | 1.56 | 8 | 1.90 | 6 | 1.31 | 1 | 2.40 | 1 | 1.56 | 0 | 0.00 |
| Aniridia | 1 | 0.10 | 0 | 0.00 | 1 | 0.22 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Anophthalmia/microphthalmia | 5 | 0.39 | 0 | 0.00 | 3 | 0.66 | 1 | 2.40 | 0 | 0.00 | 0 | 0.00 |
| Anotia/microtia | 9 | 0.88 | 2 | 0.47 | 5 | 1.09 | 0 | 0.00 | 0 | 0.00 | 2 | 4.80 |
| Aortic valve stenosis | 24 | 2.24 | 16 | 3.79 | 6 | 1.31 | 0 | 0.00 | 0 | 0.00 | 1 | 2.40 |
| Biliary atresia | 3 | 0.19 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 1.56 | 1 | 2.40 |
| Bladder exstrophy | 1 | 0.10 | 1 | 0.24 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Choanal atresia | 6 | 0.58 | 4 | 0.95 | 1 | 0.22 | 0 | 0.00 | 1 | 1.56 | 0 | 0.00 |
| Cleft lip with and without cleft palate | 95 | 8.76 | 27 | 6.40 | 44 | 9.62 | 3 | 7.20 | 13 | 20.29 | 3 | 7.20 |
| Cleft palate without cleft lip | 56 | 5.36 | 29 | 6.87 | 18 | 3.94 | 2 | 4.80 | 2 | 3.12 | 4 | 9.60 |
| Coarctation of aorta | 44 | 4.09 | 19 | 4.50 | 19 | 4.15 | 2 | 4.80 | 1 | 1.56 | 1 | 2.40 |
| Common truncus | 8 | 0.68 | 4 | 0.95 | 2 | 0.44 | 0 | 0.00 | 0 | 0.00 | 1 | 2.40 |
| Congenital cataract | 2 | 0.19 | 0 | 0.00 | 2 | 0.44 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Diaphragmatic hernia | 22 | 2.05 | 9 | 2.13 | 9 | 1.97 | 0 | 0.00 | 1 | 1.56 | 2 | 4.80 |
| Down syndrome (Trisomy 21) | 101 | 8.28 | 41 | 9.71 | 35 | 7.65 | 2 | 4.80 | 2 | 3.12 | 5 | 12.00 |
| Ebstein anomaly | 8 | 0.78 | 4 | 0.95 | 2 | 0.44 | 0 | 0.00 | 2 | 3.12 | 0 | 0.00 |
| Encephalocele | 7 | 0.68 | 3 | 0.71 | 3 | 0.66 | 0 | 0.00 | 1 | 1.56 | 0 | 0.00 |
| Esophageal atresia/tracheoesophageal fistula | 15 | 1.36 | 6 | 1.42 | 5 | 1.09 | 1 | 2.40 | 1 | 1.56 | 1 | 2.40 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories.

Table 1 – E (continued)
Arizona Birth Defects Monitoring Program
Live-born and Stillborn Cases of Congenital Anomalies by Race/Ethnicity - Arizona 2007
Incidence Rate ^{a,b} Per 10,000 Live Births

| <u>CONDITION</u> | <u>TOTAL</u> ^c | <u>RATE</u> | <u>WHITE NON- HISP.</u> | <u>RATE</u> | <u>HISP.</u> | <u>RATE</u> | <u>BLACK</u> | <u>RATE</u> | <u>NATIVE AMER.</u> | <u>RATE</u> | <u>OTHER</u> | <u>RATE</u> |
|---|---------------------------|-------------|---------------------------------|-------------|--------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|
| Fetus or newborn affected by maternal alcohol use | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Gastroschisis | 47 | 4.19 | 15 | 3.55 | 25 | 5.47 | 0 | 0.00 | 3 | 4.68 | 0 | 0.00 |
| Hirschsprung disease (congenital megacolon) | 14 | 1.27 | 8 | 1.90 | 4 | 0.87 | 1 | 2.40 | 0 | 0.00 | 0 | 0.00 |
| Hypoplastic left heart syndrome | 30 | 2.63 | 12 | 2.84 | 10 | 2.19 | 2 | 4.80 | 1 | 1.56 | 2 | 4.80 |
| Omphalocele | 23 | 2.14 | 10 | 2.37 | 8 | 1.75 | 0 | 0.00 | 3 | 4.68 | 1 | 2.40 |
| Pulmonary valve atresia and stenosis | 30 | 2.92 | 13 | 3.08 | 10 | 2.19 | 0 | 0.00 | 4 | 6.24 | 3 | 7.20 |
| Reduction deformity, lower limbs | 5 | 0.39 | 1 | 0.24 | 2 | 0.44 | 1 | 2.40 | 0 | 0.00 | 0 | 0.00 |
| Reduction deformity, upper limbs | 15 | 1.36 | 4 | 0.95 | 10 | 2.19 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Spina bifida without anencephalus | 37 | 3.60 | 18 | 4.26 | 16 | 3.50 | 1 | 2.40 | 0 | 0.00 | 2 | 4.80 |
| Tetralogy of Fallot | 36 | 3.51 | 19 | 4.50 | 12 | 2.62 | 0 | 0.00 | 2 | 3.12 | 3 | 7.20 |
| Transposition of great arteries | 38 | 3.70 | 12 | 2.84 | 17 | 3.72 | 2 | 4.80 | 1 | 1.56 | 6 | 14.40 |
| Patau syndrome (Trisomy 13) | 11 | 1.07 | 5 | 1.18 | 4 | 0.87 | 1 | 2.40 | 0 | 0.00 | 1 | 2.40 |
| Edwards syndrome (Trisomy 18) | 23 | 2.24 | 7 | 1.66 | 10 | 2.19 | 2 | 4.80 | 2 | 3.12 | 2 | 4.80 |

^a Incidence rates include live born and stillborn cases in numerator and only live births in denominator.

^b Incidence rates based on counts of less than 10 events are not statistically reliable.

^c Total includes cases of unknown race/ethnicity, therefore it may be greater than the sum of the cases listed in the individual race/ethnicity categories.

Table 2 – A
Arizona Birth Defects Monitoring Program ^{a, b}
Birth Defects^c by County of Residence, Arizona, 2003

| COUNTY | LIVE BORN (LB) WITH DEFECTS | | STILLBORNS (SB) WITH DEFECTS | | LIVE BORN AND STILLBORNS WITH DEFECTS | | NUMBER OF DEFECTS IN LIVE-BORN INFANTS | | NUMBER OF DEFECTS IN STILLBORN INFANTS | |
|---------------|-----------------------------|------------------------|------------------------------|------------------------|---------------------------------------|------------------------|--|-----------------|--|-----------------|
| | Number | % OF ALL LB W/ DEFECTS | Number | % OF ALL SB W/ DEFECTS | Number | % OF BIRTHS W/ DEFECTS | Number | AVG # PER CHILD | Number | AVG # PER CHILD |
| ARIZONA TOTAL | 601 | 0.66 | 47 | 8.72 | 648 | 0.71 | 843 | 1.40 | 61 | 1.30 |
| APACHE | 9 | 0.72 | 0 | 0.00 | 9 | 0.72 | 15 | 1.67 | 0 | 0.00 |
| COCHISE | 11 | 0.63 | 0 | 0.00 | 11 | 0.62 | 11 | 1.00 | 0 | 0.00 |
| COCONINO | 19 | 0.99 | 0 | 0.00 | 19 | 0.98 | 31 | 1.63 | 0 | 0.00 |
| GILA | 5 | 0.72 | 1 | 100.00 | 6 | 0.87 | 9 | 1.80 | 2 | 2.00 |
| GRAHAM | 2 | 0.46 | 0 | 0.00 | 2 | 0.45 | 3 | 1.50 | 0 | 0.00 |
| LA PAZ | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| MARICOPA | 392 | 0.66 | 38 | 11.52 | 430 | 0.72 | 534 | 1.36 | 47 | 1.24 |
| MOHAVE | 14 | 0.66 | 0 | 0.00 | 14 | 0.65 | 22 | 1.57 | 0 | 0.00 |
| NAVAJO | 20 | 1.17 | 1 | 11.11 | 21 | 1.22 | 28 | 1.40 | 3 | 3.00 |
| PIMA | 68 | 0.53 | 6 | 7.50 | 74 | 0.57 | 105 | 1.54 | 6 | 1.00 |
| PINAL | 19 | 0.65 | 0 | 0.00 | 19 | 0.65 | 28 | 1.47 | 2 | 0.00 |
| SANTA CRUZ | 4 | 0.51 | 0 | 0.00 | 4 | 0.50 | 7 | 1.75 | 0 | 0.00 |
| YAVAPAI | 16 | 0.86 | 1 | 7.14 | 17 | 0.91 | 19 | 1.19 | 1 | 1.00 |
| YUMA | 22 | 0.69 | 0 | 0.00 | 22 | 0.68 | 31 | 1.41 | 0 | 0.00 |

^aTotal number of live births in Arizona for 2003= 90,783. ^bTotal number of fetal deaths in Arizona for 2003= 539. ^cIncludes all 32 birth defect categories monitored. See Appendix B.

Table 2 – B
Arizona Birth Defects Monitoring Program ^{a, b}
Birth Defects^c by County of Residence, Arizona, 2004

| COUNTY | LIVE BORN (LB) WITH DEFECTS | | STILLBORNS (SB) WITH DEFECTS | | LIVE BORN AND STILLBORNS WITH DEFECTS | | NUMBER OF DEFECTS IN LIVE-BORN INFANTS | | NUMBER OF DEFECTS IN STILLBORN INFANTS | |
|---------------|-----------------------------|------------------------|------------------------------|------------------------|---------------------------------------|------------------------|--|-----------------|--|-----------------|
| | Number | % OF ALL LB W/ DEFECTS | Number | % OF ALL SB W/ DEFECTS | Number | % OF BIRTHS W/ DEFECTS | Number | AVG # PER CHILD | Number | AVG # PER CHILD |
| ARIZONA TOTAL | 723 | 0.77 | 37 | 7.33 | 760 | 0.81 | 881 | 1.22 | 48 | 1.30 |
| APACHE | 17 | 1.27 | 1 | 20.00 | 18 | 1.34 | 17 | 1.00 | 2 | 2.00 |
| COCHISE | 11 | 0.61 | 0 | 0.00 | 11 | 0.60 | 18 | 1.64 | 0 | 0.00 |
| COCONINO | 24 | 1.18 | 1 | 14.29 | 25 | 1.23 | 31 | 1.29 | 2 | 2.00 |
| GILA | 7 | 1.05 | 0 | 0.00 | 7 | 1.04 | 10 | 1.43 | 0 | 0.00 |
| GRAHAM | 3 | 0.67 | 0 | 0.00 | 3 | 0.66 | 3 | 1.00 | 0 | 0.00 |
| LA PAZ | 2 | 0.87 | 0 | 0.00 | 2 | 0.85 | 2 | 1.00 | 0 | 0.00 |
| MARICOPA | 489 | 0.81 | 26 | 7.67 | 515 | 0.85 | 600 | 1.23 | 33 | 1.27 |
| MOHAVE | 13 | 0.59 | 0 | 0.00 | 13 | 0.59 | 15 | 1.15 | 0 | 0.00 |
| NAVAJO | 24 | 1.34 | 0 | 0.00 | 24 | 1.33 | 26 | 1.08 | 0 | 0.00 |
| PIMA | 79 | 0.61 | 3 | 5.56 | 82 | 0.63 | 96 | 1.22 | 4 | 1.33 |
| PINAL | 10 | 0.33 | 0 | 0.00 | 10 | 0.32 | 11 | 1.10 | 0 | 0.00 |
| SANTA CRUZ | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| YAVAPAI | 20 | 1.00 | 3 | 20.00 | 23 | 1.14 | 21 | 1.05 | 3 | 1.00 |
| YUMA | 24 | 0.72 | 3 | 12.00 | 27 | 0.81 | 31 | 1.29 | 4 | 1.33 |

^aTotal number of live births in Arizona for 2004 = 93,396 ^bTotal number of fetal deaths in Arizona for 2004 = 505 ^cIncludes all 32 birth defect categories monitored. See Appendix B.

Table 2 – C
Arizona Birth Defects Monitoring Program ^{a, b}
Birth Defects^c by County of Residence, Arizona, 2005

| COUNTY | LIVE BORN (LB) WITH DEFECTS | | STILLBORNS (SB) WITH DEFECTS | | LIVE BORN AND STILLBORNS WITH DEFECTS | | NUMBER OF DEFECTS IN LIVE-BORN INFANTS | | NUMBER OF DEFECTS IN STILLBORN INFANTS | |
|---------------|-----------------------------|------------------------|------------------------------|------------------------|---------------------------------------|------------------------|--|-----------------|--|-----------------|
| | Number | % OF ALL LB W/ DEFECTS | Number | % OF ALL SB W/ DEFECTS | Number | % OF BIRTHS W/ DEFECTS | Number | AVG # PER CHILD | Number | AVG # PER CHILD |
| ARIZONA TOTAL | 668 | 0.70 | 16 | 3.01 | 684 | 0.71 | 815 | 1.22 | 19 | 1.19 |
| APACHE | 10 | 0.78 | 0 | 0.00 | 10 | 0.78 | 16 | 1.60 | 0 | 0.00 |
| COCHISE | 6 | 0.34 | 1 | 7.14 | 7 | 0.39 | 7 | 1.17 | 1 | 1.00 |
| COCONINO | 25 | 1.21 | 0 | 0.00 | 25 | 1.20 | 30 | 1.20 | 0 | 0.00 |
| GILA | 6 | 0.92 | 1 | 33.33 | 7 | 1.07 | 7 | 1.17 | 1 | 1.00 |
| GRAHAM | 1 | 0.22 | 0 | 0.00 | 1 | 0.22 | 2 | 2.00 | 0 | 0.00 |
| MARICOPA | 474 | 0.76 | 12 | 3.64 | 486 | 0.78 | 579 | 1.22 | 13 | 1.08 |
| MOHAVE | 13 | 0.58 | 0 | 0.00 | 13 | 0.58 | 15 | 1.15 | 0 | 0.00 |
| NAVAJO | 14 | 0.74 | 0 | 0.00 | 14 | 0.73 | 16 | 1.14 | 0 | 0.00 |
| PIMA | 61 | 0.47 | 1 | 1.47 | 62 | 0.48 | 73 | 1.20 | 3 | 3.00 |
| PINAL | 29 | 0.80 | 1 | 4.76 | 30 | 0.82 | 35 | 1.21 | 1 | 1.00 |
| SANTA CRUZ | 1 | 0.13 | 0 | 0.00 | 1 | 0.13 | 1 | 1.00 | 0 | 0.00 |
| YAVAPAI | 12 | 0.57 | 0 | 0.00 | 12 | 0.57 | 16 | 1.33 | 0 | 0.00 |
| YUMA | 16 | 0.49 | 0 | 0.00 | 16 | 0.48 | 18 | 1.13 | 0 | 0.00 |

^aTotal number of live births in Arizona for 2005 = 95,798 ^bTotal number of fetal deaths in Arizona for 2005 =532. ^cIncludes all 32 birth defect categories monitored. See Appendix B.

Table 2 – D
 Arizona Birth Defects Monitoring Program ^{a, b}
 Birth Defects^c by County of Residence, Arizona, 2006

| COUNTY | LIVE BORN (LB) WITH DEFECTS | | STILLBORNS (SB) WITH DEFECTS | | LIVE BORN AND STILLBORNS WITH DEFECTS | | NUMBER OF DEFECTS IN LIVE-BORN INFANTS | | NUMBER OF DEFECTS IN STILLBORN INFANTS | |
|---------------|-----------------------------|------------------------|------------------------------|------------------------|---------------------------------------|------------------------|--|-----------------|--|-----------------|
| | Number | % OF ALL LB W/ DEFECTS | Number | % OF ALL SB W/ DEFECTS | Number | % OF BIRTHS W/ DEFECTS | Number | AVG # PER CHILD | Number | AVG # PER CHILD |
| ARIZONA TOTAL | 592 | 0.58 | 19 | 3.87 | 611 | 0.60 | 710 | 1.20 | 23 | 1.21 |
| APACHE | 9 | 0.75 | 0 | 0.00 | 9 | 0.75 | 12 | 1.33 | 0 | 0.00 |
| COCHISE | 10 | 0.55 | 0 | 0.00 | 10 | 0.55 | 12 | 1.20 | 0 | 0.00 |
| COCONINO | 13 | 0.63 | 1 | 7.14 | 14 | 0.67 | 16 | 1.23 | 1 | 1.00 |
| GILA | 7 | 1.03 | 1 | 9.09 | 8 | 1.18 | 9 | 1.29 | 1 | 1.00 |
| GRAHAM | 3 | 0.55 | 0 | 0.00 | 3 | 0.55 | 4 | 1.33 | 0 | 0.00 |
| LA PAZ | 1 | 0.44 | 0 | 0.00 | 1 | 0.44 | 1 | 1.00 | 0 | 0.00 |
| MARICOPA | 437 | 0.68 | 15 | 4.56 | 452 | 0.68 | 520 | 1.19 | 18 | 1.20 |
| MOHAVE | 8 | 0.32 | 1 | 6.67 | 9 | 0.36 | 10 | 1.25 | 2 | 2.00 |
| NAVAJO | 15 | 0.79 | 1 | 7.69 | 16 | 0.85 | 19 | 1.27 | 1 | 1.00 |
| PIMA | 36 | 0.29 | 0 | 0.00 | 36 | 0.26 | 42 | 1.17 | 0 | 0.00 |
| PINAL | 18 | 0.40 | 0 | 5.88 | 18 | 0.40 | 22 | 1.22 | 0 | 0.00 |
| SANTA CRUZ | 5 | 0.66 | 0 | 0.00 | 5 | 0.66 | 5 | 1.00 | 0 | 0.00 |
| YAVAPAI | 15 | 0.63 | 0 | 0.00 | 15 | 0.63 | 21 | 1.40 | 0 | 0.00 |
| YUMA | 15 | 0.45 | 0 | 0.00 | 15 | 0.45 | 17 | 1.13 | 0 | 0.00 |

^aTotal number of live births in Arizona for 2006 = 102,042. ^bTotal number of fetal deaths in Arizona for 2006 =543. ^cIncludes all 32 birth defect categories monitored. See Appendix B.

Table 2 – E
Arizona Birth Defects Monitoring Program ^{a, b}
Birth Defects^c by County of Residence, Arizona, 2007

| COUNTY | LIVE BORN (LB) WITH DEFECTS | | STILLBORNS (SB) WITH DEFECTS | | LIVE BORN AND STILLBORNS WITH DEFECTS | | NUMBER OF DEFECTS IN LIVE-BORN INFANTS | | NUMBER OF DEFECTS IN STILLBORN INFANTS | |
|---------------|-----------------------------|------------------------|------------------------------|------------------------|---------------------------------------|------------------------|--|-----------------|--|-----------------|
| | Number | % OF ALL LB W/ DEFECTS | Number | % OF ALL SB W/ DEFECTS | Number | % OF BIRTHS W/ DEFECTS | Number | AVG # PER CHILD | Number | AVG # PER CHILD |
| ARIZONA TOTAL | 598 | 0.58 | 20 | 3.43 | 618 | 0.60 | 686 | 1.15 | 26 | 1.30 |
| APACHE | 9 | 0.78 | 0 | 0.00 | 9 | 0.78 | 7 | 0.78 | 0 | 0.00 |
| COCHISE | 7 | 0.38 | 0 | 0.00 | 7 | 0.38 | 8 | 1.14 | 0 | 0.00 |
| COCONINO | 13 | 0.61 | 1 | 11.11 | 14 | 0.65 | 13 | 1.00 | 1 | 1.00 |
| GILA | 7 | 1.00 | 0 | 0.00 | 7 | 1.00 | 8 | 1.14 | 0 | 0.00 |
| GRAHAM | 1 | 0.17 | 0 | 0.00 | 1 | 0.17 | 1 | 1.00 | 0 | 0.00 |
| LA PAZ | 1 | 0.87 | 0 | 0.00 | 1 | 0.87 | 2 | 1.00 | 0 | 0.00 |
| MARICOPA | 398 | 0.60 | 15 | 4.17 | 413 | 0.63 | 462 | 1.16 | 20 | 1.33 |
| MOHAVE | 11 | 0.45 | 0 | 0.00 | 11 | 0.45 | 12 | 1.09 | 0 | 0.00 |
| NAVAJO | 12 | 0.59 | 0 | 0.00 | 12 | 0.59 | 16 | 1.33 | 0 | 0.00 |
| PIMA | 75 | 0.54 | 0 | 0.00 | 75 | 0.54 | 84 | 1.12 | 0 | 0.00 |
| PINAL | 26 | 0.49 | 3 | 7.69 | 29 | 0.54 | 27 | 1.12 | 4 | 1.33 |
| SANTA CRUZ | 4 | 0.52 | 0 | 0.00 | 4 | 0.52 | 8 | 2.00 | 0 | 0.00 |
| YAVAPAI | 18 | 0.74 | 0 | 0.00 | 18 | 0.74 | 19 | 1.06 | 0 | 0.00 |
| YUMA | 16 | 0.49 | 1 | 7.14 | 17 | 0.52 | 17 | 1.00 | 1 | 1.00 |

^aTotal number of live births in Arizona for 2007 = 102,687. ^bTotal number of fetal deaths in Arizona for 2007= 583. ^cIncludes all 32 birth defect categories monitored. See Appendix B.

Table 3
Congenital Anomalies^a by Year, Live Borns and Stillborns, 1991 – 2007*
Incidence Rates Per 10,000 Live Births, Arizona

| CONDITION | | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2003 | 2004 | 2005 | 2006 | 2007 |
|--|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Amniotic bands | Cases ^b | 10 | 8 | 8 | 9 | 12 | 6 | 13 | 14 | 10 | 14 | 10 | 7 | 9 | 6 | 4 |
| | Rate | 1.47 | 1.17 | 1.16 | 1.27 | 1.66 | 0.8 | 1.72 | 1.8 | 1.24 | 1.65 | 1.10 | 0.75 | 0.94 | 0.59 | 0.39 |
| Anencephaly | Cases | 18 | 21 | 15 | 29 | 18 | 23 | 25 | 19 | 15 | 14 | 20 | 15 | 11 | 11 | 16 |
| | Rate | 2.65 | 3.06 | 2.17 | 4.09 | 2.49 | 3.06 | 3.31 | 2.44 | 1.85 | 1.65 | 2.20 | 1.61 | 1.15 | 1.08 | 1.56 |
| Aniridia | Cases | 0 | 2 | 0 | 0 | 2 | 1 | 2 | 3 | 0 | 1 | 24 | 0 | 0 | 0 | 1 |
| | Rate | 0 | 0.29 | 0 | 0 | 0.28 | 0.13 | 0.26 | 0.38 | 0 | 0.12 | 2.64 | 0.00 | 0.00 | 0.00 | 0.10 |
| Anophthalmia/microphthalmia | Cases | 34 | 24 | 16 | 18 | 25 | 20 | 19 | 13 | 14 | 22 | 24 | 14 | 10 | 7 | 5 |
| | Rate | 5 | 3.5 | 2.32 | 2.54 | 3.45 | 2.66 | 2.51 | 1.67 | 1.73 | 2.59 | 2.64 | 1.50 | 1.04 | 0.69 | 0.48 |
| Anotia/microtia | Cases | 31 | 20 | 13 | 11 | 25 | 21 | 31 | 22 | 28 | 18 | 16 | 23 | 16 | 13 | 9 |
| | Rate | 4.56 | 2.91 | 1.88 | 1.55 | 3.45 | 2.8 | 4.1 | 2.82 | 3.46 | 2.12 | 1.76 | 2.46 | 1.67 | 1.27 | 0.88 |
| Aortic valve stenosis | Cases | 17 | 22 | 15 | 21 | 30 | 19 | 27 | 26 | 42 | 33 | 33 | 29 | 17 | 17 | 24 |
| | Rate | 2.5 | 3.21 | 2.17 | 2.96 | 4.14 | 2.53 | 3.57 | 3.34 | 5.19 | 3.89 | 3.64 | 3.11 | 1.77 | 1.67 | 2.33 |
| Biliary atresia | Cases | 6 | 4 | 8 | 6 | 3 | 7 | 2 | 5 | 4 | 6 | 1 | 4 | 1 | 3 | 3 |
| | Rate | 0.88 | 0.58 | 1.16 | 0.85 | 0.41 | 0.93 | 0.26 | 0.64 | 0.49 | 0.71 | 0.11 | 0.43 | 0.10 | 0.29 | 0.29 |
| Bladder exstrophy | Cases | 2 | 4 | 1 | 1 | 3 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 1 |
| | Rate | 0.29 | 0.58 | 0.14 | 0.14 | 0.41 | 0.13 | 0.13 | 0.26 | 0.25 | 0.24 | 0.33 | 0.21 | 0.21 | 0.10 | 0.10 |
| Choanal atresia | Cases | 5 | 6 | 7 | 10 | 14 | 18 | 11 | 12 | 14 | 20 | 13 | 12 | 7 | 8 | 6 |
| | Rate | 0.74 | 0.87 | 1.01 | 1.41 | 1.93 | 2.4 | 1.46 | 1.54 | 1.73 | 2.36 | 1.43 | 1.28 | 0.73 | 0.78 | 0.58 |
| Cleft lip with or without cleft palate | Cases | 80 | 74 | 92 | 83 | 93 | 87 | 103 | 95 | 90 | 96 | 106 | 113 | 124 | 106 | 95 |
| | Rate | 11.77 | 10.78 | 13.33 | 11.71 | 12.84 | 11.59 | 13.62 | 12.19 | 11.12 | 11.31 | 11.68 | 12.10 | 12.94 | 10.39 | 9.25 |
| Cleft palate without cleft lip | Cases | 37 | 31 | 53 | 52 | 49 | 47 | 44 | 53 | 58 | 53 | 59 | 67 | 65 | 71 | 56 |
| | Rate | 5.44 | 4.52 | 7.68 | 7.34 | 6.77 | 6.26 | 5.82 | 6.8 | 7.17 | 6.25 | 6.50 | 7.17 | 6.79 | 6.96 | 5.45 |
| Coarctation of aorta | Cases ^b | 25 | 30 | 24 | 18 | 40 | 39 | 38 | 37 | 41 | 37 | 40 | 59 | 47 | 31 | 44 |
| | Rate | 1.62 | 1.89 | 2.03 | 1.27 | 1.38 | 2 | 1.59 | 1.03 | 1.61 | 1.77 | 4.41 | 6.32 | 4.91 | 3.04 | 4.28 |
| Common truncus | Cases | 6 | 3 | 4 | 6 | 3 | 7 | 11 | 11 | 1 | 6 | 11 | 8 | 6 | 4 | 8 |
| | Rate | 0.88 | 0.44 | 0.58 | 0.85 | 0.41 | 0.93 | 1.46 | 1.41 | 0.12 | 0.71 | 1.21 | 0.86 | 0.63 | 0.39 | 0.77 |
| Congenital cataract | Cases | 10 | 12 | 8 | 14 | 14 | 9 | 13 | 11 | 14 | 13 | 10 | 17 | 10 | 9 | 2 |
| | Rate | 1.47 | 1.75 | 1.16 | 1.97 | 1.93 | 1.2 | 1.72 | 1.41 | 1.73 | 1.53 | 1.10 | 1.82 | 1.04 | 0.88 | 0.19 |

^a See Appendix A and Appendix B for definitions of the conditions. ^b"Cases" is the number of live born and stillborn infants ≥ 20 weeks gestation.

* For the years 2001 – 2002 ABDMP has incomplete data and are therefore not included in this table

Table 3 (continued)

Congenital Anomalies^a by Year, Live Borns and Stillborns, 1991 – 2007*
Incidence Rates Per 10,000 Live Births, Arizona

| CONDITION | | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Diaphragmatic hernia | Cases ^b | 23 | 13 | 18 | 21 | 20 | 15 | 15 | 30 | 19 | 29 | 22 | 19 | 23 | 17 | 22 |
| | Rate | 3.38 | 1.89 | 2.61 | 2.96 | 2.76 | 2 | 1.98 | 3.85 | 2.35 | 3.42 | 2.42 | 2.03 | 2.40 | 1.67 | 2.14 |
| Down syndrome (Trisomy 21) | Cases | 83 | 88 | 81 | 100 | 90 | 96 | 101 | 125 | 115 | 110 | 116 | 120 | 131 | 102 | 101 |
| | Rate | 12.21 | 12.82 | 11.74 | 14.11 | 12.43 | 12.79 | 13.36 | 16.04 | 14.21 | 12.96 | 12.78 | 12.85 | 13.67 | 10.00 | 9.84 |
| Ebstein's anomaly | Cases | 10 | 7 | 8 | 7 | 6 | 11 | 9 | 5 | 8 | 9 | 4 | 10 | 10 | 4 | 8 |
| | Rate | 1.47 | 1.02 | 1.16 | 0.99 | 0.83 | 1.46 | 1.19 | 0.64 | 0.99 | 1.06 | 0.44 | 1.07 | 1.04 | 0.39 | 0.78 |
| Edwards syndrome (Trisomy 18) | Cases | 13 | 12 | 14 | 14 | 18 | 16 | 15 | 12 | 18 | 25 | 24 | 25 | 20 | 17 | 23 |
| | Rate | 1.91 | 1.75 | 2.03 | 1.97 | 2.49 | 2.13 | 1.98 | 1.54 | 2.22 | 2.95 | 2.64 | 2.68 | 2.09 | 1.67 | 2.24 |
| Encephalocele | Cases | 14 | 2 | 6 | 11 | 6 | 15 | 9 | 8 | 11 | 11 | 13 | 9 | 7 | 4 | 7 |
| | Rate | 2.06 | 0.29 | 0.87 | 1.55 | 0.83 | 2 | 1.19 | 1.03 | 1.36 | 1.3 | 1.43 | 0.96 | 0.73 | 0.39 | 0.68 |
| Esophageal atresia/tracheoesophageal fistula | Cases | 16 | 14 | 13 | 14 | 18 | 16 | 22 | 19 | 14 | 18 | 26 | 21 | 13 | 16 | 15 |
| | Rate | 2.35 | 2.04 | 1.88 | 1.97 | 2.49 | 2.13 | 2.91 | 2.44 | 1.73 | 2.12 | 2.86 | 2.25 | 1.36 | 1.57 | 1.46 |
| Fetus or newborn affected by maternal alcohol use | Cases | 27 | 33 | 26 | 14 | 27 | 10 | 9 | 6 | 12 | 3 | 7 | 4 | 2 | 2 | 0 |
| | Rate | 3.97 | 4.81 | 3.77 | 1.97 | 3.73 | 1.33 | 1.19 | 0.77 | 1.48 | 0.35 | 0.77 | 0.43 | 0.21 | 0.20 | 0.00 |
| Gastroschisis | Cases | 36 | 27 | 15 | 27 | 27 | 42 | 36 | 39 | 28 | 46 | 39 | 57 | 47 | 53 | 47 |
| | Rate | 5.3 | 3.93 | 2.17 | 3.81 | 3.73 | 5.59 | 4.76 | 5 | 3.46 | 5.42 | 4.30 | 6.10 | 4.91 | 5.19 | 4.58 |
| Hirschsprung disease | Cases | 13 | 7 | 8 | 10 | 16 | 10 | 8 | 8 | 13 | 12 | 13 | 12 | 17 | 5 | 14 |
| | Rate | 1.91 | 1.02 | 1.16 | 1.41 | 2.21 | 1.33 | 1.06 | 1.03 | 1.61 | 1.41 | 1.43 | 1.28 | 1.77 | 0.49 | 1.36 |
| Hypoplastic left heart syndrome | Cases | 11 | 13 | 14 | 9 | 10 | 15 | 12 | 8 | 13 | 15 | 20 | 15 | 29 | 20 | 30 |
| | Rate | 1.62 | 1.89 | 2.03 | 1.27 | 1.38 | 2 | 1.59 | 1.03 | 1.61 | 1.77 | 2.20 | 1.61 | 3.03 | 1.96 | 2.92 |
| Omphalocele | Cases | 21 | 10 | 17 | 11 | 14 | 21 | 10 | 14 | 14 | 19 | 59 | 13 | 5 | 15 | 23 |
| | Rate | 3.09 | 1.46 | 2.46 | 1.55 | 1.93 | 2.8 | 1.32 | 1.8 | 1.73 | 2.24 | 6.50 | 1.39 | 0.52 | 1.47 | 2.23 |

^a See Appendix A and Appendix B for definitions of the conditions. ^b"Cases" is the number of live born and stillborn infants ≥ 20 weeks gestation.

* For the years 2001 – 2002 ABDMP has incomplete data and are therefore not included in this table

Table 3 (continued)

Congenital Anomalies^a by Year, Live Borns and Stillborns, 1991- 2007*
Incidence Rates Per 10,000 Live Births, Arizona

| CONDITION | | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2003 | 2004 | 2005 | 2006 | 2007 |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|
| Patau Syndrome (Trisomy 13) | Cases | 6 | 15 | 9 | 3 | 8 | 12 | 5 | 10 | 8 | 16 | 17 | 13 | 7 | 8 | 11 |
| | Rate | 0.88 | 2.19 | 1.3 | 0.42 | 1.1 | 1.6 | 0.66 | 1.28 | 0.99 | 1.89 | 1.87 | 1.39 | 0.73 | 0.78 | 1.07 |
| Pulmonary valve atresia and stenosis | Cases | 55 | 56 | 50 | 60 | 69 | 63 | 67 | 56 | 69 | 78 | 77 | 94 | 56 | 66 | 30 |
| | Rate | 8.09 | 8.16 | 7.25 | 8.46 | 9.53 | 8.39 | 8.86 | 7.18 | 8.53 | 9.19 | 8.48 | 10.06 | 5.85 | 6.47 | 2.92 |
| Pyloric stenosis | Cases | 148 | 137 | 127 | 159 | 148 | 140 | 152 | 135 | 145 | 159 | 177 | 162 | 1 | 1 | 0 |
| | Rate | 21.77 | 19.96 | 18.41 | 22.43 | 20.44 | 18.65 | 20.11 | 17.32 | 17.92 | 18.74 | 19.50 | 17.35 | 0.10 | 0.10 | 0.00 |
| Rectal and large intestinal atresia/stenosis | Cases | 39 | 33 | 30 | 28 | 42 | 30 | 20 | 43 | 28 | 33 | 36 | 31 | 9 | 1 | 1 |
| | Rate | 5.74 | 4.81 | 4.35 | 3.95 | 5.8 | 4 | 2.65 | 5.52 | 3.46 | 3.89 | 3.97 | 3.32 | 0.94 | 0.10 | 0.10 |
| Reduction deformity, lower limbs | Cases | 15 | 12 | 17 | 13 | 14 | 14 | 20 | 20 | 17 | 22 | 15 | 6 | 10 | 6 | 5 |
| | Rate | 2.21 | 1.75 | 2.46 | 1.83 | 1.93 | 1.86 | 2.65 | 2.57 | 2.1 | 2.59 | 1.65 | 0.64 | 1.04 | 0.59 | 0.49 |
| Reduction deformity, upper limbs | Cases | 41 | 25 | 25 | 30 | 32 | 23 | 28 | 23 | 29 | 37 | 31 | 23 | 29 | 23 | 15 |
| | Rate | 6.03 | 3.64 | 3.62 | 4.23 | 4.42 | 3.06 | 3.7 | 2.95 | 3.58 | 4.36 | 3.41 | 2.46 | 3.03 | 2.25 | 1.46 |
| Renal agenesis/hypoplasia | Cases | 37 | 33 | 30 | 25 | 39 | 39 | 34 | 36 | 30 | 36 | 36 | 41 | 6 | 1 | 1 |
| | Rate | 5.44 | 4.81 | 4.35 | 3.53 | 5.39 | 5.19 | 4.5 | 4.62 | 3.71 | 4.24 | 3.97 | 4.39 | 0.63 | 0.10 | 0.10 |
| Spina bifida without anencephalus | Cases | 31 | 36 | 35 | 32 | 33 | 32 | 37 | 33 | 40 | 29 | 40 | 31 | 33 | 26 | 37 |
| | Rate | 4.56 | 5.25 | 5.07 | 4.51 | 4.56 | 4.26 | 4.89 | 4.23 | 4.94 | 3.42 | 4.41 | 3.32 | 3.44 | 2.55 | 3.60 |
| Tetralogy of Fallot | Cases | 22 | 32 | 30 | 30 | 29 | 34 | 33 | 33 | 25 | 32 | 39 | 41 | 41 | 37 | 36 |
| | Rate | 3.24 | 4.66 | 4.35 | 4.23 | 4.01 | 4.53 | 4.37 | 4.23 | 3.09 | 3.77 | 4.30 | 4.39 | 4.28 | 3.63 | 3.51 |
| Transposition of great arteries | Cases | 26 | 25 | 28 | 30 | 33 | 34 | 40 | 36 | 39 | 42 | 38 | 46 | 36 | 35 | 38 |
| | Rate | 3.82 | 3.64 | 4.06 | 4.23 | 4.56 | 4.53 | 5.29 | 4.62 | 4.82 | 4.95 | 4.19 | 4.93 | 3.76 | 3.43 | 3.70 |

^a See Appendix A and Appendix B for definitions of the conditions. ^b"Cases" is the number of live born and stillborn infants \geq 20 weeks gestation.

* For the years 2001 – 2002 ABDMP has incomplete data and are therefore not included in this table

The rates are calculated as the number of live born and stillborn cases of each defect in each year divided by the total number of live births in each year.

Live births for each year are as follows:

| Year | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2003 | 2004 | 2005 | 2006 | 2007 |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|
| # of live births in Arizona to Arizona residents | 67,981 | 68,635 | 68,993 | 70,892 | 72,404 | 75,087 | 75,601 | 77,945 | 80,908 | 84,867 | 90,783 | 93,396 | 95,798 | 102,042 | 102,687 |

Figure 1:

Trends of Selected Congenital Anomalies, Incidence Rates, 1991-2007

(Live Born and Stillborn Cases per 10,000 Live Births)

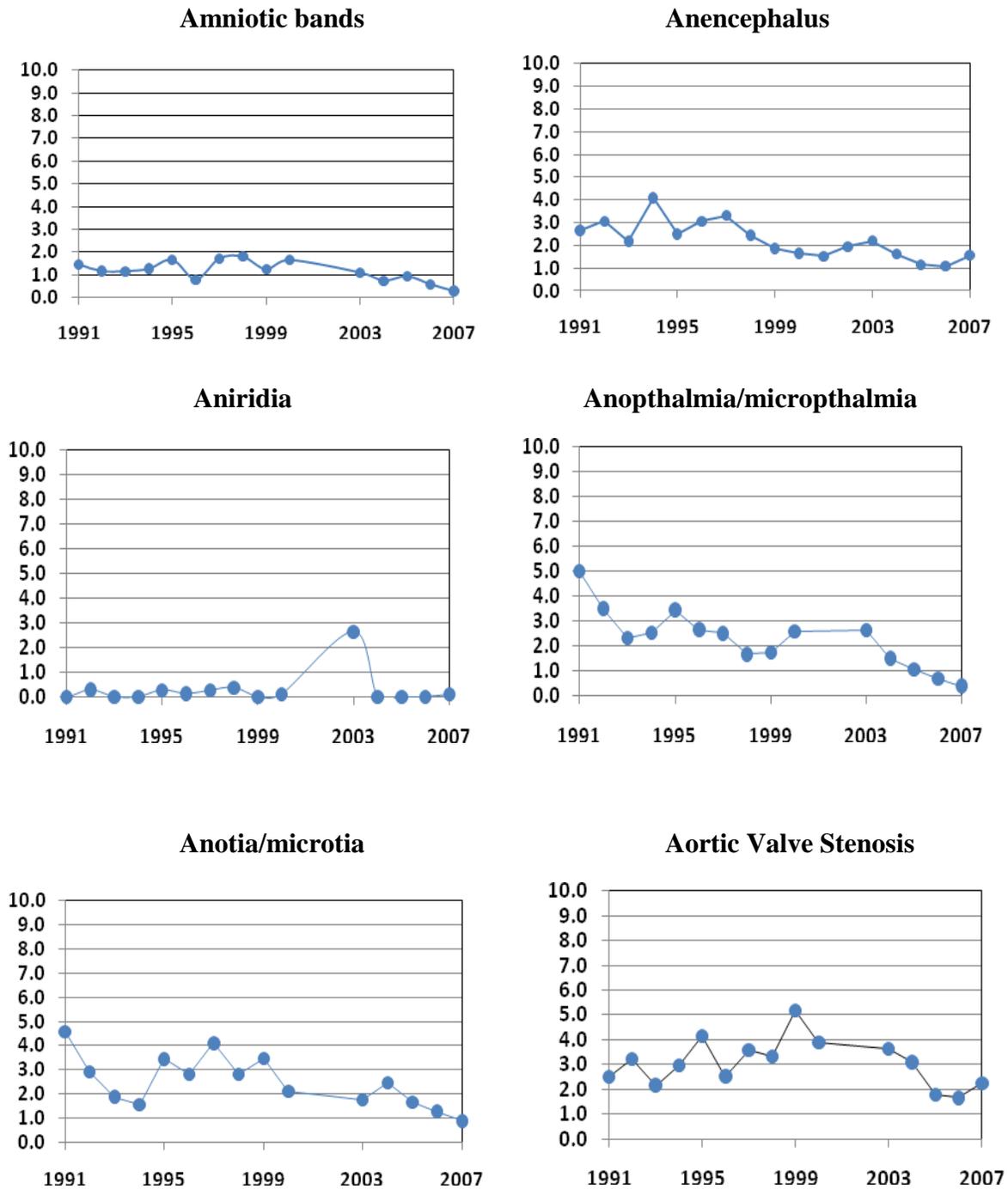


Figure 1:

Trends of Selected Congenital Anomalies, Incidence Rates, 1991-2007

(Live Born and Stillborn Cases per 10,000 Live Births)

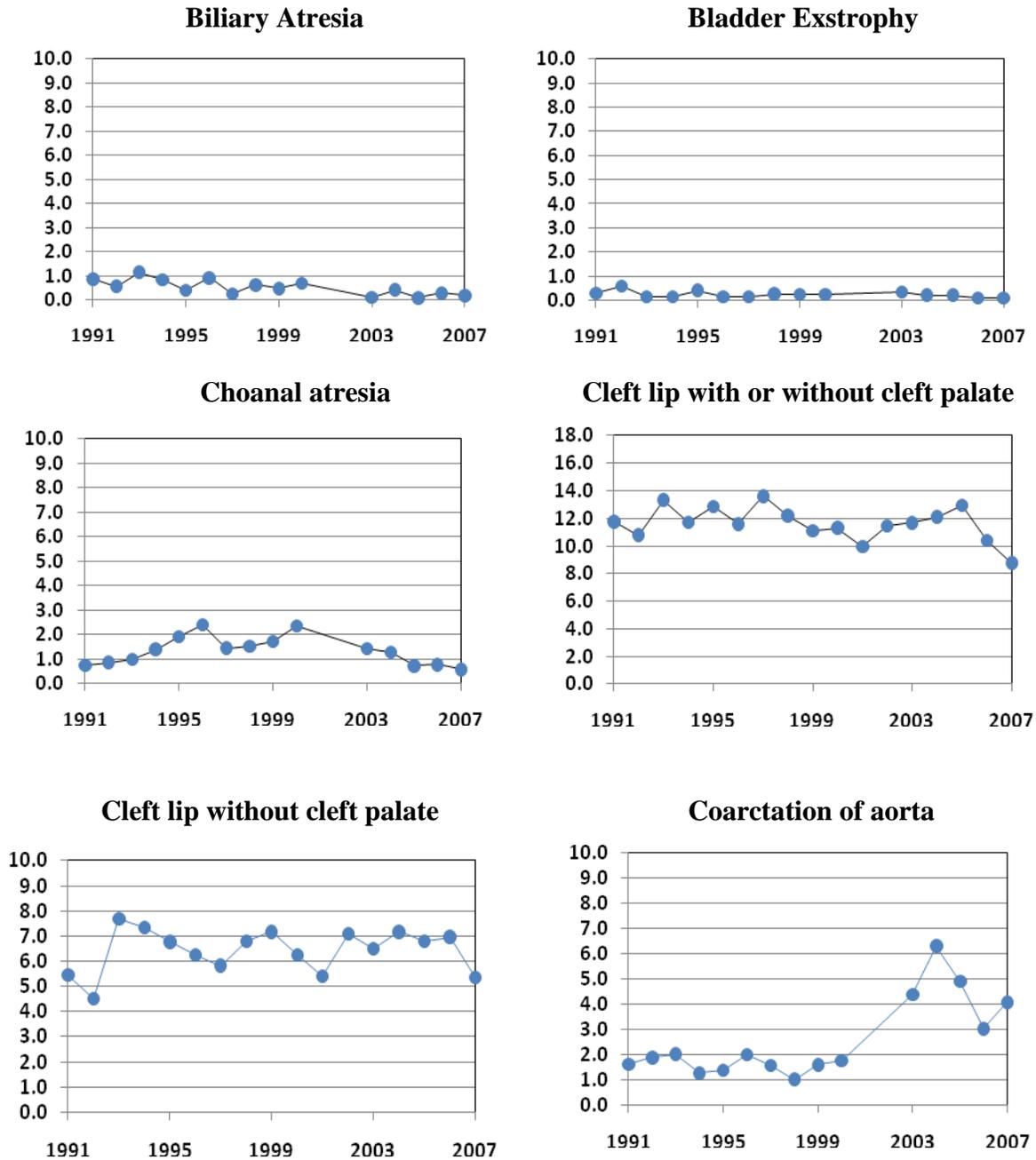


Figure 1:

Trends of Selected Congenital Anomalies, Incidence Rates, 1991-2007

(Live Born and Stillborn Cases per 10,000 Live Births)

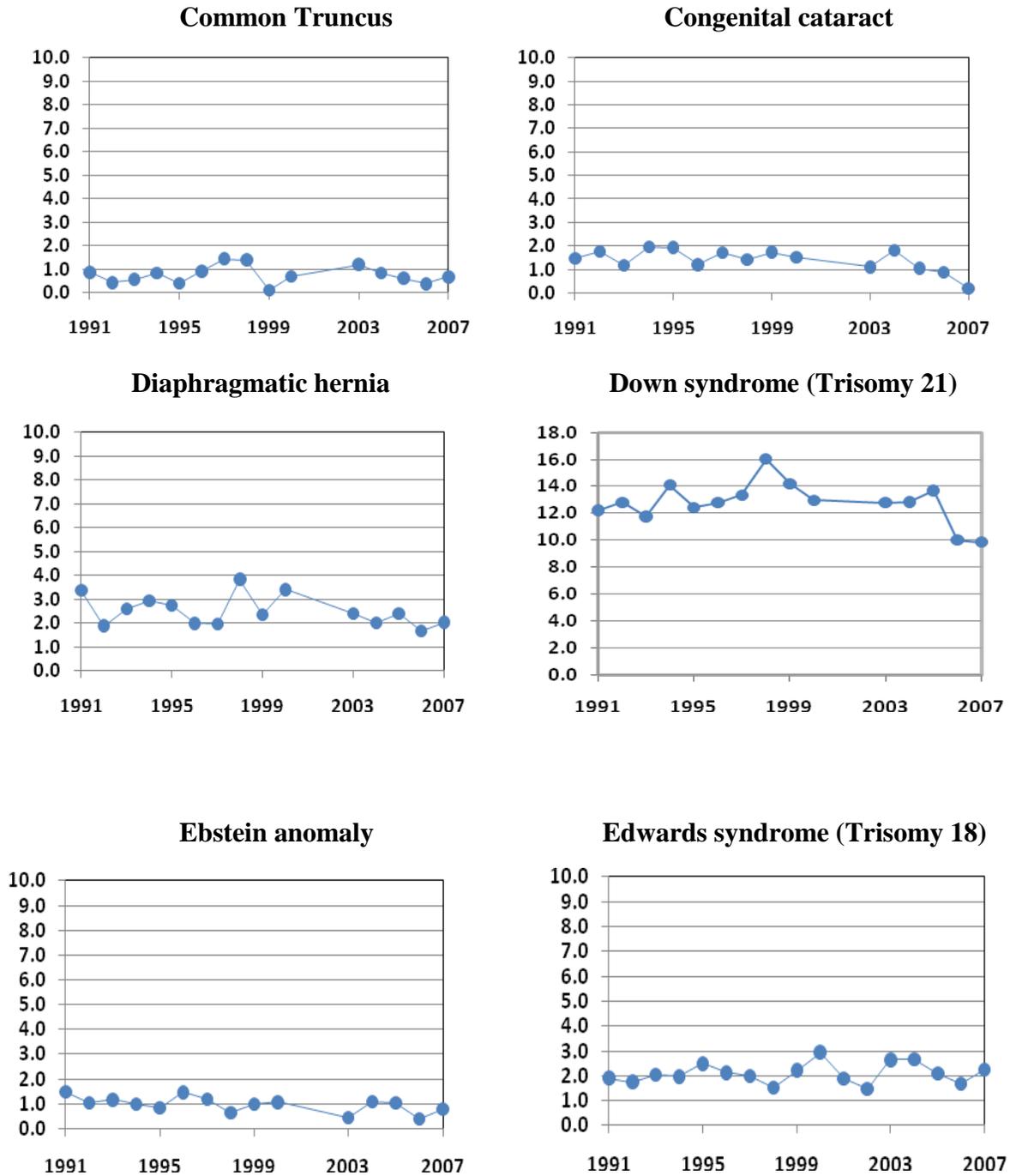


Figure 1:

Trends of Selected Congenital Anomalies, Incidence Rates, 1991-2007

(Live Born and Stillborn Cases per 10,000 Live Births)

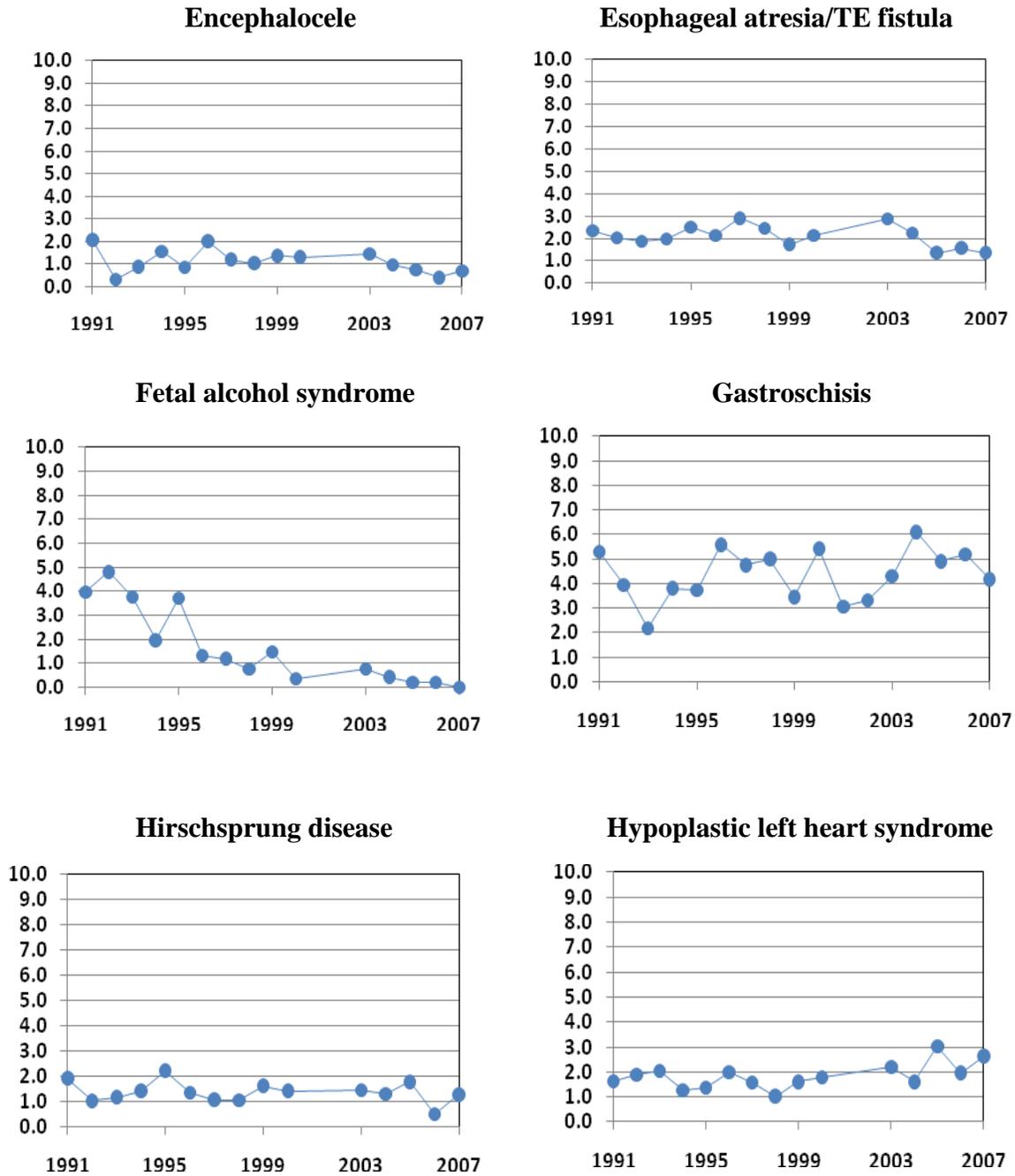


Figure 1:

Trends of Selected Congenital Anomalies, Incidence Rates, 1991-2007

(Live Born and Stillborn Cases per 10,000 Live Births)

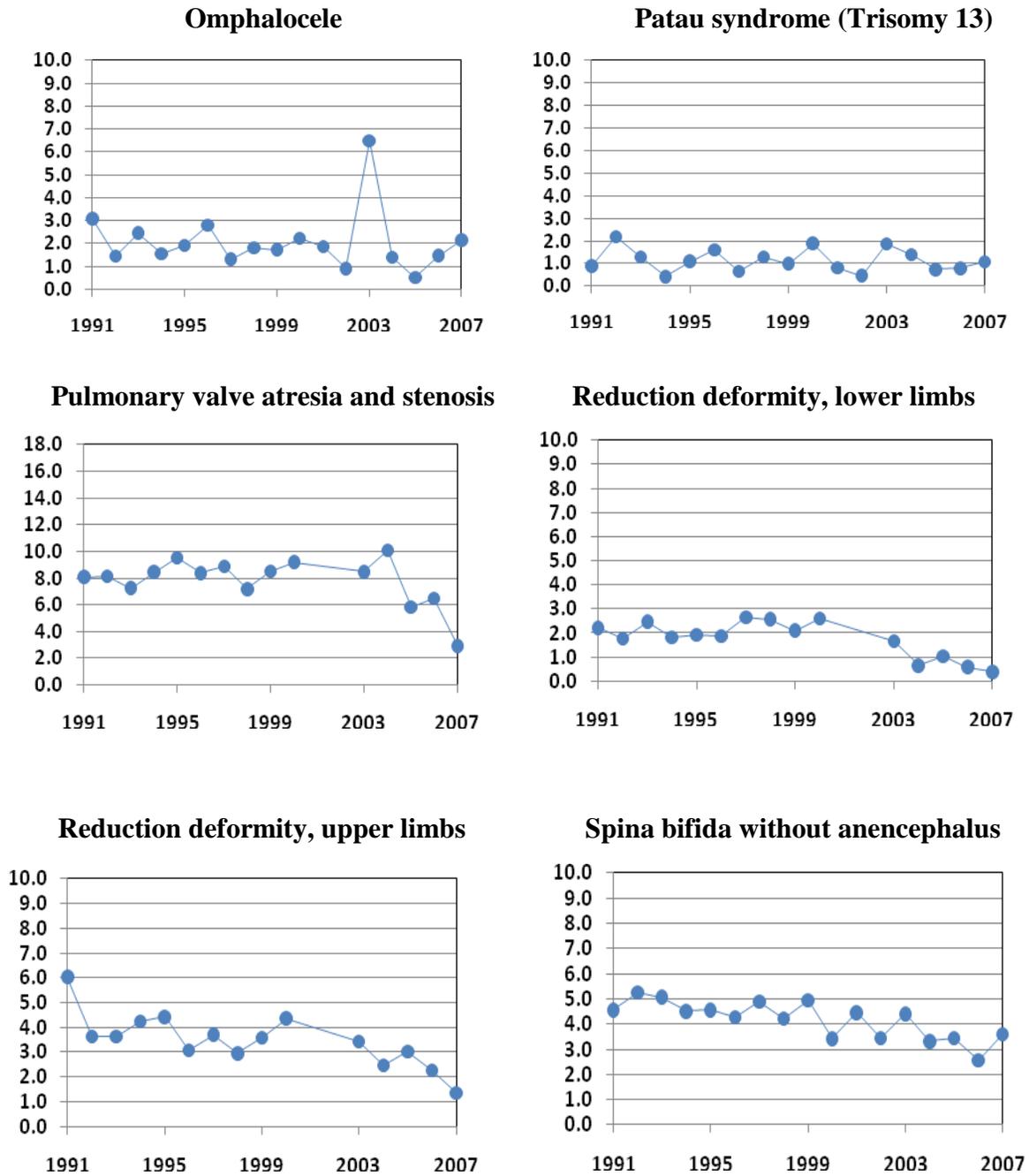
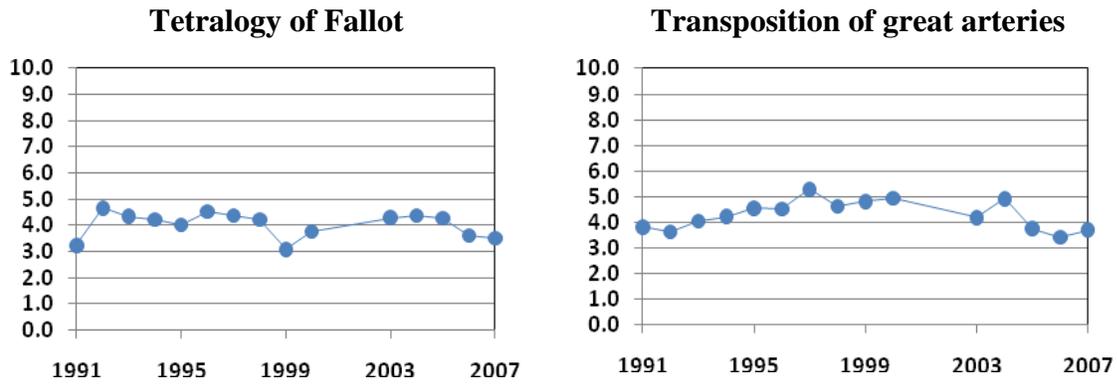


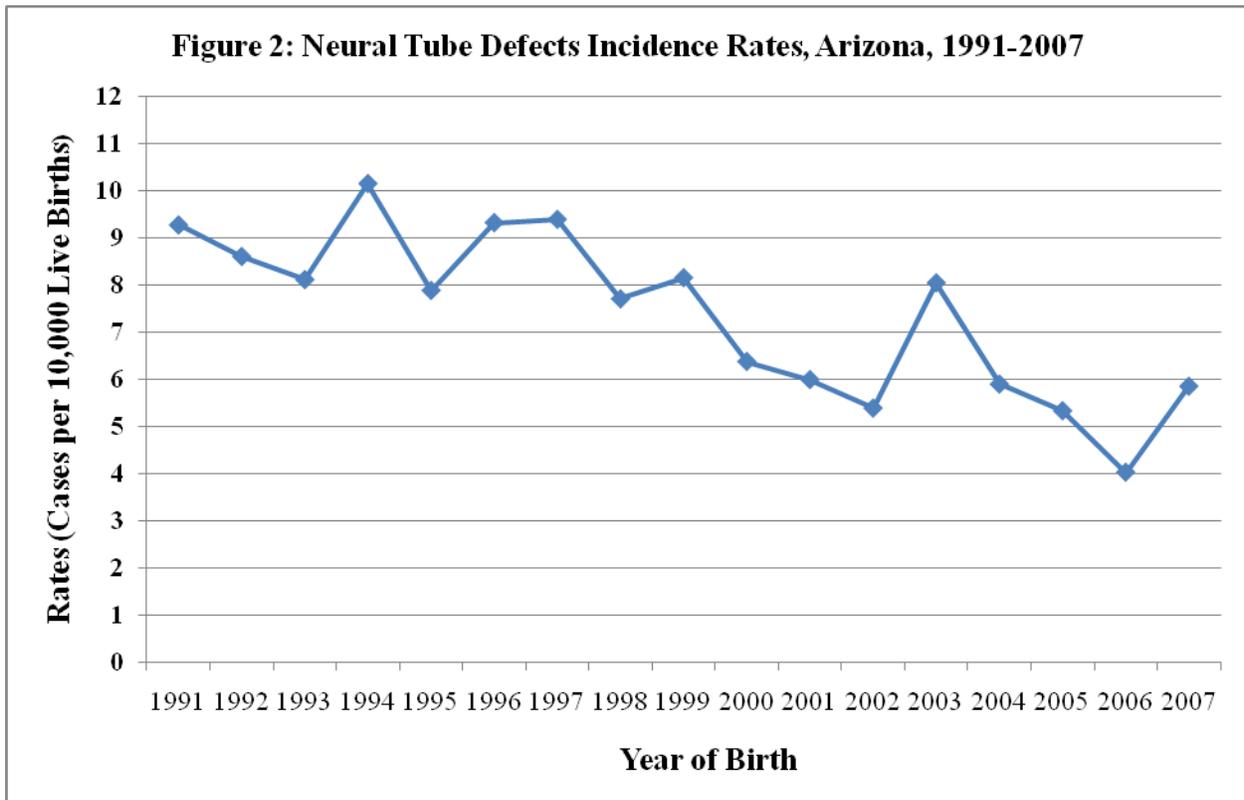
Figure 1:

Trends of Selected Congenital Anomalies, Incidence Rates, 1991-2007

(Live Born and Stillborn Cases per 10,000 Live Births)



NEURAL TUBE DEFECTS



Neural tube defects (NTDs) result from the failure of the neural tube to close properly in fetal development, occurring at approximately four weeks gestation. The three major NTDs are anencephaly, encephalocele, and spina bifida. Anencephaly is an absence of part or all of the brain. Encephalocele is the herniation of brain tissue through a gap in the skull. Spina bifida is a defective closure of the bones of the spine, through which the spinal cord and meninges may or may not protrude. Research indicates that maternal obesity, socioeconomic status and neighborhood social conditions, prior spontaneous and elective terminations, and short periods of time between pregnancies are associated with an increased risk for an NTD-affected pregnancy.^{29,30,31} However, compelling data from randomized clinical trials shows that daily intake of 400 mcg of folic acid starting before conception and continuing through the first trimester can reduce the risk of an NTD-affected pregnancy by at least 50 percent.^{32,33}

Because of the overwhelming evidence that folic acid helps to prevent these birth defects, the Food and Drug Administration mandated fortification of cereal grain products with 140 mcg/100 g starting in January of 1998.³⁴ Since then, there has been a 26% decrease in NTD-affected pregnancies in the United States.³⁵ The pre-fortification NTD rate in Arizona (1995 and 1996 data combined) was 8.61 cases per 10,000 live births. The post-fortification NTD rate in Arizona (2003-2007 data combined) was 5.78 cases per 10,000 live births. This shows a 33% decline in NTD rates in Arizona post-fortification.

RACE/ETHNICITY

All race and ethnic groups experience birth defects, but the frequency and types of these defects vary by race and ethnicity.^{36,37} The race and ethnicity information collected in the Arizona birth and fetal death certificates allow for the analysis of birth defects by race and ethnicity. See Appendix E for an explanation of how race/ethnicity is determined for each case.

Figure 3 displays the rates of spina bifida without anencephalus by race and ethnicity for births for 2003 to 2007, combined. (See Tables 1-A, 1-B, 1-C, 1-D and 1-E for data). The overall rate of spina bifida without anencephaly for Black was higher than it was for Native Americans while the rate for Whites and Hispanics were comparable. Arizona data in 2003-2007 also shows that the rate of spina bifida without anencephaly was higher in Hispanics than it was in Whites.

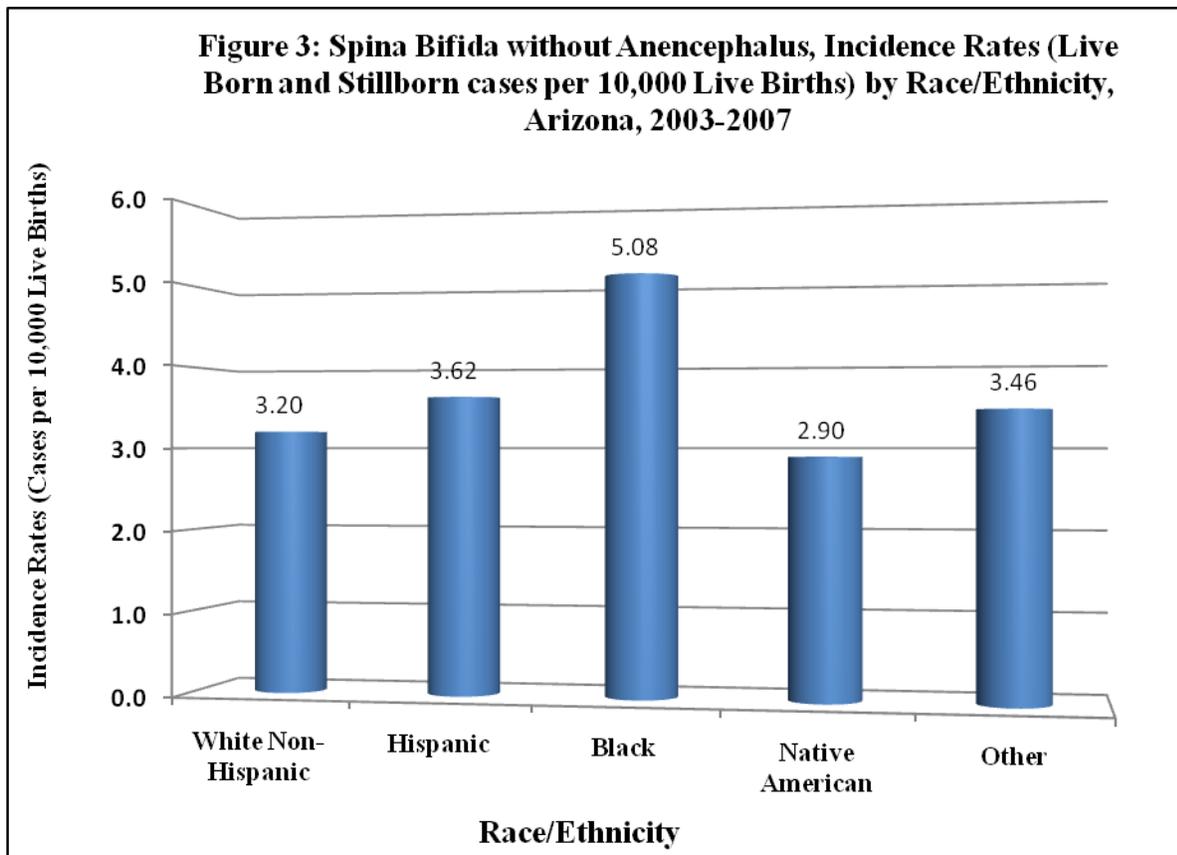
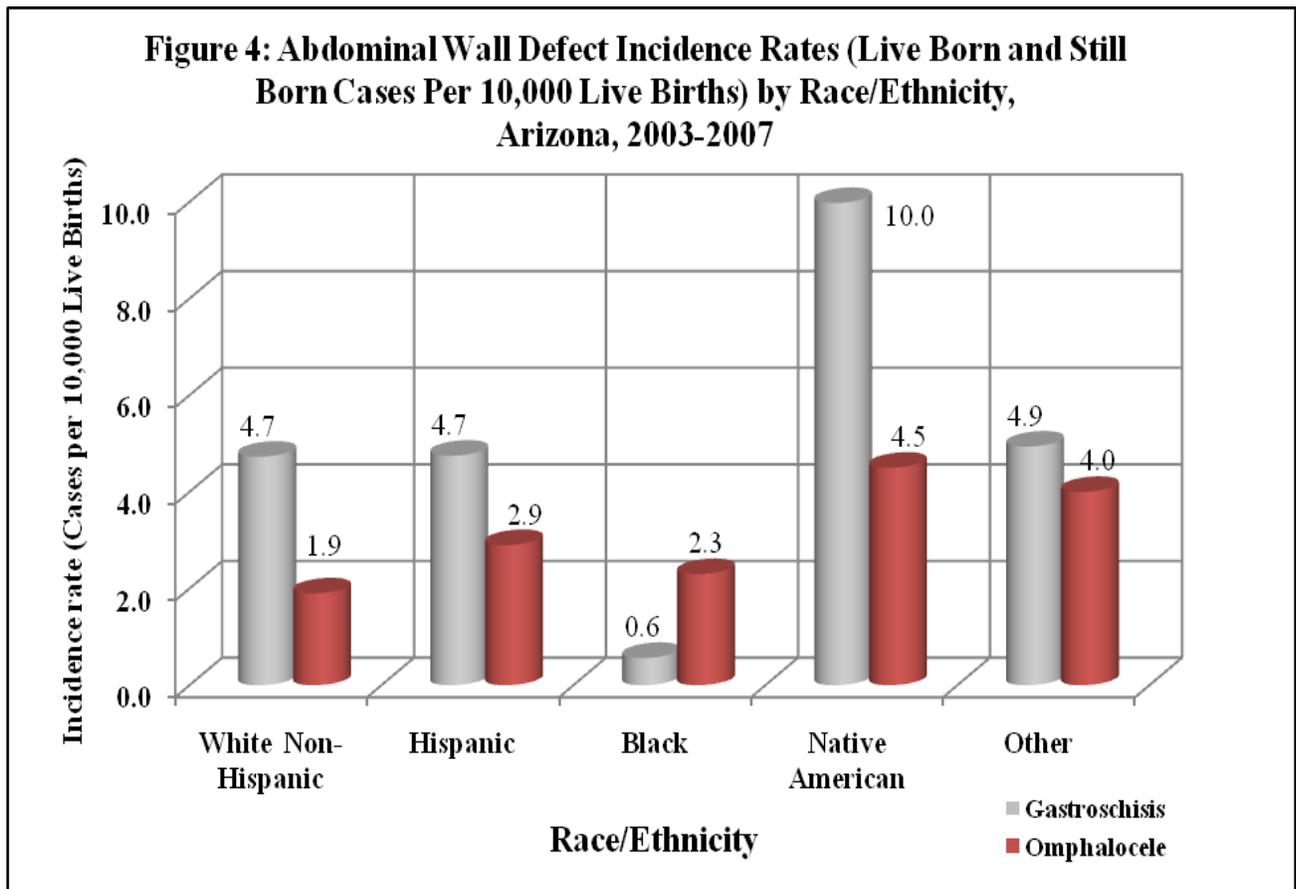
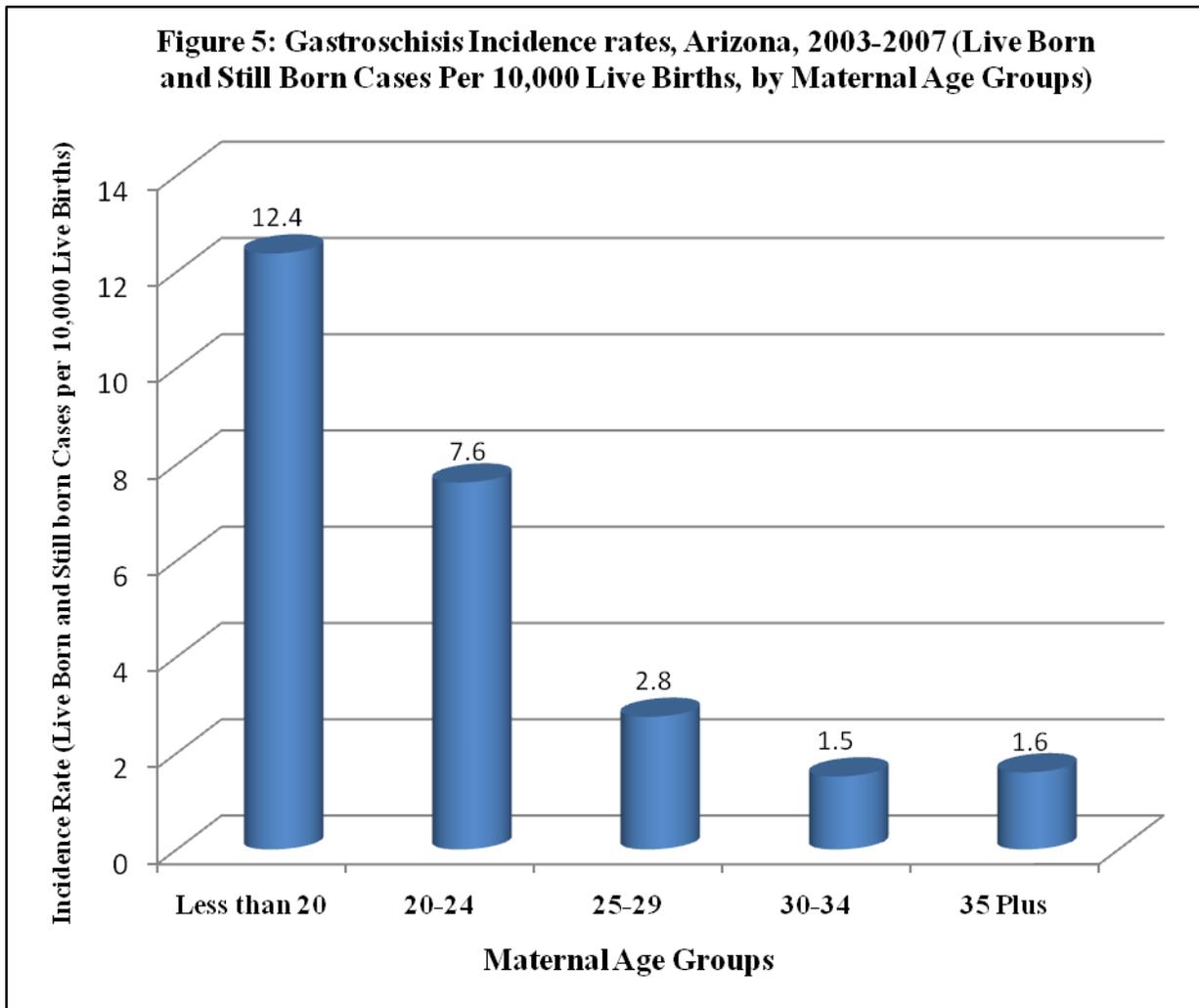


Figure 4 shows the rates of gastroschisis and omphalocele for 2003 to 2007. The rate of gastroschisis among Native Americans was significantly higher than the rates for Whites and Hispanics (10 for Native American v. 4.7 for Whites and Hispanics per 10,000 live births). In contrast, the rate of omphalocele in Whites was significantly lower than the rates for Native Americans and Hispanics (1.9 for Whites v. 4.5 for Native Americans and 2.9 for Hispanics per 10,000 live and still births).



MATERNAL AGE

Maternal age was divided into five age groups: less than 20 years of age, 20 to 24 years of age, 25 to 29 years of age, 30 to 34 years of age, and 35 years of age and older. Figure 5 demonstrates that gastroschisis incidence rates for 2003-2007 decreased with increasing maternal age. The rates of gastroschisis for the less than 20 years of age and the 20 to 24 years of age maternal age groups were statistically higher than the state rate for gastroschisis. It has been reported in the literature that teen mothers are six times more likely than women 25 years of age or older to have a child with gastroschisis.³⁸ In Arizona from 2003-2007, teen mothers were 2.1 times more likely than a women 25 years or older to have a child with gastroschisis.



COUNTY PATTERNS FOR SENTINEL DEFECTS

Tables 4-7 look at the number of cases and incidence rates statewide and by county for 2003-2007 data combined for the following sentinel defects: neural tube defects, gastroschisis, omphalocele, and heart defects. These defects were chosen because of their significant public health impact.

Neural Tube Defects (Table 4)

The neural tube defect rate for the state was 5.40 per 10,000 live births. The Gila County rate of 11.46 cases per 10,000 births is statistically significantly elevated. This presents an opportunity to promote the prenatal intake of folic acid as a preventative measure among women of childbearing age.

Gastroschisis and Omphalocele (Table 5 and Table 6)

Abdominal wall defects include omphalocele and gastroschisis (Table 5 and Table 6). Young maternal age has been shown to be a high risk factor for gastroschisis.³⁷ Other risk factors for gastroschisis are maternal use of cocaine, aspirin, or amphetamines; exposure to solvents; and maternal dietary inadequacy.^{39,40} Table 5 presents the gastroschisis incidence rate for the state at 3.89 per 10,000 live births. Santa Cruz County had the lowest incidence rate, at 2.12, followed by Pinal County, with the rate of 2.47 per 10,000 live births. Table 6 presents the omphalocele incidence rate for the state at 1.32 per 10,000 live births. Yuma County had the lowest incidence rate, at 0.56 per 10,000 live births. Cochise, Coconino, Gila, Navajo and Pinal counties had higher incidence rates of omphalocele than that of the state although not statistically significant.

Heart Defects (Table 7)

The heart defects included in Table 7 include transposition of the great arteries, tetralogy of Fallot, pulmonary valve atresia and stenosis, Ebstein's anomaly, aortic valve stenosis, hypoplastic left heart, and coarctation of aorta. The heart defect rate for Gila County was significantly higher than the state rate (36.83 vs. 24.19 per 10,000 live births). Coconino County had the second highest heart defect rate at 31.47, followed by Yavapai County at 29.11 per 10,000 live births. On the other hand, Santa Cruz, Yuma and La Paz's prevalence were significantly lower than the state rate at 19.07, 18.43 and 19.49 per 10,000 live births.

Table 4

Neural Tube Defects* - Incidence Rates by County, Arizona, 1991-2007
(Live Born Cases Per 10,000 Live Births)

| County | Cases (1991-2007) | Rate | 95% Confidence Interval |
|---------------|------------------------------|-------------|------------------------------------|
| Arizona | 793 | 5.40 | 5.03-5.78 |
| Apache | 8 | 3.29 | 1.01-5.57 |
| Cochise | 12 | 3.94 | 1.71-6.17 |
| Coconino | 16 | 4.71 | 2.40-7.01 |
| Gila | 14 | 11.46 | 5.46-17.46 |
| Graham | 10 | 11.99 | 4.56-19.42 |
| Greenlee | 0 | 0.00 | 0.00-0.00 |
| La Paz | 0 | 0.00 | 0.00-0.00 |
| Maricopa | 514 | 5.57 | 5.09-6.06 |
| Mohave | 18 | 5.26 | 2.83-7.70 |
| Navajo | 26 | 8.00 | 4.93-11.08 |
| Pima | 107 | 4.91 | 3.98-5.85 |
| Pinal | 20 | 4.12 | 2.31-5.92 |
| Santa cruz | 7 | 4.94 | 1.28-8.61 |
| Yavapai | 11 | 3.72 | 1.52-5.92 |
| Yuma | 30 | 5.58 | 3.59-7.58 |

*Neural tube defects include anencephaly, encephalocele, and spina bifida (see Appendices A and B for definitions).

Table 5
 Gastroschisis* - Incidence Rates by County, Arizona, 1991-2007
 (Live Born Cases Per 10,000 Live Births)

| County | Cases (1991-2007) | Rate | 95% Confidence Interval |
|---------------|------------------------------|-------------|------------------------------------|
| Arizona | 571 | 3.89 | 3.55-4.18 |
| Apache | 8 | 3.29 | 1.01-5.57 |
| Cochise | 8 | 2.62 | 0.81-4.44 |
| Coconino | 22 | 6.47 | 3.77-9.17 |
| Gila | 8 | 6.55 | 2.01-11.09 |
| Graham | 5 | 5.99 | 0.74-11.25 |
| Greenlee | 1 | 4.33 | -4.15-12.81 |
| La Paz | 0 | 0.00 | 0.00-0.00 |
| Maricopa | 336 | 3.64 | 3.23-4.01 |
| Mohave | 23 | 6.73 | 3.98-9.48 |
| Navajo | 11 | 3.39 | 1.39-5.39 |
| Pima | 95 | 4.32 | 3.44-5.19 |
| Pinal | 13 | 2.47 | 1.07-3.87 |
| Santa Cruz | 3 | 2.12 | -0.28-4.52 |
| Yavapai | 16 | 5.42 | 2.76-8.07 |
| Yuma | 22 | 4.09 | 2.38-5.81 |

*See Appendices A and B for a definition of gastroschisis and codes included in this diagnostic category.

Table 6
Omphalocele* - Incidence Rates by County, 1991-2007
 (Live Born Cases Per 10,000 Live Births)

| County | Cases (1991-2007) | Rate | 95% Confidence Interval |
|---------------|------------------------------|-------------|------------------------------------|
| Arizona | 194 | 1.32 | 1.13-1.50 |
| Apache | 2 | 0.82 | -0.32-1.96 |
| Cochise | 6 | 1.97 | 0.39-3.54 |
| Coconino | 8 | 2.35 | 0.72-3.98 |
| Gila | 4 | 3.27 | 0.07-6.48 |
| Graham | 0 | 0.00 | 0.00-0.00 |
| Greenlee | 0 | 0.00 | 0.00-0.00 |
| La Paz | 0 | 0.00 | 0.00-0.00 |
| Maricopa | 123 | 1.33 | 1.09-1.56 |
| Mohave | 3 | 0.88 | -0.12-1.87 |
| Navajo | 5 | 1.54 | 0.19-2.89 |
| Pima | 26 | 1.19 | 0.74-1.65 |
| Pinal | 9 | 1.85 | 0.64-3.06 |
| Santa Cruz | 2 | 1.41 | -0.55-3.37 |
| Yavapai | 3 | 1.02 | -0.13-2.16 |
| Yuma | 3 | 0.56 | -0.07-1.19 |

*See Appendices A and B for a definition of omphalocele and codes included in this diagnostic category.

Table 7
Heart Defects*- Incidence Rates by County, 1991-2007
(Live Born Cases Per 10,000 Live Births)

| County | Cases (1991-2007) | Rate | 95% Confidence Interval |
|---------------|------------------------------|-------------|------------------------------------|
| Arizona | 3551 | 24.19 | 23.4-24.99 |
| Apache | 53 | 21.81 | 15.94-27.68 |
| Cochise | 73 | 23.95 | 18.46-29.45 |
| Coconino | 107 | 31.47 | 25.5-37.43 |
| Gila | 45 | 36.83 | 26.07-47.59 |
| Graham | 23 | 27.57 | 16.3-38.84 |
| Greenlee | 5 | 21.64 | 2.67-40.6 |
| La Paz | 7 | 19.49 | 5.05-33.92 |
| Maricopa | 2315 | 25.11 | 24.08-26.13 |
| Mohave | 72 | 21.06 | 16.19-25.92 |
| Navajo | 78 | 24.01 | 18.69-29.34 |
| Pima | 440 | 20.21 | 18.32-22.1 |
| Pinal | 121 | 24.91 | 20.47-29.35 |
| Santa Cruz | 27 | 19.07 | 11.88-26.26 |
| Yavapai | 86 | 29.11 | 22.96-35.26 |
| Yuma | 99 | 18.43 | 14.8-22.06 |

*Heart defects include truncus arteriosus, transposition of the great arteries, tetralogy of Fallot, pulmonary valve atresia and stenosis, Ebstein's anomaly, aortic valve stenosis, hypoplastic left heart, and coarctation of aorta.

Appendix B lists codes defining each condition.

APPENDIX A
Definitions of Reported Birth Defects
(As defined in the National Birth Defects Prevention Network's
Guidelines for Conducting Birth Defect Surveillance, Appendix 3.2)

Amniotic Bands

Strands of tissue that float in the amniotic fluid as a consequence of tears or ruptures in the amniotic membrane which surrounds the fetus during development.

Anencephalus

Partial or complete absence of the brain and skull.

Aniridia

Hypoplasia of the iris of both eyes.

Anophthalmia/Microphthalmia

Anophthalmia – Total absence of eye tissue or apparent absence of the globe in an otherwise normal orbit.
Microphthalmia – Reduced volume of the eye. The corneal diameter is usually less than 10 millimeters, or the anteroposterior globe diameter is less than 20 millimeters.

Anotia/Microtia

Anotia – Total absence of the external ear and canal.

Microtia – Malformation or hypoplasia of the external ear (auricle, pinna).

Aortic Valve Stenosis

Obstruction or narrowing of the aortic valve, which may impair blood flow from the left ventricle to the aorta.

Biliary Atresia

Congenital absence of the lumen of the extrahepatic bile ducts.

Bladder Exstrophy

A defect in the lower abdominal wall and anterior wall of the bladder through which the lining of the bladder is exposed to the outside.

Choanal Atresia

Congenital obstruction of the opening of the nasal cavity into the nasopharynx on either side. This prevents communication of the nasal cavity with the pharynx.

Cleft Lip with and without Cleft Palate

A defect in the upper lip resulting from incomplete fusion of the parts of the lip.

Cleft Palate without Cleft Lip

An opening in the roof of the mouth resulting from incomplete fusion of the shelves of the palate. The opening may involve the hard palate only, the soft palate only, or both.

Coarctation of the Aorta

Narrowing of the descending aorta, which may obstruct blood flow from the heart to the rest of the body. The most common site of coarctation occurs distal to the origin of the left subclavian artery in the region of the ductus arteriosus.

Common Truncus (Truncus Arteriosus or TA)

Failure of separation of the aorta and the pulmonary artery, resulting in a single common arterial trunk carrying blood from the heart to both the body and lungs.

Congenital Cataract

An opacity of the lens of the eye that has its origin prenatally.

Diaphragmatic Hernia

Incomplete formation of the diaphragm through which a portion of the abdominal contents herniate into the thoracic cavity.

Down Syndrome (Trisomy 21)

The presence of three copies of all or a large part of chromosome 21.

Ebstein's Anomaly

Downward displacement of the tricuspid valve into the right ventricle. The tricuspid valve is usually hypoplastic and regurgitant.

Edwards Syndrome (Trisomy 18)

The presence of three copies of all or a large part of chromosome 18.

Encephalocele

Herniation of brain tissue and/or meninges through a defect in the skull. The hernia sac is usually covered by skin.

Esophageal Atresia/ Tracheoesophageal Fistula

Esophageal atresia – A condition in which the esophagus ends in a blind pouch and fails to connect with the stomach.

Tracheoesophageal fistula – An abnormal communication between the esophagus and the trachea. This is almost always associated with some form of esophageal atresia.

Fetus/Newborn Affected by Maternal Alcohol Use (Fetal Alcohol Syndrome/FAS)

A spectrum of abnormalities resulting from exposure to alcohol *in utero*. While the specific abnormalities vary among individuals, the hallmarks include growth deficiency, microcephaly, facial dysmorphisms, and neurodevelopmental abnormalities.

Gastroschisis

A congenital opening or fissure in the anterior abdominal wall lateral to the umbilicus through which the small intestine, part of the large intestine, and occasionally the liver and spleen, may herniate. The opening is separated from the umbilicus by a small bridge of skin, and the herniating organs are not covered by a protective membrane. Gastroschisis usually occurs on the right side of the umbilicus, although it may occur on the left.

Hirschsprung Disease (Congenital Megacolon)

Hirschsprung disease – Absence of the parasympathetic ganglion nerve cells (aganglionosis) of the wall of the colon or rectum, which may result in congenital megacolon.

Hypoplastic Left Heart Syndrome (HLHS)

A condition in which the structures on the left side of the heart and the aorta are extremely small. Classically, this condition includes hypoplasia of the left ventricle, atresia or severe hypoplasia of the mitral and aortic valves, and hypoplasia and coarctation of the aorta.

Omphalocele

A defect in the anterior abdominal wall in which the umbilical ring is widened, allowing herniation of abdominal organs, including the small intestine, part of the large intestine, and occasionally the liver and spleen, into the umbilical cord. The herniating organs are covered by a nearly transparent membranous sac.

Patau Syndrome (Trisomy 13)

The presence of three copies of all or a large part of chromosome 13.

Pulmonary Valve Atresia and Stenosis

Pulmonary valve atresia – Lack of patency, or failure of formation altogether, of the pulmonary valve, resulting in obstruction of blood flow from the right ventricle to the pulmonary artery.

Pulmonary valve stenosis – Obstruction or narrowing of the pulmonary valve, which may impair blood flow from the right ventricle to the pulmonary artery.

Reduction Deformity, Lower Limbs

Complete or partial absence of the upper leg (femur), lower leg (tibia and/or fibula), ankle (tarsals), foot (metatarsals), or toes (phalanges).

Reduction Deformity, Upper Limbs

Complete or partial absence of the upper arm (humerus), lower arm (radius and/or ulna), wrist (carpals), hand (metacarpals), or fingers (phalanges).

Spina Bifida without Anencephalus

Incomplete closure of the vertebral spine (usually posteriorly) through which spinal cord tissue and/or the membranes covering the spine (meninges) herniate.

Tetralogy of Fallot

The simultaneous presence of a ventricular septal defect (VSD), pulmonic stenosis, a malpositioned aorta that overrides the ventricular septum, and right ventricular hypertrophy.

Transposition of the Great Arteries (TGA)

Transposition of the aorta and the pulmonary artery such that the aorta arises from the right ventricle (instead of the left) and the pulmonary artery arises from the left ventricle (instead of the right).

APPENDIX B
ICD-9 and CDC/BPA Codes Defining Conditions in the ABDMP Annual Report

The birth defect categories analyzed in this report are listed below, along with the code ranges that define each category. The center column shows the World Health Organization's International Classification of Disease, 9th Revision, Clinical Modification (ICD-9-CM) (1979) code ranges for each category. The right column specifies the British Pediatric Association Classification of Diseases (BPA) (1979) code ranges for the same conditions.

| Condition | ICD-9 codes | BPA codes |
|--|--------------------------------------|---|
| Anencephalus | 740.0 – 740.1 | 740.00 – 740.10 |
| Amniotic bands | No code | 658.8 |
| Aniridia | 743.45 | 743.42 |
| Anophthalmia/microphthalmia | 743.0, 743.1 | 743.00 – 743.10 |
| Anotia/microtia | 744.01, 744.23 | 744.01, 744.21 |
| Aortic valve stenosis | 746.3 | 746.3 |
| Biliary atresia | 751.61 | 751.65 |
| Bladder exstrophy | 753.5 | 753.5 |
| Choanal atresia | 748 | 748 |
| Cleft lip with and without cleft palate | 749.1, 749.2 | 749.10 – 749.29 |
| Cleft palate without cleft lip | 749 | 749.00 – 749.09 |
| Coarctation of aorta | 747.1 | 747.10 – 747.19 |
| Common truncus | 745 | 745.00 – 745.01 |
| Congenital cataract | 743.30 – 743.34 | 743.32 – 743.326 |
| Diaphragmatic hernia | 756.6 | 756.610 – 756.617 |
| Down syndrome (Trisomy 21) | 758 | 758.00 – 758.09 |
| Ebstein's anomaly | 746.2 | 746.2 |
| Edwards syndrome (Trisomy 18) | 758.2 | 758.20 – 758.290 |
| Encephalocele | 742 | 742.00 – 742.09 |
| Esophageal atresia/tracheoesophageal fistula | 750.3 | 750.30 – 750.35 |
| Fetus/newborn affected by maternal alcohol use | 760.71 | 760.71 |
| Gastroschisis | 756.79 | 756.71 |
| Hirschsprung disease | 751.3 | 751.30 – 751.34 |
| Hypoplastic left heart syndrome | 746.7 | 746.7 |
| Omphalocele | 756.79 | 756.7 |
| Patau syndrome (Trisomy 13) | 758.1 | 758.10 – 758.19 |
| Pulmonary valve atresia and stenosis | 746.01, 746.02 | 746.00 – 746.01 |
| Reduction deformity, lower limbs | 755.30 – 755.39 | 755.30 – 755.39 |
| Reduction deformity, upper limbs | 755.20 – 755.29 | 755.20 – 755.29 |
| Spina bifida without anencephalus | 741.0, 741.9 (except 740.0 - 740.10) | 741.00 – 741.99 (except 740.0 – 740.10) |
| Tetralogy of Fallot | 745.2 | 745.20 – 745.21, 746.84 |
| Transposition of great arteries | 745.10, 745.11, 745.12, 745.19 | 745.10 – 745.19 |

APPENDIX C
Precision of Diagnosis Codes

Often health care professionals qualify a diagnosis, using words to express their level of confidence that the particular diagnosis explains what has been observed when examining, testing, or performing a procedure on a patient. If a professional makes a diagnosis using a qualifying term, the ABDMP assigns that diagnosis a “precision code,” based on the table below. Higher code numbers indicate higher “levels of precision.” Generally, if a diagnosis is made several times with different levels of precision, the diagnosis is assigned the precision code consistent with the most certain diagnosis.

| <u>Precision Code</u> | <u>Qualifying Terms</u> |
|-----------------------|---|
| 1 | not stated |
| 2 | probably not |
| 3 | vs, or |
| 4 | rule out, equivocal, questionable, r/o, uncertain, concern for, doubtful |
| 5 | suggestive of |
| 6 | suspected, suspicious |
| 7 | possible, may have, could be, felt to be, perhaps, consider, may be, question of, question |
| 8 | consistent with, most likely |
| 9 | compatible with, like, appears, evidence of, seems, apparent, believe |
| 10 | probable, presume |
| 11 | (code not currently used) |
| 12 | precise diagnosis, characteristic of (even if qualified with "mild," "somewhat," "relatively," or "borderline") |

APPENDIX D
Exclusion List
Non-reportable Birth Defect Cases

The following potential cases are not included in the ABDMP Report:

- Duplicate abstracts and/or duplicated anomalies (cases with multiple abstracts; child seen at more than one facility), i.e., duplicate cases are merged and counted once.
- “Possibles” abstracted for review and consideration and subsequently determined to have conditions or defects that were not reportable according to the ABDMP lists of “excludable conditions.”
- Babies born to mothers whose residences are out-of-state or out-of-country (i.e., nonresident cases).
- “Negatives,” that is, conditions that were ruled-out during case-finding and medical record review.
- “No match” cases. A birth certificate was not on file and the state of birth could not be confirmed as Arizona.
- Cases among aborted fetuses less than 20 weeks gestation and weighing less than 500 grams. These cases were excluded because there was no reliable denominator that could be used to generate a birth defect rate.
- Prenatally diagnosed cases that did not result in a known live birth or stillbirth are not included. The ABDMP is not currently visiting prenatal diagnostic centers to identify cases.
- Defects with a “precision of diagnosis” code 1-7 are excluded. Only those defects diagnosed at the higher levels of precision (8 or above) are included. Refer to Appendix B for list of precision of diagnosis codes.
- Cases only diagnosed outside of the hospital setting are generally not identified and included in the ABDMP. Children’s Rehabilitative Services Clinics and pediatric genetics clinics are the only outpatient facilities where cases are ascertained.

APPENDIX E Race and Ethnicity

The Arizona Birth Defects Monitoring Program does not collect race and ethnicity data directly from hospital or clinic records. However, all case files are matched with a birth or fetal death certificate prior to being included in the dataset. For statistical purposes, the ABDMP defines the race and ethnicity of the child as equivalent to the mother’s race and ethnicity as recorded on the child’s birth or fetal death certificate. In this report race and ethnicity combinations are classified the same as in other Arizona Department of Health Services publications, as follows:

**Classification of Race/Ethnicity Combinations in Arizona
Statistical Reports**

| | Hispanic | Non-Hispanic |
|------------------------|-----------------|---------------------|
| White | Hispanic | White |
| Black | Black | Black |
| Native American | Native American | Native American |
| Other | Other | Other |

- “White” refers to White non-Hispanics.
- “Hispanic” refers to White Hispanics.
- “Black” refers to African Americans, whether or not they are also Hispanic.
- “Native American” includes people of all Native American tribes, Aleuts, and Eskimos, whether or not they are living on reservation land and whether or not they are Hispanic
- “Other” includes persons who are Asian, unclassified, or did not provide a response to race question on the certificate.

NOTE: Arizona Birth Defects Monitoring Program data provided to the Centers for Disease Control and Prevention (CDC) and which may be published in other documents is analyzed using different classifications for race and ethnicity combinations, as follows.

**Classification of Race/Ethnicity Combinations in National
Statistical Reports Related to Birth Defects**

| | Hispanic | Non-Hispanic |
|------------------------|-----------------|---------------------|
| White | Hispanic | White |
| Black | Hispanic | Black |
| Native American | Hispanic | Native American |
| Other | Other | Other |

APPENDIX F

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