



February 3, 2014

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Fort Riley MEDDAC
Fort Riley, Kansas 66442

Dear Dr. Benne:

This letter summarizes the results of an investigation by the Kansas Department of Health and Environment (KDHE) in response to your concerns regarding: 1) a potential increase in the occurrence of anencephaly between 2011 and 2013 in the 97th Military Police (MP) Battalion (BN) and 2) the overall crude birth prevalence of anencephaly in Tricare/Champus beneficiaries in Kansas.

Background

On August 15, 2013 you contacted the KDHE Office of Vital Statistics regarding your concerns about a potential increase in the occurrence of anencephaly in a particular military unit by reporting three cases of anencephaly over the last 2 years. Your concerns were relayed to the Maternal and Child Health/Environmental Health/Oral Health Epidemiology section at KDHE.

Methods

In response to these concerns, KDHE used the Birth Defects Information System to verify the three cases of anencephaly reported among women associated with the 97th MP BN between 2011 and 2012. The Birth Defects Information System (BDIS) contains data on live births and still births as captured on the birth certificate and also contains information on congenital malformations reported through the State of Kansas Reporting Form for Congenital Malformations and Fetal Alcohol Syndrome.

KDHE staff also worked with Fort Riley MEDDAC staff to obtain information from the three women's medical records on a number of potential risk factors for birth defects. KDHE staff looked for a pattern of risk factors among the women reported. Potential risk factors included mother's age, ethnicity, race, history of diabetes and gestational diabetes, family history of birth defects, body mass index prior to pregnancy, history of fever, use of saunas and hot tubs during pregnancy, use of anti-seizure medication during pregnancy, use of folic acid one month before and during the first trimester, use of multivitamins one month before and during the first trimester, occupation, business/industry, military deployment status and association with the 97th MP BN. Potential risk factors related to the father were also noted including father's age, ethnicity, race, occupation, business/industry, military deployment status and association with the 97th MP BN. Information on the pregnancy was also collected including residential address at conception, date conceived, medical diagnosis of birth defect and pregnancy outcome.

In order to calculate the expected number of cases of anencephaly among deliveries in Geary and Riley counties, the reported cases of anencephaly were stratified into two groups: live birth and terminated (induced).

The crude birth prevalence of anencephaly among live births was calculated for Geary and Riley counties, for Tricare/Champus beneficiaries, and for the State of Kansas based on data from 2007 to 2011 (the most recent years clean data are available). The Poisson distribution was used to determine confidence intervals around prevalence rates of

anencephaly among live births and to determine whether there was a difference between the expected and observed numbers of anencephaly cases in each group (live births and induced terminations).

Results

Live birth

The anencephaly case listing that was provided to KDHE included one live birth in 2011 and two induced terminations in 2012. We were able to identify the baby born alive in 2011 in the BDIS. However, the diagnosis reported on the birth certificate was hydrocephalus, not anencephaly. There was no reporting of this case through the State of Kansas Reporting Form for Congenital Malformations and Fetal Alcohol Syndrome. Therefore, without a chart review, we were unable to confirm the diagnosis of anencephaly.

During our assessment of potential risk factors for birth defects, we assessed whether the birth defects were concentrated in the 97th MP BN and whether they were isolated to women who were active duty soldiers. Of the three reported cases of birth defects, only one of the two women reporting induced terminations was an active duty soldier (116th company). The other two women (one induced termination and one live birth) were “stay at home” mothers. The mother of the live birth has no connection to the 97th MP BN.

Assessing patterns in other potential risk factors among the three women, none of the women reported Hispanic ethnicity, a history of gestational diabetes or the use of anti-seizure medication during pregnancy. Data on the use of folic acid one month before and during the first trimester or the use of multivitamins one month before and during the first trimester were incomplete. One of the women reported a family history of birth defects.

Assessing patterns in potential risk factors among the fathers, they were active duty in the 116th, 300th, or the 2nd Brigade (no connection to the 97th MP BN) and had been deployed to either Iraq or Afghanistan. Data was incomplete for ethnicity and race.

There were no cases of anencephaly among live births in Geary and Riley counties between 2007 and 2011. Similarly, for Tricare/Champus beneficiaries, there were no live birth cases reported in the 2007-2011 time period in Kansas. The overall rate of live birth infants with anencephaly was 1.51 per 10,000 live births for Kansas in 2007-2011.

Table 1: Crude Live Birth Prevalence for Anencephaly, 2007-2011

	Number of Cases ^{§†}	Number of Live Births‡	Crude Birth Prevalence (per 10,000 live births)	95% Confidence Interval (per 10,000 live births) [*]
Geary and Riley counties	0	9,747	0	0 - 3.78
TriCare/Champus	0	9,642	0	0 - 3.83
Kansas	30	198,340	1.51	1.02 - 2.16

[§]Anencephaly cases include ICD-9 diagnosis codes 740.0 - 740.1 among live births.

[†]Include in-state resident live births only.

^{*}95% Confidence Interval based on the Poisson distribution

Induced Terminations

In Kansas, the birth defects information on induced terminations is not reportable. Since the other two reported anencephaly cases in 2012 were diagnosed prenatally and were induced terminations, there is not any good baseline data to calculate the expected number of cases of anencephaly among cases of induced terminations. Anencephaly cases are considered rare events relative to the total number of live births, in this case, the total number of pregnancies, in the same year/period. Anencephaly cases may be characterized by the Poisson distribution which describes such counts. There were no observed anencephaly cases among the 97th MP BN induced terminations in any of the years between 2007 and 2011. Based upon the Poisson distribution, the expected number of anencephaly cases in 2012 would be between 0 and 4 cases. Therefore, the observed two anencephaly cases in 2012 were within the range of what one could expect for this anomaly.

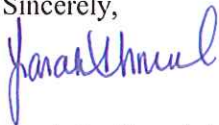
Impressions

Based on the data that we were able to gather, it does not appear as if there is an increase in the occurrence of anencephaly among women associated with the 97th Military Police (MP) Battalion between 2011 and 2012. Of the maternal and paternal potential risk factors that were assessed, there were no patterns to implicate any risk factor.


The exact causes of anencephaly are unknown. Inadequate intake of folic acid (vitamin B9) before and during pregnancy may increase the risk of neural tube defects, such as anencephaly or spina bifida (a birth defect in which the spine is exposed).

We share your concern for the health of the Fort Riley community. We recognize that every adverse pregnancy outcome is significant for the person affected and her family. Staff from our Bureau of Family Health can provide resources for members of your community who want information on healthy women, pregnancies and babies. We will continue to monitor the occurrence of birth defects in Kansas. If you have any questions about this report, please contact Farah Ahmed at 785-296-6426 or fahmed@kdheks.gov or contact Jamie Kim at 785-296-6467 or jkim@kdheks.gov. For more information on services provided for women, children and families and children with special health care needs, please contact the Bureau of Family Health at 785-291-3368.


Sincerely,



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cc: Michelle Johnson, Disease Intervention Specialist, Army Public Health Nursing
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