Birth Defects in Kettleman City

One in every 33 babies is born with a birth defect, including structural defects, metabolic disorders, and some types of developmental disabilities. For this reason, California passed a law in 1982 to monitor birth defects. The California Birth Defects Monitoring Program (CBDMP) sends well-trained staff to hospitals to review medical records of all children born with a suspected birth defect. Information collected is included in the Registry. CBDMP uses these data to monitor trends and to help plan prevention strategies targeting known causes of birth defects, including tobacco smoking, alcohol consumption, diabetes, and vitamin deficiencies.

Background

In July 2009, the Kings County Health Officer responded to community concerns about a possible increase in birth defects in Kettleman City. To evaluate these concerns, the CBDMP was asked to review its Registry data to assess if there has been an increase in the expected number of birth defects, including cleft lip and palate.

Study Design

This study looks at birth defects in four areas: Kettleman City, Avenal (another city within close proximity to Kettleman City), Kings County, and the five southern Central Valley counties (Kings, Fresno, Kern, Madera and Tulare). These areas have been monitored by CBDMP since 1987. Data collection is complete for births occurring from 1987-2006 and is still in progress for births occurring from 2007-2008. The types of birth defects reviewed included Trisomy 13, Trisomy 18, Down syndrome, cleft lip, cleft palate, heart defects, neural tube defects, and specific urinary, intestinal, abdominal wall, and limb reduction defects.

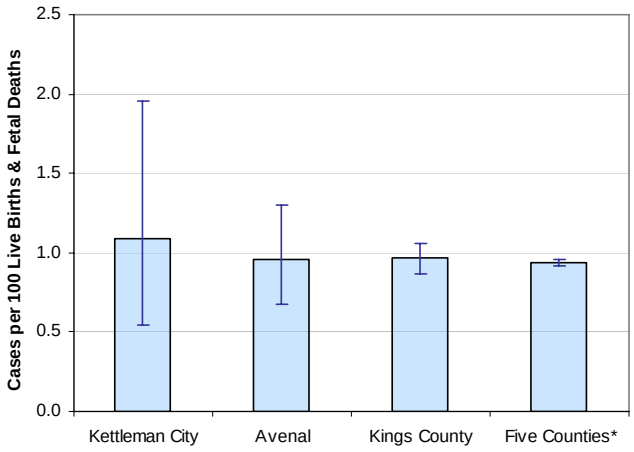
Summary

- There were no patterns among cases to suggest that there was a common underlying cause for the birth defects in Kettleman City.
- The overall birth defects rate in Kettleman City for the time period monitored (1987 - 2008) was not higher than expected.
- In 2008, four cases were identified in Kettleman City – one more than would be expected based on the historic pattern.
- In small populations, a grouping of birth defects can happen together by chance from time to time.
- Continued monitoring of births in Kettleman City will provide further information.

CBDMP reviewed Registry data for births occurring in the four areas. CBDMP followed a protocol developed to respond to community concerns (see the *Evaluating Small Areas* box on page 4). The data from Kettleman City and Avenal were compared to the greater county data as well as to data from all five southern Central Valley counties. CBDMP evaluated the rates of the specific conditions listed above. The rate is defined as the number of births and fetal deaths with defects divided by the total number of births and fetal deaths in an area during the same time period. CBDMP reviewed detailed medical case information to see if there were patterns suggesting a common underlying cause.

BIRTH DEFECTS GRAPH, 1987 – 2008

THE NUMBER OF LIVE BIRTHS & FETAL DEATHS WITH DEFECTS PER 100 LIVE BIRTHS & FETAL DEATHS (WITH 95% CONFIDENCE INTERVAL)



Note: The average number of births with birth defects will fluctuate more in areas with small numbers of births. Therefore, the lines on the graph represent the confidence interval, which is the most likely range within which the true average number of births with birth defects lies.

* Excludes 2008 births

BIRTH DEFECTS RATES

The overall rate of birth defects in Kettleman City throughout the period monitored (1987 - 2008) was not significantly higher than the rate in the other areas examined (see Birth Defects Graph and Table on pages 2 and 3). Because the population in Kettleman City is quite small, year-by-year rates may fluctuate and raise concerns where none may be warranted. The addition of a single birth with a birth defect will make the rate for that year appear much higher than usual.

- ***Could an increase in birth defects be a cluster?***

A cluster is more than the expected number of cases of a birth defect in a specific area and period of time than would be expected based on comparison with past rates. Birth defects, like other health outcomes, often occur in clusters. However, most clusters happen by chance and are due to normal fluctuation of birth defects rates over time. In areas with small populations, the rate of birth defects tends to fluctuate more than in areas with larger populations, since small changes in the number of cases can create large changes in the rates.

- ***Was the overall birth defects rate higher than expected?***

Even though annual fluctuations are often seen in areas of small population size, the overall rate in Kettleman City, Avenal, Kings County, and the five southern Central Valley counties fell within the same range for the 22 year period (see Birth Defects Graph and Table on pages 2 and 3). Due

to the small number of births in Kettleman City, year-by-year rates of birth defects cannot be accurately evaluated. Annual changes may reflect normal patterns. CBDMP will continue to monitor birth defects in Kettleman City and Kings County to determine if further investigations are warranted.

- *Were specific conditions elevated?*

The rates of the specific types of birth defects reviewed (Trisomy 13, Trisomy 18, Down syndrome, cleft lip, cleft palate, heart defects, neural tube defects, and specific urinary, intestinal, abdominal wall, and limb reduction defects), either evaluated as part of a syndrome or seen alone, were not higher than expected. A syndrome is a condition with a collection of abnormalities often seen together. When an abnormality occurs as part of a syndrome, this may indicate a different underlying reason for that birth defect. There were no patterns among cases to suggest there was a common underlying cause for birth defects in Kettleman City.

- *How can you tell if the birth defects are related to an environmental condition?*

This question cannot be answered simply by reviewing rates or cases. Finding environmental causes of birth defects requires well-controlled studies of specific exposures. One of the hallmarks of a teratogen – an environmental cause of birth defects – is that it will produce a distinctive, characteristic pattern of malformations. CBDMP reviewed the cases of birth defects in Kettleman City and Avenal, including a detailed review of the cleft lip and palate cases from 1987 through 2008, to see if there were similarities suggesting a single underlying cause. However, the types of birth defects and syndromes in Kettleman City do not appear unusual or show any obvious connection.

BIRTH DEFECTS TABLE
1987 – 2008
THE NUMBER OF LIVE BIRTHS & FETAL DEATHS WITH DEFECTS
PER 100 LIVE BIRTHS & FETAL DEATHS
(WITH 95% CONFIDENCE INTERVAL)

Kettleman City	1.09	(0.55 – 1.96)
Avenal	0.95	(0.68 – 1.3)
Kings County	0.96	(0.87 – 1.06)
*Five-County Region	0.94	(0.92 – 0.96)

Note: The rate (or percentage) of births with birth defects will fluctuate more in areas with small numbers of births. Therefore, the confidence interval is used as the most likely range within which the true rate (or percentage) of birth defects lies.

* Excludes 2008 births

ADDITIONAL REVIEWS

The California Department of Public Health (CDPH) also reviewed cancer cases and asthma hospitalizations in Kettleman City and found no elevated risk or unusual patterns. CDPH reviewed drinking water testing data for the Kettleman City public water system and found naturally occurring arsenic levels to be elevated similar to findings in many well water sources in the county, region and across the state (the system treats water to remove

benzene contamination possibly due to historic oil drilling in the area).

Causes of Birth Defects

Although the causes of many birth defects are unknown, families should be aware of associated risk factors. Some of the major known causes of birth defects include smoking, alcohol consumption, infections, vitamin deficiencies, use of certain medications, and poorly controlled diabetes during pregnancy. To learn more about birth defects, please visit our website at www.cdph.ca.gov/programs/CBDMP

Preconception & Prenatal Care

All women who could become pregnant should consult with a health care provider regarding preconception health care, especially if there are concerns about birth defects. By taking action on specific health issues and/or risk factors before pregnancy, future problems for the mother and the baby might be prevented. Getting early and regular prenatal care also promotes a healthy pregnancy. Please see the following guidelines for steps to reduce the risk of birth defects: http://www.cdph.ca.gov/programs/CBDMP/Documents/MO-CBDMP-ReducingtheRisk.pdf

Evaluating Small Areas

The California Birth Defects Monitoring Program does not routinely analyze data from small areas such as zip codes. However, CBDMP has developed a protocol to respond to specific community concerns about the environment.

The protocol looks for hallmarks seen when an environmental agent might be the cause of birth defects in the first year of life. These might include a dramatic increase in a specific condition, a characteristic pattern of defects, and an exposure in common.

The protocol can uncover major birth defects problems, but generally cannot determine if environmental conditions are causing birth defects. For this, sizeable studies with accurate exposure information are needed.

Steps for assessing birth defects in small areas include:

- Identifying data from the Registry that have been collected from the hospitals in the area of concern.
- Comparing the area's overall birth defects rate to county and regional rates.
- Examining rates of specific birth defects which are common and likely to be diagnosed in the first year of life.
- Examining rates of other specific conditions if past scientific studies suggest possible links to the environmental exposure of concern.
- Reviewing cases to look for similarities or recurring patterns of defects.

If a problem is identified in the small area evaluation, a cluster investigation might be recommended. Cluster investigation steps include receiving protocol approval from the California Committee for the Protection of Human Subjects, conducting interviews, and evaluating epidemiologic data.