

Joelle's Story

Submitted by WakeMed Mothers' Milk Bank

Four years ago Alicia Manson began her career as a nurse on the Mother/Baby unit at WakeMed in Raleigh, North Carolina. She has a passion for taking care of mothers and their babies. Alicia says, "I love teaching new mothers. I love to see the bond between mothers and babies and taking care of new life."

Two years ago Alicia and her husband Tremayne were blessed with their first child, Isaac, and on March 14, 2009, their second child arrived, Joelle Manson. Joelle was a beautiful baby girl, who was born with a hypoplastic left heart and a double outlet right ventricle. These defects put an extra strain on Joelle's heart causing it to work much harder than normal. The doctors at the University of North Carolina hospital (UNC) decided the best course of action to correct the problems with Joelle's heart involved three phases of surgeries. As the doctors and nurses in the UNC neonatal intensive care unit (NICU) and pediatric intensive care unit (PICU) did all they could do to help baby Joelle, Alicia worked hard to pump and save her breast milk, in hopes that someday Joelle would be able to benefit from it.

The day after the first surgery Joelle went into cardiac arrest; she pulled through and her health began to improve. As time went on Joelle moved toward recovery. She began to breathe on her own; she was weaning off her medications, and working with a physical therapist. At two and a half months Joelle was finally able to have some of her mother's breast milk; she began to grow and show normal baby expressions. Although Joelle was taking small amounts of her mother's milk, Alicia realized she had enough breast milk to share; so she called the WakeMed Mothers' Milk Bank and began donating.

Once Joelle was three months old, the PICU doctors felt she was strong enough to undergo the second surgery. As the doctors planned the second surgery the Manson family was busy spending time with their new baby girl. Big brother Isaac was finally able to come to the PICU and meet his little sister, Joelle's Grandfather took her on her first wagon ride around the unit and many family photos were taken.

After showing many signs of improvement, Joelle took a turn for the worse and unexpectedly went into cardiac arrest for a second time; this time she was unable to pull through. The loss of their three and a half month old baby girl came with such shock for the Manson family. How would they ever recover from such a devastating loss?

During Joelle's three and a half month stay in the NICU and PICU, Alicia diligently pumped and saved her breast milk. She donated hundreds of ounces and stored the remainder of the milk in her home freezer and freezers at UNC. When Joelle passed away the nurses



Baby Slate: A Long Road

By Amy Vickers, RN, BSN, IBCLC

In the summer of 2008, Christal and Rusty Suson were thrilled to be awaiting the arrival of their first baby. During a routine ultrasound in July, instead of learning if their baby would be a boy or a girl, they learned their baby would have problems, big problems.

Christal and Rusty learned their baby boy had a very serious birth defect called gastroschisis. Gastroschisis (gas-tro-ski-sis) is a birth defect that occurs when the abdominal wall fails to close properly and the baby's internal organs push outside of the body. The next few months became a whirl of one prenatal appointment after another and the news they were given was grim. There was a possibility their baby would not survive and if he did, he would face surgery and potentially long-term complications.

On September 19, 2008, eight weeks early, Slate Landon Suson was born weighing 4.83 pounds. He was immediately admitted to the Neonatal Intensive Care Unit at Cook Children's



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Board of Directors meeting in Kalamazoo

From the President

By Pauline Sakamoto, RN, MS

HMBANA continues to grow in size and stature. In 2008, over 1.4 million ounces of donor human milk was dispensed by North American milk banks. In the first three quarters of 2009, distribution has continued to grow particularly in the Neonatal Intensive Care Units and Pediatric Units. The difficult US economy has not impacted the need for donor human milk. I am particularly proud of the HMBANA milk banks who have continued to serve infants with a medical need regardless of ability to pay processing fees on the part of the family. Low estimates run into the hundreds of thousand dollars annually for those HMBANA milk banks serving these medically fragile infants unable to pay associated fees. The volume of milk distribution speaks highly of the member banks' ability to educate health care professionals regarding the benefits and safety of donor human milk.

On September 11 and 12, 2009, the HMBANA Board of Directors met in Kalamazoo, Michigan, at the Bronson Mothers' Milk Bank. Cindy Duff, director of the Kalamazoo Bank, and staff graciously hosted the two days of intense work. Board members were impressed by The Bronson Mothers' Milk Bank operation and innovative ideas. Introductions were made of the two newest developing non-profit milk bank members, the Northwest Mothers' Milk Bank in Portland, Oregon (June Winfield, Director) and the long-awaited Ontario Milk Bank in Toronto, Canada (Debbie Stone, Dorothy Dougherty and Sharon Unger, MD, from the planning committee). It was a pleasure to meet them and share ideas! Jean Drulis, Vice President, announced she is working with seven other potential developing milk banks in the US. HMBANA continues to help communities develop local milk banks and depots. One of our oldest members, the Mothers' Milk Bank in Denver, Colorado, has recently organized under a new non-profit foundation called the Rocky Mountain Children's Hospital Foundation. This is exciting news for the Denver Milk Bank!

HMBANA has accomplished a large amount of work to continue serving the infants and children of North America. The 2009 edition of the Guidelines for the Establishment and Operation of a Donor Human Milk Bank is complete and available for sale. Kim Updegrave and the guidelines committee did an exceptional job in updating these guidelines. An assessment tool for milk bank processing and guideline adherence is in the final stages of testing. Cindy Duff and the accreditation committee are continuing efforts to refine the assessment tool into an accreditation process for milk banks, milk depots and distribution sites. A potential assessment/certification process for hospitals

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FAQs: Swine Flu and Breast Milk

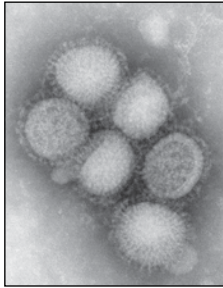
By Kim Updegrave, RN, CNM, MSN, MPH, Clinical Director, Mothers' Milk Bank at Austin



What is swine flu?

Novel influenza A (H1N1), novel H1N1 flu, and swine flu all refer to influenza identified first in April of 2009 that has spread throughout the world. Typically mild in nature, with symptoms similar to familiar strains of seasonal flu, complications and fatalities resulting from this flu

have occurred in populations not typically at risk from seasonal flu: women of childbearing years and young children. Swine flu persisted in



activity throughout the summer season, a time when seasonal flu virtually disappears. Several models have been proposed predicting its potential reach through fall and winter, but there is disagreement on the severity of the continued outbreak.

How can people protect themselves?

Prior to vaccine availability, people can protect themselves by avoiding exposure to those with obvious flu symptoms—coughing, sneezing, fever, aches—staying well-rested and nourished, and washing hands frequently. When someone is ill in the household, instilling strict and frequent hand-washing practices, and encouraging covering of mouth and nose when coughing and sneezing is wise. Employees with ill staff need to encourage sick policies that allow employees who are symptomatic to stay home until fever and cough subside.

When will a vaccine be available? In what form?

The Centers for Disease Control announced that 3.4 million doses of the swine flu vaccine will be initially distributed to states in early October. Additional doses, roughly 20 million per week, will be available in subsequent weeks. This will be a live attenuated vaccine available as a nasal spray.

Who should be immunized?

The nasal spray version of swine flu vaccine is approved for people age two to 49 years. Approval has not yet been granted for younger children or pregnant women. First-round vaccination will prioritize healthcare providers with direct patient contact, and care-takers and household contacts of infants under 6 months of age.

How many doses will it take to be protected?

One shot will be enough for healthy adults, but two doses will be required for younger children.

How many times can you get swine flu?

Once only—you are immune to swine flu once you have had it. However, knowing that you have definitely had swine flu is challenging, as symptoms of various types of flu mimic each other, and rapid testing methods have not been shown to be reliable. Health care providers are encouraged to treat those with suspicious symptoms as if they have swine flu.

Should you get the vaccine if you've already been ill with suspected swine flu?

Yes. There is no evidence that receiving the vaccine when you have already had swine flu will cause any kind of reaction, but there is evidence showing that the various types of flu and their symptoms overlap enough to raise doubts that any one episode of mild flu-like symptoms is definitively swine flu.

Should you receive the seasonal flu vaccine this year even if you intend to receive the swine flu vaccine?

Yes, seasonal flu will also be seen this year. Less emphasis will be placed on differentiating the type of flu experienced versus avoiding as much of an outbreak as possible, most especially in vulnerable populations.

How will breastfeeding moms be treated?

The Centers for Disease Control recommends that breastfeeding be protected and supported at all times. Mothers with influenza should be encouraged and assisted to express her milk, and the infant should be fed the mother's expressed milk by another person who is well. This may require separation of mother and infant temporarily, but breastfeeding should be facilitated during this time. Antiviral treatment is not a contraindication to breastfeeding.

Moms should wash hands with soap and water, or use an alcohol-based hand rub before feeding their baby, and avoid coughing or sneezing while feeding baby. If the mom is ill and there is no one else well in the household to care for the baby, she should wear a facemask, and cover mouth and nose with a tissue when sneezing or coughing.

If the baby is sick, mom should continue breastfeeding, passively immunizing her infant via her antibodies.

How will milk banks be affected?

Donors to milk banks are temporarily deferred during periods of illness or during the use of medications such as anti-virals and fever-reducing medications. Women who receive the live vaccine do not require a deferral—temporary or permanent—since the live attenuated virus replicates primarily in the nasopharynx. According to the CDC, a mom's likely exposure of her child is via her own nasal secretions rather than the breast milk.

Milk banks may see a short-term increase in hospital's use of donor human milk as hospital protocols may require separation of baby and mother while mother begins

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Developing Milk Bank Update

The following featured Milk Banks have applied for and been accepted as Developing Milk Banks. Other communities with milk bank planning in various stages include:

- Orlando, Florida
- Jackson, Mississippi
- Kansas City, Missouri
- Oklahoma City, Oklahoma
- Hudson Valley, New York

Mothers' Milk Bank of New England

The mission of Mothers' Milk Bank of New England (MMBNE) is to provide donor human milk to newborns in need by:

- collecting, pasteurizing and dispensing donor human milk;
- educating the medical and general communities about indications for, benefits and use of donor human milk;
- furthering our knowledge of donor milk through research.

We have made great strides in all three of these areas in the past year. Since last August, MMBNE has been receiving milk from Mothers' Milk Bank of Ohio. We

dispense about 600 ounces per week and, in the last year, we have served 25 babies and three hospitals. Currently, we are in the process of retro-fitting our office and creating a milk processing lab.

Educating the medical and lay communities is an essential part of our work. We have presented Grand Rounds and inservice training lectures at about a dozen hospitals in New England and spoken at numerous conferences. In April, 2009, we held a very successful one-day conference on "Human Milk Banking: Preventive Medicine in Practice." Sixty-five practitioners from five New England states attended the conference and it has generated much conversation among practitioners and hospitals about using donor human milk.

MMBNE is in the process of establishing a Research Board and collaborations with hospitals throughout the region that are engaging in research on use of donor human milk.

Toronto, Ontario, Milk Bank

A working group in Toronto, Canada, have dreamed of building a milk bank in their city for many years and are now pleased to announce themselves as a Developing Milk Bank. Their milk bank will be unique in that it is a collaborative effort amongst three hospitals with tertiary care NICUs. They have identified staff, a work space and begun to purchase equipment and it is hoped that they will begin dispensing pasteurized human milk within the upcoming year.



Lactation Consultant Joanne Ransom, RN, IBCLC, with Krystal Larsen making her first donation, 600+ ounces, at Providence Newberg Medical Center. Krystal read about donating milk when she delivered her baby, Harley, at Providence. He is a healthy two-month-old and the milk was sent to Denver Milk Bank.

Northwest Mothers Milk Bank

www.nwmmb.org

A new milk bank in Portland, Oregon—that's our dream. With some of the highest breastfeeding rates in the nation, the Northwest region has breastfeeding mothers willing to donate and a demand for the use of donor milk. But we don't have a milk bank, yet.

In the last year, the Northwest Mothers Milk Bank has formed a non-profit organization with a board of directors and medical advisory board. To build our local network of donors, we've worked with local hospitals to open two donor depots with a third to come next month. These drop-off sites are shipping milk to other milk banks for the time being. They are also building awareness and getting moms interested in donation. We've had a tremendous response already! We're conducting community outreach to the lactation and medical communities as well as the general public. Our board members and volunteers have spoken at conferences, staffed tables at farmer's markets, handed out brochures and made valuable connections.

The hard work of raising money is upon us. Our fundraising committee is working on grant applications and soliciting individual donors. The support and advice of HMBANA members has been invaluable to us and we welcome continued encouragement as we make our dream a reality.



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**100 Years of Milk Banking:
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Mothers' Milk Bank in San Jose celebrates 35 years of service

By Pauline Sakamoto, RN, MS

This year the Mothers' Milk Bank celebrated our 35th Anniversary with two events! On April 9, 2009, invited guests were treated to Northern California wines and sumptuous catering from Whole Foods. The event was held at the Whole Foods Culinary Center in Cupertino and was sponsored by Merrill Lynch in Cupertino, California. Flowers were donated by Citti Florist. Glamorous invitations were also donated by Minuteman Press. Although it rained that day and traffic was awful, we had a good turn out of friends and supporters of the Milk Bank. Recognition from Congressman Michael Honda and Senator Elaine Alquist were read during the event. Terry Asquith, the previous Milk Bank Director and one of the original charter members of HMBANA, also came out to celebrate with us. She was the hit of the party telling the audience what it was like starting this milk bank up and the develop-

ment of HMBANA. She was instrumental in studies regarding processing of human milk, uses for donor milk and networking with international milk banks to standardize milk bank procedures.

For the families of supporters of the milk bank, we had a Mother's Day 5K Fun Run, (walk, stroll, and crawl) at Vasona Park in Los Gatos. As the first venture into this type of event, Christie Dacanay, our Recipient Coordinator, and Mary Vidovich and baby Janie, one of the Directors of our Board, both avid runners coordinated the event. The local Los Gatos Running Store offered the timing equipment and staff to run the race. Luckily, the morning was absolutely beautiful and the park facility was green and the lake filled with ducks. Donors, previous recipients, and staff from the local hospitals that we serve came out and enjoyed the fresh air, food from Whole Foods, a raucous

visit from Sharkey for the kids and quiet spaces to breastfeed! Everyone who entered the race received a T-shirt and a goody bag from Whole Foods filled with chocolates, soaps, energy bars and a flower for Mothers' Day. The Buddhist Church's Sangha Crafters made baby hats and crochet blankets for the babies entered in the race. After the race, donated gifts were drawn such as a \$500 gift certificate to a Los Gatos jewelry store. Many of the hospital runners requested we do this annually so they can challenge other hospital groups!

Terry Asquith mentioned that never in her dreams she thought that we'd be able to process over 300,000 ounces in the little portable building where our milk bank is located! The exposure in the press and these events has motivated the Board of Directors to find a new facility for the milk bank and expand services for the next 35 years!

2010 Conference

100 Years of Milk Banking: Looking Back, Reaching Forward

By Naomi Bar-Yam

The first milk bank in North America was established in 1910 at the Floating Hospital for Children in Boston. The Human Milk Banking Association of North America was established in 1985 to serve as a professional organization for all non-profit milk banks in North America and to establish safe, evidence-based guidelines for establishing and running donor milk banks. April 12-13, 2010, HMBANA members and colleagues will come together to celebrate 100 years of milk banking and 25 years of HMBANA.

The conference, *100 Years of Milk Banking: Looking Back, Reaching Forward*, will take place where milk banking began, in Boston, hosted by HMBANA's newest milk bank, the Mothers' Milk Bank of New England. It will be held at the beautiful Hyatt Regency Hotel in Cambridge, MA, on the Charles River, a few blocks from Harvard Square and just across the river from Boston.

The conference will feature presentations on the history of donor milk, new cutting edge research on breastfeeding, human milk and donor human milk as well as sessions on current trends in milk banking around the world, inpatient and outpatient uses of donor milk, and practical and ethical concerns in milk banking.

Research topics include: Virus and disease transmission in human milk, Robert Lawrence, MD; Anti-tumor activity in human milk, Anders Hakenssen, MD; Environmental contaminants in human milk, Ardythe Morrow PhD; Calcium-phosphorus Bioavailability, Ron Cohen, MD; Oligosaccharides in Human Milk, David Newburg, PhD.

Clinical sessions include: Bereavement and milk donation; cost savings of using donor milk in the NICU; safety of donor milk; getting donor milk in the NICU; storage and handling of human milk.

HMBANA is applying for continuing education credits for physicians, nurses,

midwives, lactation consultants, social workers and dieticians.

We are planning a gala 100th/25th anniversary dinner and program Monday evening, and tourist activities in Boston Sunday afternoon, before the conference begins.

The conference is a wonderful opportunity to meet and network with milk banking and perinatal health professionals and colleagues from all over North America and the world.

Scholarships are available for students and residents in medicine, nursing, social work, midwifery, lactation consulting. Please email: education@milkbankne.org for more information.

More information and online conference registration will be available at: www.hmbana.org

We look forward to seeing you in April!

Medical Center in Fort Worth, Texas. Within two hours of birth, Slate had surgery. Because the abdominal contents would not initially fit into the abdominal cavity, the first surgery was to cover the unprotected, exposed intestines with a sac or "silo" to help prevent moisture loss and infection while attempting to slowly lower the intestines into the abdomen.

At one week of age, Slate had a second surgery to close his abdomen. The surgeon explained to Christal and Rusty they would do their best to save Slate's intestines, but there was a significant chance his bowel would not work or a large amount of bowel would have to be removed. This could leave Slate without enough bowel to sustain his nutritional needs.

Each day brought a new problem Slate had to overcome. Slate had a central line, was on a ventilator to breathe for him, had multiple blood and platelet transfusions, infections, worries about liver function and nutrition.

When Slate was about three weeks old, Christal and Rusty were told that his intestines were not working and he would need another surgery in a few weeks. This would not be the last surgery he would need. At one month of age, Slate had another surgery. Some of his bowel was removed which left him with two temporary colostomies.

The next two months were a roller coaster ride for the Suson family. Slate would improve and be able to tolerate tiny feedings and then he would regress. His lungs would improve and he would come off the ventilator and then he would deteriorate and need to be put back on. On one terrible day, Christal had to watch her baby be resuscitated and placed back on the ventilator. He would need to be stuck over and over for blood work and IV's. His colostomy bags would need to be changed over and over in an uncomfortable procedure. He developed a potentially life-threatening infection and was put in isolation on very strong antibiotics. He required nutrition intravenously all this time and it was causing his liver to fail.

Thanksgiving and Christmas came and went and little Slate still struggled to survive. The biggest obstacle to overcome was Slate being able to tolerate feeding so that he could come off the IV nutrition that was affecting his liver.

Despite her best efforts, the severity and stress of Slate's health problems took their toll on Christal's ability to provide breastmilk long-term. She felt helpless. Christal knew how important breastmilk is for any baby, but for her critical, vulnerable baby she knew it was vital. Slate began getting tiny feedings of donor human milk from the Mothers' Milk Bank of North Texas (MMBNT). He slowly began to tolerate larger amounts and gradually came off his IV nutrition. He was still very fragile and his liver problems left him very jaundiced, but he was tolerating feedings.



Finally, on January 23, 2009, at four months of age, Slate was released from the hospital. His family was elated. Slate came home on gastric tube feedings of donor human milk and was allowed to take donor milk through a bottle a few times a day. He still had a long way to go. There were concerns about his nutrition, weight gain and development, but he was home and Rusty and Christal were hopeful that he would continue to improve.

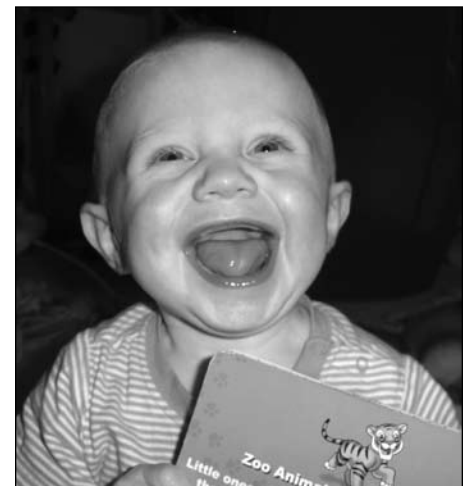
Slate continued to improve on donor human milk and was gaining weight. The jaundice improved as his liver has had a chance to recover.

Slate's neonatologist, Dr. Erin Hamilton-Spence says, "Slate was always a determined baby. The amount of bowel he lost during his surgeries was staggering.

Many of us doubted whether he would ever be able to grow and thrive without his IV nutrition. Christal was devastated when her milk supply did not last. But as he recovered from his illnesses, Slate did better on donor milk than on anything else. I was thrilled that the donor milk enabled him to adapt and get rid of the IV nutrition. I have no doubt that donor milk was, and is still, a huge benefit to Slate's health and development."



Slate is now 13 months old and weighs over 21 pounds! He continues to thrive on donor milk and now takes all of his feedings by bottle. "He can really suck down a bottle," says his grandmother when she stopped by the milk bank to pick up his milk. He is developmentally on track for his gestational age and scooting across the floor. The Suson family knows their precious baby is a miracle. Christal says, "We fought for our son's survival and we know that donor human milk was a big part of that survival. I don't know where Slate would be if there were not mothers willing to donate their milk. The milk bank has been a true God-send for our child and our family."



From the Journals

By Kim Updegrave, RN, CNM, MSN, MPH

Donor Human Milk Study

Untalan P, Keeney S, Palkowetz K, Rivera A, Goldman A. Heat susceptibility of interleukin-10 and other cytokines in donor human milk. *Breastfeeding Medicine*. September 2009, 4(3): 137-144.

The researchers in this study utilized donor human milk from a milk bank to examine effects of Holder pasteurization on certain anti-inflammatory components of human milk—epidermal growth factor (EGF), transforming growth factor (TGF-β1), erythropoietin (EPO), and interleukin (IL)-10. Recognizing benefits of mothers' own milk for preterm infants they sought answers regarding potential benefits of pasteurized donor human milk to those infants in light of unknown effects of

pasteurization on those components of milk thought to be responsible for protection against disease states such as necrotizing enterocolitis.

Using standard testing methods, donor human milk was tested pre- and post-Holder pasteurization for concentrations of EGF, TGF-β1, EPT and IL-10. There were no significant differences in EGF and TGF-β1 concentrations in unprocessed and Holder pasteurized donor human milk. Concentrations of EPO and IL-10 decreased significantly from unprocessed milk to Holder pasteurized donor human milk, and in 7 and 6 of the samples, respectively, no detection of these components was possible after pasteurization.

EGF promotes the growth and development, maintenance, and repair of intestinal epithelium. As such, its persistence

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From the President

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collecting, storing and distributing human milk was also discussed. The committee did an exceptional job of incorporating tissue banking regulations into the instrument as the standard. The research committee, chaired by Donna Miracle, collected human milk samples for research studies being conducted at CDC, North Carolina State University and individual milk bank studies. It is exciting to see milk banks continue to develop their own body of research. Efforts are underway to look that the ethical value of distribution of human milk and potentially expanding and reconstructing the membership structure of HMBANA.

A very active conference committee, headed by Naomi Bar-Yam and Frances Jones, is working diligently to make the April 12 and 13, 2010, conference in Cambridge, Massachusetts, the best International Congress of Milk Banks! The conference will celebrate the 25th anniversary of HMBANA and the 100th anniversary of Milk Banking in North America. We have scheduled over 25 speakers from around the world presenting on the uses of donor milk, composition of human milk and lactation issues. We will be thrilled to welcome doctors, nurses, lactation consultants, dietitians and social workers to this exceptional conference in Cambridge, the birthplace of milk banking. The network possibilities are endless with our international peers!

Kim Updegrave was elected secretary of the executive board and Cindy Duff was elected as board representative member on the executive committee. HMBANA is blessed to have hard-working individuals at the helm!

HMBANA continues to garner support from professional organizations. The American Academy of Family Physicians endorses HMBANA milk banks in their position paper on Breastfeeding Support, 2008. As well as the American Breastfeeding Medicine's Position paper on Donor Milk Banking, 2008.

As I close my column, I want to acknowledge some news about one of the founding members of HMBANA. Mary Rose Tully, who is such an inspiration to all of the milk bank directors, has been diagnosed with cancer and is currently being treated for the disease. We missed her intensely in Kalamazoo, but the wisdom and direction she has shared with us for many years was present with us. We wish her a speedy recovery and think of her daily.

FAQs: Swine Flu & Breast Milk

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her treatment for suspected swine flu. Success of breastfeeding during this interval will depend on hospital support for expression of milk, and severity of disease in the mom.

Milk banks may also be affected, as the general population is affected, by symptomatic staff requiring more sick time than usual. Staff with suspected influenza should be instructed to remain at home. Strategic cross training of staff in order to cover all responsibilities will be key to a smooth flu season.

What are the concerns for the future?

Influenza viruses continue to change, presenting an annual challenge to develop effective vaccination programs. Each new vaccine will be closely monitored for both effectiveness and side effects. The Centers for Disease Control will maintain a national database for tracking reactions and supply. Personal hygiene measures that limit exposing others to respiratory-spread illnesses are lifelong recommendations for maintaining wellness. Responding to each new flu season with rational thought and behaviors will protect the population from negatively influencing healthy practices such as breastfeeding.

Joelle's Story

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at UNC encouraged Alicia to donate the remainder of her milk to the WakeMed Mothers' Milk Bank. Over the next several weeks Alicia made many more donations to the Milk Bank making her total donation come to 3,866 ounces!

After this experience, Alicia approaches patient teaching in a more passionate way. She desires for other mothers to have the same sense of fulfillment that she experienced as a donor to the WakeMed Mothers' Milk Bank. The memory of Joelle Manson will live on in the hearts of her family forever and many babies will benefit from Alicia's generous donation.

Return Service Requested

From the Journals

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through the pasteurization process is an important finding in support of the use of Holder pasteurized donor human milk for the preterm infant. TGF- β 1 is both anti-inflammatory through reducing production of IL-8 (a pro-inflammatory cytokine) and plays a role in maintaining intestinal epithelium. As such, its ability to persist through the pasteurization process also suggests that this valued component of human milk remains protective and productive for the preterm infant. IL-10 protects against experimentally induced intestinal disease in mice. Its significant reduction in pasteurized human milk may affect the ability of donor human milk to protect the preterm infant against NEC. The researchers took their experiments one step further, investigating T-cell proliferation inhibition in donor human milk that had reduced IL-10 secondary to pasteurization. They saw no decrease in the anti-proliferative effect of human milk on T-cells, suggesting that other factors in human milk besides IL-10 work to produce this effect.

Finally, and significantly for milk banks, EGF and IL-10 concentrations were found to be lower than reported in previous studies, perhaps reflecting the pumping dates of the particular 17 samples of milk studied. Milk utilized for this study reflected pumping dates of 8 ± 3.5 months, considerably later pumping dates than milk utilized in previous studies of these components. This finding lends important information for the milk bank industry in terms of careful selection of appropriate milk for the neonate in the clinical setting.

Breastmilk Study

Zimmerman D, et al. Effect of a 24+ Hour Fast on Breast Milk Composition. *J Hum Lact* 25(2), 2009.

Researchers in Israel prospectively studied breast milk samples collected from 48 women observing strict dietary restrictions associated with religious beliefs. The goal of this study was to determine whether or not there were any changes to select breast milk components in samples taken directly after 25 hours of fasting in comparison with those taken before fasting began. Breastfeeding women participated in this study to measure levels of sodium, calcium phosphorus, triglycerides, total protein, and lactose. The women had to be exclusively breastfeeding a healthy infant between the age of one and six months, and they could use any method of expression to obtain the samples expressed prior to feeding their infant. All samples had to be collected at a similar time of day to recognize natural diurnal changes previously noted in studies, and each woman served as her own control. Neither food nor water was allowed during the fast.

Results of tests on the milk revealed significant increases in sodium, calcium, and protein levels immediately after completion of the fast. At the same time, phosphorus and lactose levels significantly decreased, and potassium and triglycerides were unchanged. Authors theorize that the sodium increase may have represented a decrease in maternal milk supply, not measured in this study, but logical in light of previous studies showing

no effect of maternal diet on breastmilk sodium, but increased levels of sodium noted in involuntal breast milk. Protein levels in milk have previously been studied in relation to chronic malnutrition and were found to have little link to maternal consumption, however acute changes have been found in other small studies when women's diets were suddenly manipulated.

This study serves to increase our understanding of the variation of nutritional components in breast milk as they relate to maternal lifestyles. It raises questions of the role of dehydration in these changes, and warrants further study in this area. It should be noted, however, that although thousands of women honor these religious fasting days, there is no documentation of negative clinical outcomes among their infants—perhaps another area warranting study.

In summary, fasting of 24 hours or longer is associated with changes in a number of biochemical markers in human milk. Some of these changes are also found in the 24 hours after re-feeding. Fasting is experienced by many women each year in honor of cultural and religious beliefs with no reported clinical effects documented. Fasting may also be experienced by women undergoing various medical tests and treatments, as well as those engaged in dietary modification challenges. Changes in milk components may necessitate the education of women regarding adequate hydration prior to and immediately following fasting, as well as the avoidance of activities enhancing dehydration during the period of fasting.