DISTRICT HEALTH DEPARTMENT

EPI - NEWS

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Gastroschisis Cluster Investigation in Washoe County

In October 2007, the Washoe County District Health Department began an investigation of a cluster of gastroschisis, a rare birth defect that results in incomplete closure of the abdominal wall. Babies with this birth defect are born with part of their intestines outside their bodies, which necessitates repair of the abdominal wall in the first week of life.

The investigation began when the public health nurses reported a suspected increase in the number of referrals of babies with gastroschisis. Since April, they had received referrals for six (6) babies, compared with an annual average of 1.1 cases (range 0 -3) over a15-year period (1991 – 2005). Once the investigation began, a few physicians in Washoe County reported that they also suspected an increase, because they were aware of an additional six (6) unborn babies with gastroschisis whose mothers were still receiving prenatal care.

By the end of December 2007, twelve (12) babies with gastroschisis had been born in Washoe County since April, resulting in a rate of 20.95 cases per 10,000 births. This compares with an average rate of 2.2 cases per 10,000 births for the 15-year period 1991-2005, resulting in a relative rate of 10.2 (95% confidence interval, 4.8 – 21.4) (Figure 1). This means that a baby born in Washoe County during 2007 was 10 times more likely to have gastroschisis than a baby born in any of the years from 1991 through 2005.

Gastroschisis has been increasing globally since the 1970's, from < 1 per 10,000 births to 2-4 per 10,000 births in some countries. For example, in 1998, the rate in Mexico was 4.98 (95% CI, 2.87 – 7.90) per 10,000 births, an increase from 1.2 in 1980. The rate has increased in the United States, as well; for all regions combined, the rate increased from approximately 1.9 per 10,000 births in 1996, to 3.7 per 10,000 births in 2003.

Studies have suggested potential risk factors for gastroschisis (Table 1), but young maternal age (< 20 years of age) is the only consistent risk factor.

Figure 1. Rates (cases per 10,000 births) of gastroschisis in Washoe County, 1991-2007.

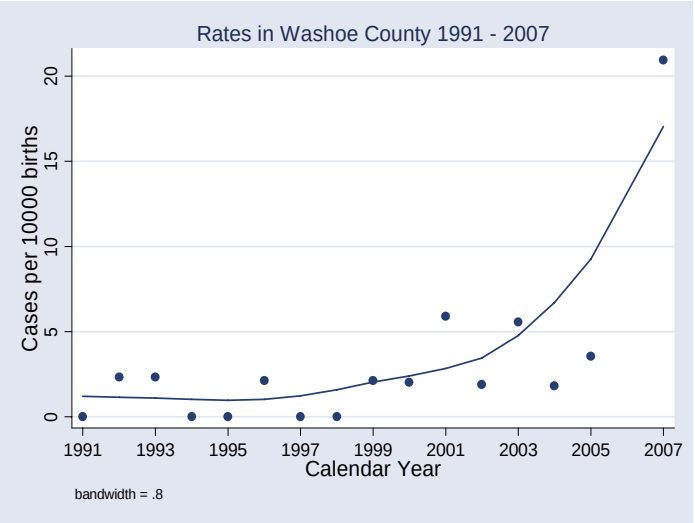


Table 1. Suspected risk factors [1]

	Weight of evidence
Obstetric factors	
Young maternal age	**STRONG**
Maternal illness	Equivocal
Low maternal body mass	Weak
Chemical Agents	
Tobacco use	Weak
Alcohol consumption	Weak
Medications	Weak
Recreational drugs	Very Weak
Socioeconomic factors	
Lower social class	Weak
Diet	
Various nutrients	Low

The Washoe County public health investigation includes obtaining detailed information about environmental exposures, lifestyle, and recent medical history from women who gave birth to babies with gastroschisis, or whose babies were diagnosed with gastroschisis, during 2007. Hopefully, the ongoing investigation will lead to important clues about potential causes for this cluster in Washoe County.

Please share this document with all physicians & staff in your facility/office.

Birth Defects in Washoe County. Birth defect rates are calculated using the number of birth defects and the total number of births recorded over a specified period of time (e.g., one year) (see below).

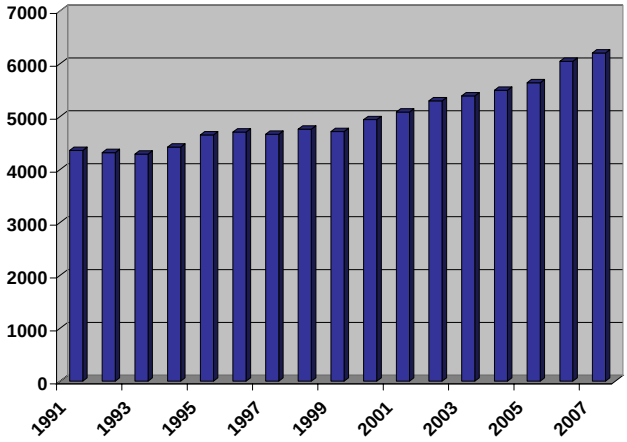
$$\frac{\text{Number of birth defects}}{\text{Total number of births}} \times 1000 \text{ (or } 10{,}000) = \text{Rate}$$

(Rates usually are reported as cases per 1000 births or per 10,000 births.)

The data used in this report come from birth certificates, on which health care providers note any birth defects at the time of birth. Information about birth defects is sometimes available from registries, or monitoring systems, but those data are not available for Washoe County at this time.

In Washoe County, the annual number of births has been growing steadily since 1991 (Figure 2).

Figure 2. Births in Washoe County 1991 - 2007



The trends for birth defects in Washoe County, however, are unusual (Figure 3). Rates tended to be somewhat low until 1999, at which time there was an impressive increase (from 5-25 per 1000 births to over 35 per 1000 births). The national rate is approximately 30 per 1000 births; in other words, one of every 33 babies is born with a birth defect[2].

The unusual pattern for total birth defects in Washoe County is similar for specific birth defects. For example, birth defects of the heart or circulatory system increased from <20 per 10,000 births before 1999 to 120-180 per 10,000 after 1999 (Figure 4). Heart defects are among the most common birth defects in the U.S., affecting approximately 1 in every 100 or 200 babies[2]. Neural tube defects are also common in the U.S., affecting approximately 1 in every 1000 pregnancies. In Washoe County, the rates for neural tube defects and other central nervous system defects were 1 to 2 per 1000 births, except in 1999 and 2000, when the rates were 3 and 6 per 1000 births, respectively (Figure 5)

Figure 3. Birth defects Washoe County 1991-2005

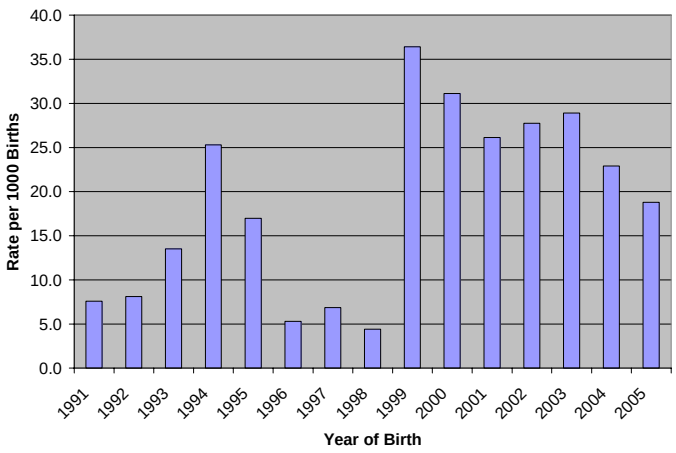


Figure 4. Heart defects Washoe County 1991-2005

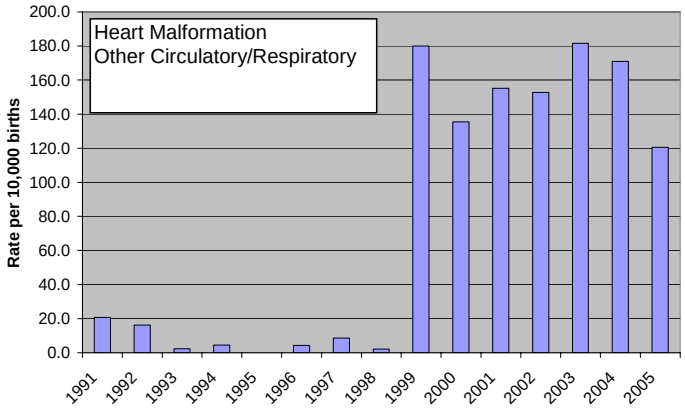
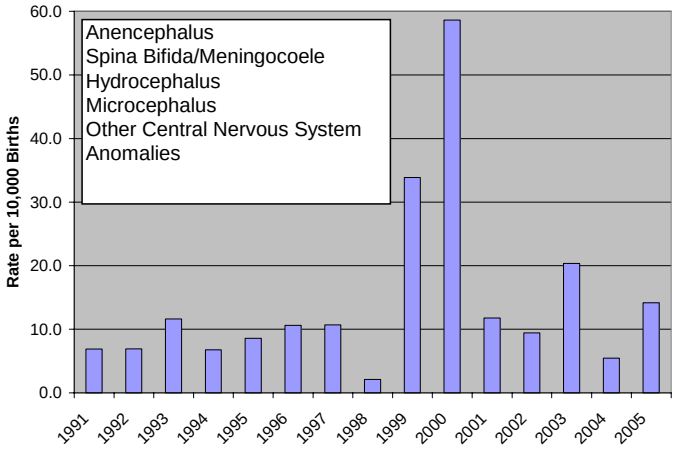
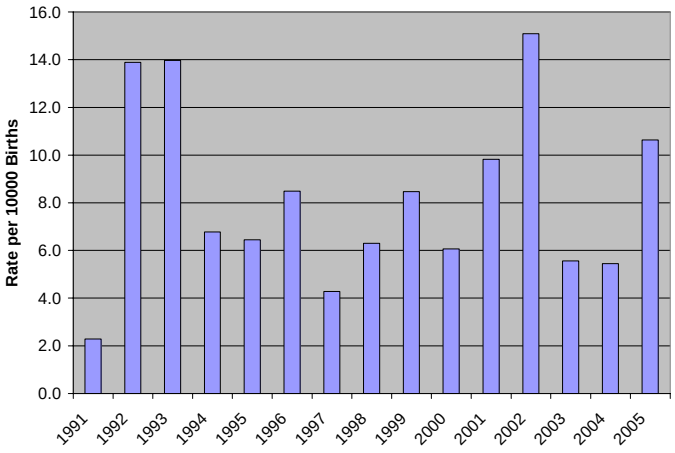


Figure 5. Central nervous system defects Washoe County 1991-2005



Cleft palate is another common birth defect, affecting approximately 1 in 700 babies (1.4 cases per 1000 births) in the U.S. The rates in Washoe County have fluctuated between 2 and 15 cases per 1000 births (Figure 6).

Figure 6. Cleft palate Washoe County 1991-2005



Generally, an unusual pattern as the one seen for birth defects in Washoe County from 1991 to 2005 suggests an artifact of data, such as differences in reporting or diagnosis practices. For example, new physicians, medical facilities, diagnostic tests, or reporting policies could cause an increase in "apparent" birth defects when the increase was actually better reporting. Similarly, a change in the birth certificate could account for the apparent increase.

It is most likely that legislation regarding the reporting of birth outcomes introduced in 1999 (http://www.leg.state.nv.us/NRS/NRS-442.html#NRS442Sec330 influenced reporting practices, resulting in an apparent increase in birth defects. As a result of that legislation, the Nevada Birth Defects Surveillance System (now called the Nevada Birth Outcomes Monitoring System) was established. The Monitoring System uses active surveillance to identify infants and children with birth defects to promote service coverage in order to minimize the physical and economic burden resulting from the defects and diseases

Birth Defects Prevention Month. January is National Birth Defects Prevention Month. As you may know, birth defects are the leading cause of infant mortality, and the costs, both monetary and non-monetary, to individuals, families, communities, and the health care industry are substantial. Each year, approximately 140 (2.6%) babies in Washoe County are born with a birth defect and nationally 120,000 babies are affected.

During pregnancy, a woman may be exposed to various infectious diseases, some of which have the ability to infect the placenta and seriously harm a fetus resulting in deafness, vision loss, neurological and behavioral disorders, or other birth defects.

Toxoplasmosis, cytomegalovirus (CMV), varicella, rubella, and lymphocytic choriomeningitis virus (LCMV) are among agents that are recognized to have the potential to cause birth defects in a developing fetus. Additionally, while some infectious diseases may not pass from an infected mother to her baby, they may have a serious impact on pregnancy such as uterine infection, miscarriage, premature labor, or stillbirth.

Prenatal testing for immunity to infections is an ideal start for any woman planning a family. Furthermore, should exposure to infectious disease occur while a woman is pregnant, she should be aware that consultation with her physician is important to determine the likelihood of infection or harm to the fetus, and the preventive measures available such as vaccination.

Especially important is counseling pregnant women on steps they can take to protect themselves and their unborn children using diligent hygiene methods in everyday life. The Birth Defects Prevention Network has provided a fact sheet (available at http://www.cdc.gov/ncbddd/pregnancy_gateway/default.htm) describing measures every woman can take to prevent infections whether she is pregnant or not. Some examples are:

Frequent handwashing, especially after caring for children, handling pets, or gardening;

- Using care when selecting, handling, and preparing certain foods;
- Avoiding dirty cat litter and wild or pet rodents and their droppings;
- Avoiding sick people;
- Testing for STDs and group B strep.

You can make a difference in the lives of Washoe County families and communities. The National Birth Defects Prevention Network has a variety of information about the prevention of birth defects and invites you to visit their website (http://www.nbdpn.org/current/resources/bdpm2008.html) for handouts that are helpful to your patients. www.nbdpn.org.

If you have comments or questions, please contact Dr. Leslie Elliott, Sr. Epidemiologist, 775-328-6104.

References

1 British Journal of Obstetrics and Gynaecology, 2000, Vol 107: 1339-1346

2 Centers for Disease and Control Prevention, Atlanta, GA. http://www.cdc.gov/ncbddd/bd/default.htm