

Survey of Children Adopted from China Tested by Ultrasound for Exposure to Melamine

Introduction

In September of 2008, information was made available from the Chinese government about widespread illness among Chinese infants and children due to adulteration of milk and formula products (Centers for Disease Control, 2008). The international community became concerned when it was learned that the products were contaminated with melamine. Melamine is added to milk products to trick industry quality tests used to detect protein levels in milk. Melamine is high in nitrogen which causes a false high protein reading in testing. Melamine was found to be a contaminant in pet food in 2007 which led to the death of many family pets.

Children in China who ingested the milk and formula with melamine have suffered kidney problems, including kidney stones. Tens of thousands of Chinese children have been reported sickened and hospitalized; four children were reported to have died (World Health Organization, 2008). There are no studies on the long-term effects of melamine on the human body.

Parents of children adopted from China became concerned about possible ingestion of melamine by their children prior to their adoption. Some children experienced unexplained renal symptoms and underwent testing; some families decided to test their children because of possible exposure due to recent date of adoption, and some because they believe their child drank contaminated formula.

It is unknown how far back the melamine contamination began (Lim, 2008; Fairclough, 2008). There is a lack of information on prevalence and inconstancy of recommendations regarding how many and which children to screen (The Center for Adoption Medicine, 2008; American Society of Pediatric Nephrology, 2008). Because there were scattered reports of children adopted earlier than 2008 having melamine exposure related kidney stones, parents with children adopted from China formed an online group to gather information about prevalence, testing for, symptoms of, and treatment of melamine exposure¹. Because there is so much that is unknown at this point, parents were motivated to gather anecdotal information regarding test results of children adopted from China by constructing and administering an on-line survey. This is the first report of survey results; as children continue to be tested survey results will be updated in the hopes of gathering information to spur further research.

Methodology

The web-based survey was distributed to members of the Yahoo internet group “China Milk Group”. Group members were also asked to invite others to participate in the survey if they knew of other families with children adopted from China who had been tested by ultrasound due to concerns regarding exposure to melamine prior to adoption.

¹ <http://groups.yahoo.com/group/ChinaMilkIssue/>

Only families with children who had been tested with ultrasound for kidney stones were allowed to submit data by taking the survey. This was done because of early reports that some children who had tested positive for kidney stones had normal blood work and urinalysis prior to their ultrasound.

Demographics

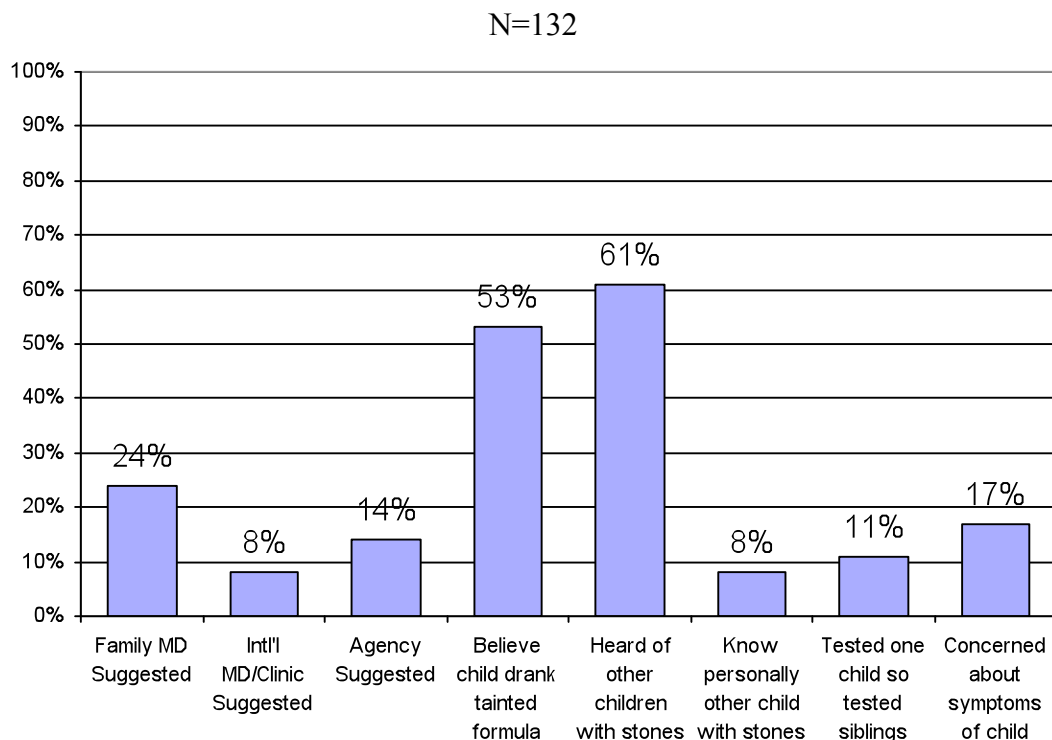
From October – November 23, 2008, families provided information on 132 children. The earliest reported date of adoption was April 2002, and the latest was October 2008. The average age of the children at the time of adoption was 18 months, with a range of 6 months to 13 years.

One hundred twenty-two of the children were female, ten were male. The average age of the children at the time of the survey was 3 years 9 months, with a range of 10 months to 14 years.

Why did families decide to have their children tested?

The survey asked respondents to indicate what their reasons were for having chosen to have their children tested for melamine exposure. Figure 1 illustrates the results.

Figure 1. Reasons Families Chose to Test Their Children.



Almost two-thirds of the survey respondents indicated that they had heard of other children with kidney stones which influenced them to have their children tested. Over half of the families reported the belief that their child drank melamine contaminated formula as a reason for testing.

Results of Testing

Results of Ultrasound Tests

Of the 132 children tested via ultrasound, 8 (6%) were found to have kidney stones. Of the eight children found to have stones, parents reported that 4 appeared to be melamine kidney stones, and 4 reported that it was unclear whether they were melamine or calcium based kidney stones.

All eight of the children were female. Date of birth was reported for 6 of the 8 children; this ranged from January 2003 and July 2006.

Date of Birth for Children Positive for Stones:

January 2003
October 2004
May 2005
May 2006
June 2006
July 2006

The time of adoption was reported for 6 of the 8 children found to have kidney stones. The earliest date of adoption was April 2004 and the most recent occurred in March, 2008.

Date of Adoption for Children Positive for Stones

April 2004
October 2005
May 2006
April 2007
January 2008
March 2008

The eight children were reported to be adopted from five provinces in China.

Location of Child in China Prior to Adoption for Children Positive for Stones

Dao County, Hunan Province
Fuzhou, Jiangxi Province
Gaozhou, Guangdong Province
Huangmei, Hubei Province
Jia Yu, Hubei Province
Nanchang, Jiangxi Province
Xuishui, Jiangxi Province
Zhenjiang, Jiangsu Province

Number of Children With Normal Ultrasound, Kidney Stones, and Other Findings

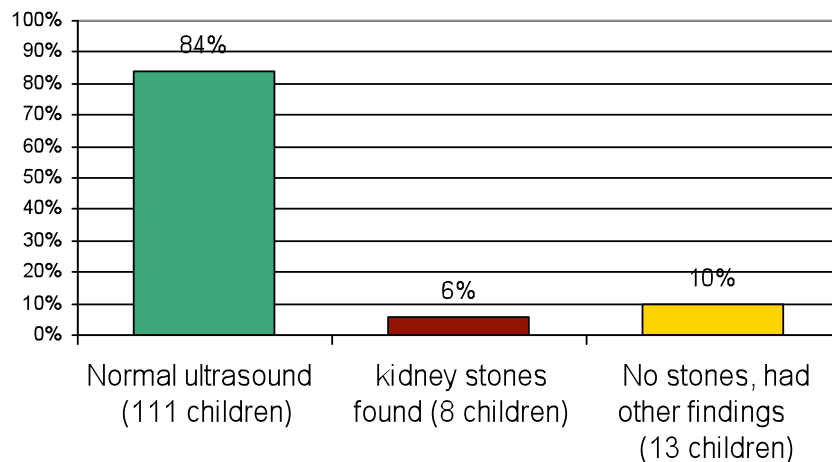
Other Ultrasound Findings for Children Negative for Stones

Parents were asked if their children had other findings besides kidney stones on renal ultrasound. Parents reported the following for 13 of the 126 children who were negative for stones, but had other findings:

- 5 children with hydronephrosis (one of the five with hydroureteronephrosis)
- 4 children with bladder debris
- 2 children with enlargement of one or both kidneys
- 2 children with kidney cysts

Figure 2 illustrates the percentage of children found to have normal ultrasound, kidney stones, and other findings.

Figure 2. Ultrasound Findings: Normal, kidney stones, and other findings

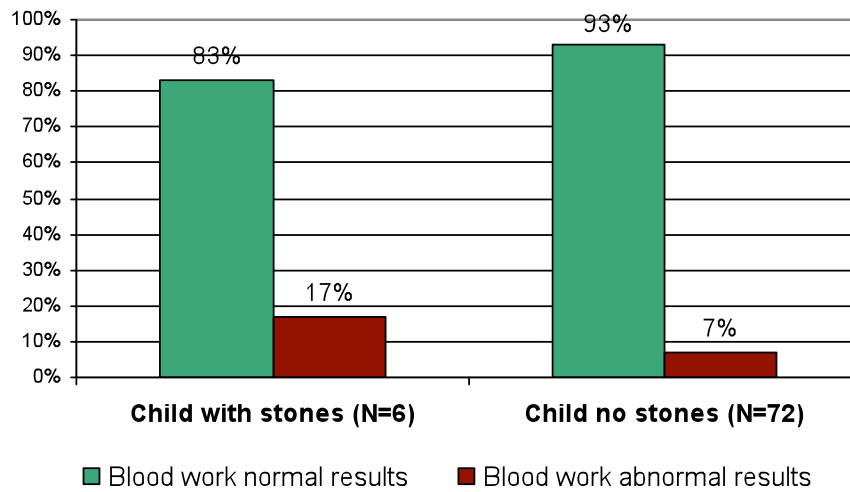


Most of the children had normal ultrasounds (84%). However, 16% of the children were either found to have kidney stones, or other findings that have been reported recently to be possibly due to melamine exposure (Wong & Chiu, 2008).

Results of Blood Work

Seventy-eight of the 132 children who underwent ultrasound testing for melamine exposure also had reported blood work. Survey respondents were asked if the results of their child's tests were reported to them as "normal" or "abnormal". Figure 3 shows results for children who tested positive for stones and for children who tested negative for stones.

Figure 3. Results of Blood Work: Comparison of Children with and without Stones

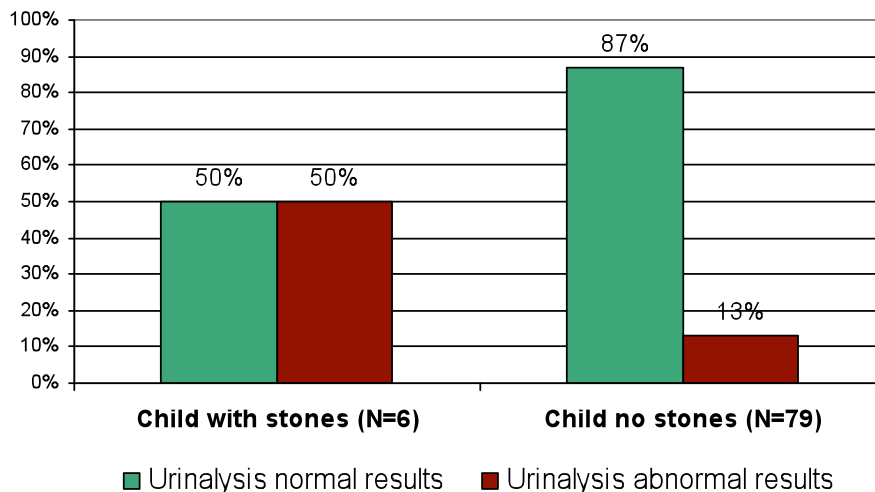


Most of the children (93%) of children who had no stones found via ultrasound had blood work reported to be normal. This was true for the children found to have stones as well, 5 of the 6 (83%) had blood work that was reported to be within the normal range.

Results of Urinalysis

Forty-eight of the 91 children who underwent ultrasound testing for melamine exposure reporting their child also had a urinalysis. Survey respondents were asked if the results of their child’s urinalysis were reported to them as “normal” or “abnormal”. Figure 3 shows results for children who tested positive for stones and for children who tested negative for stones.

Figure 4. Results of Urinalysis: Comparison of Children with and without Stones



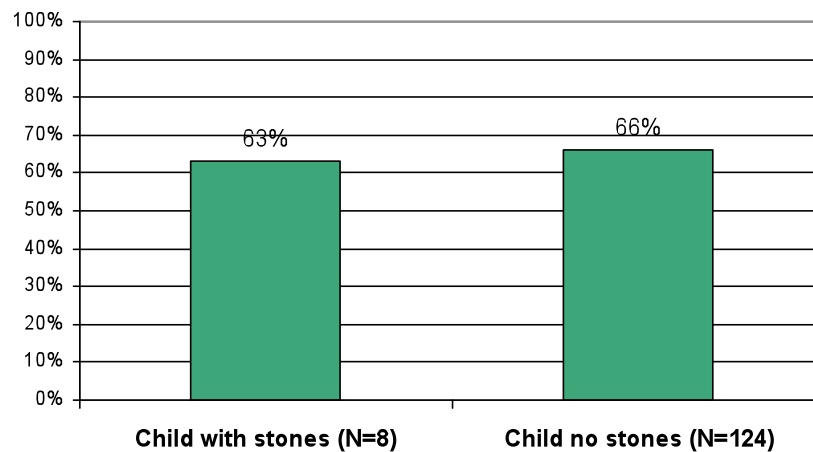
Most of the children (87%) of children who had no stones found via ultrasound had urinalysis reported to be normal. Three of the six children found to have stones had urinalysis reported to be within the normal range, the other three had abnormal results.

What Symptoms Did Children Have Prior to Being Tested?

Children with No Symptoms Who Were Growing Well

Survey respondents were asked to indicate what, if any symptoms their children had prior to their being tested. Figure 4 shows the children who were reported to have “no symptoms and growing well” prior to testing.

Figure 5. Child Has No Symptoms and is Growing Well: Comparison of Children with and without Stones

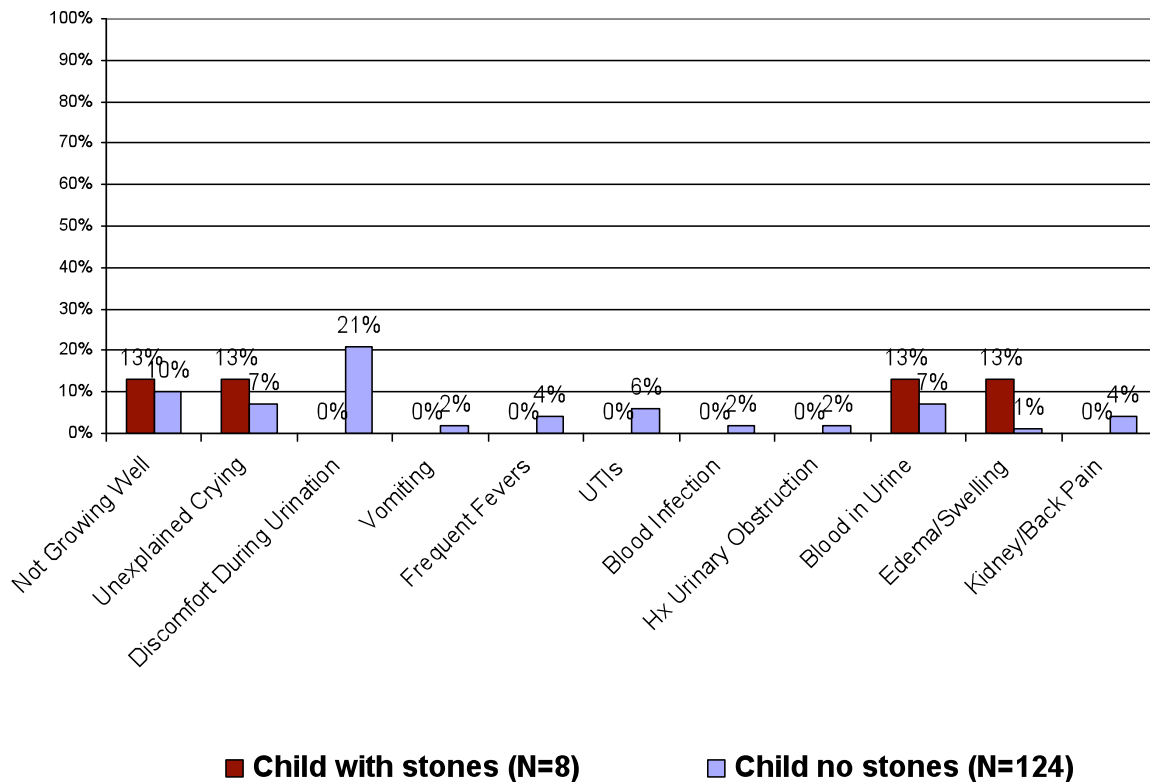


Most children had no symptoms and were reported to be growing well prior to testing.

Children with Symptoms Prior to Testing

Some parents did report physical symptoms that their child had. Figure 5 shows the symptoms that parents reported for children did have before testing.

Figure 6. Child Symptoms Prior to Testing: Comparison of Children with and without Stones



Symptoms reported for children who were shown to have kidney stones by ultrasound were growth issues, unexplained crying, blood in urine, and edema/swelling. The most often reported symptoms for children who tested negative for kidney stones were discomfort during urination, blood in urine, and urinary tract infections.

Summary

The majority of the 132 children tested via ultrasound (84%) were found to have normal ultrasound findings, 6% were found to have kidney stones, and 10% were found to have other ultrasound findings which may be related to melamine exposure such as hydronephrosis/hydroureteronephrosis, debris in the bladder, and enlarged kidney(s). The eight children who were found to have kidney stones were adopted as far back as April of 2004. Most (63%) of the children found to have kidney stones did not have symptoms prior to testing; most (83%) had blood work reported to be in the “normal” range, and half had urinalysis that was reported to be “normal”.

The survey is limited and is anecdotal in nature; the methodology and small numbers of children tested do not allow for statistical analysis. In addition, whether or not the kidney stones found in these children are melamine related is sometimes unclear. Four of the seven children found to be

positive for kidney stones had parents who reported that their child's physicians believed the kidney stones did not resemble typical kidney stones and appeared to melamine stones, others parents reported uncertainty whether or not the kidney stones were melamine or another type of stone (the more commonly found calcium stones, or the less commonly found struvite, uric acid or cystine stones). While in general it is unusual for young children to be diagnosed with kidney stones, medical sources indicate that the overall incidence of kidney stones in young children has increased (Children's Hospital Boston, 2007; Tarkan, 2008). While recent literature has described some other ultrasound findings as possibly related to melamine exposure (Wong & Chiu, 2008), this cannot be known with certainty.

However, this initial anecdotal data shows that it is possible that children who have normal blood work and urinalysis go on to have stones discovered during renal ultrasound. In addition these children often have no medical symptoms prior to testing.

The timing of the children's adoptions should also be noted. Reports from within China indicate that the contamination of the milk supply is likely to go back farther than the last two years, and it is possible that earlier melamine contamination has exposed far more children than is commonly believed. Three of the six children with dates of adoption reported that were found to have kidney stones were adopted prior to June 2006. Five of the 13 children with abnormal ultrasound findings, other than kidney stones, were adopted prior to June 2006.

References

American Society of Pediatric Nephrology (2008, October). *Statement on Melamine Guidelines*. Woodlands, Texas. Retrieved October 31, 2008, from [http://www.aspneph.com/ASPNSStatement%20Melamine%20Oct22_cbl%20\(3\).pdf](http://www.aspneph.com/ASPNSStatement%20Melamine%20Oct22_cbl%20(3).pdf) .

The Center for Adoption Medicine. (2008, October 14th). *Melamine and Chinese Adoptions*. Seattle, WA. Retrieved October 14, 2008, from <http://www.adoptmed.org/topics/melamine-and-chinese-adoptions.html> .

Centers For Disease Control. (2008, November 10). *Travel Notices: Melamine in Chinese-Manufactured Infant Formula*. Retrieved November 14, 2008, from <http://wwwn.cdc.gov/travel/contentMelamineChina.aspx> .

Children's Hospital Boston.(2007). Pediatric Kidney Stones on the Rise. *Pediatric Views*, June, 2007. Retrieved October 31, 2008, from http://www.childrenshospital.org/views/june07/pediatric_kidney_stones_on_the_rise.html .

Lim, L. (2008, September 25). *Chinese Milk Worker: Complaints Ignored For Years*. [Morning Edition](#), (radio broadcast). National Public Radio, Washington. Retrieved October 15, 2008, from <http://www.npr.org/templates/story/story.php?storyId=95026204> .

Fairclough, G. (2008, November 3). Tainting of Milk is Open Secret in China. *The Wall Street Journal*. Retrieved November 3, 2008, from

<http://online.wsj.com/article/SB122567367498791713-email.html> .

Tarkan, L. (October 27, 2008). Rise in Kidney Stones is Seen in U.S. Children. *New York Times*, retrieved October 31, 2008, from http://www.nytimes.com/2008/10/28/health/28kidn.html?_r=1&ei=5070&emc=eta1&oref=slogin .

Wong, S.N., Chiu, M.C. (2008). The Scare of Melamine Tainted Products. *Hong Kong Journal of Paediatrics*. 13:230-234. Retrieved December 1, 2008 from <http://www.hkjpaed.org/pdf/2008;13;230-234.pdf> .

World Health Organization. (2008, November 11). *Melamine-contamination event, China, September-October 2008*. Retrieved November 14, 2008 from http://www.who.int/foodsafety/fs_management/infosan_events/en/index.html .

For More Information:

To connect with other parents who are gathering information on melamine exposure and what it means for children adopted from China, as well as to see results of this survey, join the Yahoo group China Milk Issues at <http://groups.yahoo.com/group/ChinaMilkIssue/>

If you have had your child adopted from China tested by ultrasound for melamine exposure and would like to take the survey, you may link to:
http://www.surveymonkey.com/s.aspx?sm=UzXj_2fa1wrrzTmj7UPQbkBA_3d_3d

For more information on survey methodology and data analysis, contact:
Tammy Richards, M.Ed.
Adoptive Parent/Research Analyst
trichards19@gmail.com