Health Alert:

Two cases of invasive *Enterobacter sakazakii* infection in infants treated in Missouri hospitals

December 19, 2011

This document will be updated as new information becomes available. The current version can always be viewed at http://www.health.mo.gov

The Missouri Department of Health & Senior Services (DHSS) is now using 4 types of documents to provide important information to medical and public health professionals, and to other interested persons:

Health Alerts convey information of the highest level of importance which warrants immediate action or attention from Missouri health providers, emergency responders, public health agencies, and/or the public.

Health Advisories provide important information for a specific incident or situation, including that impacting neighboring states; may not require immediate action.

Health Guidances contain comprehensive information pertaining to a particular disease or condition, and include recommendations, guidelines, etc. endorsed by DHSS.

Health Updates provide new or updated information on an incident or situation; can also provide information to update a previously sent Health Alert, Health Advisory, or Health Guidance; unlikely to require immediate action.

Office of the Director
912 Wildwood
P.O. Box 570
Jefferson City, MO 65102
Telephone: (800) 392-0272
Fax: (573) 751-6041
Web site: http://www.health.mo.gov

Health Alert
December 19, 2011

FROM: **MARGARET T. DONNELLY**
DIRECTOR

SUBJECT: **Two cases of invasive *Enterobacter sakazakii* infection in infants treated in Missouri hospitals**

The Missouri Department of Health and Senior Services (DHSS) has been notified of two cases of invasive *Enterobacter sakazakii* infection in newborns treated in Missouri hospitals within the last month. The most recent case notification occurred yesterday. Of these two cases, one was an out-of-state resident who recovered, and the most recent case was a Missouri resident who has died. Both infants were fed powdered infant formula. Clusters of *E. sakazakii* infections have previously been reported around the world among infants fed milk-based powdered formula from various manufacturers. Testing of all baby formulas involved, as well as all other products given to the babies reported in Missouri is on-going.

Enterobacter sakazakii is a gram-negative rod-shaped bacterium within the family *Enterobacteriaceae.* Recently, *E. sakazakii* has been reclassified as a *Cronobacter sakazakii*; the genus *Cronobacter* is synonymous with *Enterobacter sakazakii.* The natural habitat of *E. sakazakii* is not well understood. The bacterium can be detected in the gut of healthy humans, most probably as an intermittent guest. It can also be found in the gut of animals, as well as in the environment.

The majority of cases of *E. sakazakii* infection reported in the literature have been described in newborns with sepsis, meningitis, or necrotizing enterocolitis as a consequence of the infection, and the case-fatality rate among infected neonates has been reported to be as high as 33% - 80%. The pathogen is also a rare cause of bacteremia and osteomyelitis in adults, but the outcomes related to adult disease seem to be significantly milder.

The scientific literature suggests that premature infants and those with underlying medical conditions are at highest risk for developing *E. sakazakii* infection. Several outbreaks have occurred in neonatal intensive care units worldwide. However, an apparently healthy full-term newborn infant who suffered permanent neurological sequelae has also been previously reported.

Although the reservoir of the organism is unknown, a growing number of outbreaks of infection among newborns has provided compelling evidence that milk-based powdered infant formulas have served as the source of infection. One study tested milk-based powdered infant formula products obtained from a number of different countries and found that *E. sakazakii* could be recovered from 14% of samples. The results of another investigation suggest that even low levels of *E. sakazakii* in milk-based powdered infant formula can lead to development of infection. *E. sakazakii* has been detected in other types of food, but only powdered infant formula has been linked to outbreaks of disease. No exclusively breastfed infants have been reported to have *E. sakazakii* infections.

There are at least three routes by which *E. sakazakii* can enter infant formula:

a) through the raw material used for producing the formula;
b) through contamination of the formula or other dry ingredients after pasteurization; and
c) through contamination of the formula as it is being reconstituted by the caregiver just prior to feeding.

It is important to remember that powdered infant formulas are not commercially sterile products. Powdered milk-based infant formulas are heat-treated during processing, but unlike liquid formula products they are not subjected to high temperatures for sufficient time to make the final packaged product commercially sterile. FDA has noted that infant formulas nutritionally designed for consumption by premature or low birth weight infants are available only in commercially sterile liquid form. However, so-called "transition" infant formulas that are generally used for premature or low birth weight infants after hospital discharge are available in both non-commercially available sterile powder form and commercially sterile liquid form. Some other specialty infant formulas are only available in non-sterile powder form.

Recommendations

In light of the epidemiological findings and the fact that powdered infant formulas are not commercially sterile products, FDA recommends that powdered infant formulas not be used in neonatal intensive care settings unless there is no alternative available. If the only option available to address the nutritional needs of a particular infant is a powdered formula, risks of infection in **healthy and sick** newborn babies can be reduced by:

- Preparing only a small amount of reconstituted formula for each feeding to reduce the quantity and time that formula is held at room temperature for consumption. Do not hold reconstituted formula for longer than two hours without refrigeration. Recognizing differences in infant formula preparation among hospitals, individual facilities should identify and follow procedures appropriate for that institution to minimize microbial growth in infant formulas;
- Minimizing the holding time, while under refrigeration, before a reconstituted formula is fed; and
- Minimizing the "hang-time" (i.e., the amount of time a formula is at room temperature in the feeding bag and accompanying lines during enteral tube feeding), with no "hang-time" exceeding 4 hours. Longer times should be avoided because of the potential for significant microbial growth in reconstituted infant formula.

The World Health Organization guidelines on safe preparation of powdered infant formula are available at: http://www.fao.org/ag/agn/agns/files/pif_guidelines.pdf.

DHSS urges health care providers to report cases of *E. sakazakii* infections in infants to your local public health agency, or to DHSS at 800/392-0272 (24/7).