5th International Congress
“Donor human milk as a bridge for successful breastfeeding”

European Milk Bank Association (EMBA)

TURIN
10th-11th October 2019

NH Torino Santo Stefano

www.embacongress.it
# EMBA BOARD OF DIRECTORS

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
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<tr>
<td>Enrico Bertino</td>
<td>President</td>
<td>Turin (Italy)</td>
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<td>Aleksandra Wesolowska</td>
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# SPEAKERS & MODERATORS

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<td>Sertac Arslanoglu</td>
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<td>Alessandra Coscia</td>
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<td>Guglielmo Salvadori</td>
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<td>Umberto Simeoni</td>
<td>Lausanne (Switzerland)</td>
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<td>Diane L. Spatz</td>
<td>Philadelphia, PA</td>
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<td>Catharina Svanborg</td>
<td>Stockholm (Sweden)</td>
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<td>Amy Vickers</td>
<td>Fort Worth, TX</td>
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<td>Gillian Weaver</td>
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<td>Aleksandra Wesolowska</td>
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<tr>
<td>Time</td>
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<tr>
<td>8:15-10:15 a.m.</td>
<td><strong>SESSION I. THE WONDERS OF HUMAN MILK</strong></td>
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<tr>
<td>8:15-8:35</td>
<td>Human milk oligosaccharides: impact on microbiota and infant outcomes</td>
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<td>8:35-8:55</td>
<td>Infant gut microbiota colonization: origin and function of microorganisms</td>
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<td>8:55-9:15</td>
<td>The therapeutic anticancer potential of HAMLET: where are we now?</td>
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<td>9:15-9:35</td>
<td>Antiviral properties of human colostrum: identification of new active components</td>
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<td>9:35-9:55</td>
<td>Discussion</td>
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<td>9:55-10:15 a.m.</td>
<td><strong>Oral Communications</strong></td>
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<td>9:55-10:15 a.m.</td>
<td>OC01 Human breast milk - derived mesenchymal stromal cell (MDMSCs)</td>
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<td>characterization: key players in neonatal adaptive immunity?</td>
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<td>10:15-10:30 a.m.</td>
<td><strong>Greetings from Authorities</strong></td>
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<td>10:30-10:50 a.m.</td>
<td><strong>Coffee Break</strong></td>
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<tr>
<td>10:50 a.m.-1:00 p.m.</td>
<td><strong>SESSION II. DONOR HUMAN MILK FOR PRETERM INFANTS: IS THERE ENOUGH EVIDENCE?</strong></td>
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<tr>
<td>10:50-11:10</td>
<td>Impact of donor milk on short-term clinical outcomes in NICU</td>
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<td>11:10-11:30</td>
<td>Effects of early nutrition on health at adulthood in preterm born subjects</td>
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<td>11:30-11:50</td>
<td>Comparative digestomic: a promising tool for the characterization of donor human milk</td>
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<tr>
<td>11:50-12:10 p.m.</td>
<td>Economic evaluation of donor human milk use in preterm infants</td>
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<td>12:10-12:30</td>
<td>Discussion</td>
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12:30-1:00 p.m. **Oral Communications**

OC03 Improved outcomes from feeding with donor preterm milk  
*Giannoula Gialeli (Athens, Greece)*

OC04 Growth, feeding tolerance and metabolism in extreme preterm infants under exclusive human milk diet  
*Fabian Eibensteiner (Vienna, Austria)*

OC05 Relationship between human milk volume intake and clinical outcome in very low birth weight infants  
*Nadia Liotto (Milan, Italy)*

1:00-2:20 p.m.  
**Lunch and Poster Session (from P01 to P24)**  
*Coordinator: Clair-Yves Boquien*

2:20-4:10 p.m. **SESSION III. DONOR HUMAN MILK AS A BRIDGE FOR SUCCESSFUL BREASTFEEDING**  
*Moderators: Jean-Charles Picaud, Guglielmo Salvadori*

2:20-2:40 Strategies to promote lactation and breastfeeding in preterm infants  
*Amy Vickers (Fort Worth, TX, US)*

2:40-3:00 Human milk banking: competitive or supportive for breastfeeding?  
*Rachel Buffin (Lyon, France)*

3:00-3:20 Recommendations for the use of mother’s own milk in NICU  
*Gillian Weaver (London, UK)*

3:20-3:50 Beyond BFHI – The Spatz 10 step model for human milk and breastfeeding for vulnerable infants  
*Diane L. Spatz (Philadelphia, PA, US)*

3:50-4:10 **Discussion**

4:10-4:30 p.m. **Coffee Break**
4:30-6:10 p.m.  **SESSION IV. PRACTICAL ASPECTS OF HUMAN MILK BANKING**  
*Modemators: Amy Vickers, Daniele Farina*

4:30-4:50  The importance of breast milk and human milk banks for preterm babies — the parents’ perspective  
*Silke Mader (Munich, Germany)*

4:50-5:10  Best practices to limit contamination of donor milk in a milk bank  
*Jim Gray (London, UK)*

5:10-5:30  Survey on the operation of European Milk Banks  
*Aleksandra Wesolowska (Warsaw, Poland)*

5:30-5:50  Discussion

5:50-6:10 p.m.  **Oral Communications**

OC06  Exploring the impact of maternal stress on glucocorticoids in human milk and infant temperament  
*Eva Naninck (Amsterdam, the Netherlands)*

OC07  Advancing the Safety of Human Donor Milk with Direct Pathogen Testing with Nucleic Acid Amplification  
*Victoria Niklas (Duarte, CA, US)*

6:10-7:10 p.m.  **EMBA GENERAL ASSEMBLY**
8:30-10:30 a.m.  **SESSION V. OPTIMIZATION OF NUTRITIONAL QUALITY OF DONOR HUMAN MILK**  
*Moderators: Aleksandra Wesolowska, Lars Bode*

8:30-8:50  Optimization of processing of donor human milk  
*Guido E. Moro (Milan, Italy), Alessandra Coscia (Turin, Italy)*

8:50-9:10  Optimization of human milk fortification  
*Sertac Arslanoglu (Istanbul, Turkey)*

9:10-9:30  Assessment of human milk composition  
*Christoph Fusch (Hamilton, Canada)*

9:30-9:50  The LACTACOL cohort: impact of the protein content of breastmilk during hospitalization of preterm newborns, on growth and neurodevelopment until 2 years of age  
*Clair-Yves Boquien (Nantes, France)*

9:50-10:10  Discussion

10:10-10:30 a.m.  **Oral Communications**

OC08  The effect of different time-temperature profiles on bioactive proteins during pasteurization of donor human milk  
*Eva Kontopodi (Amsterdam, the Netherlands)*

OC09  News from the MaxiMoM (Maximizing Mother’s Milk) program of research in Canada  
*Sharon Unger (Toronto, Canada)*

10:30-11:00 a.m.  **Coffee Break**
PROGRAMME - October 11th 2019, Friday

11:00 - 12:00 a.m. Oral Communications

Moderators: Rachel Buffin, Guido Moro

OC10 Fortified human milk diet and growth in very preterm infants: a multicenter study
Betina Soldateli (Boston, MA, US)

OC11 A pre-post intervention study to assess the impact of Mother-Baby Friendly Initiative Plus model in improving utilization of human milk feeding and neonatal outcomes at tertiary and secondary care facilities
Ruchika Sachdeva (Mumbai, India)

OC12 Effects on gastroesophageal reflux of a donkey milk-derived human milk fortifier versus standard fortifier in a population of preterm newborns - Additional data of Fortilat Study
Elena Maggiora (Turin, Italy)

OC13 Vitamins intake in supplemented and non-supplemented human milk donors
Kristin Keller (Madrid, Spain)

OC14 Food-processing approaches to generate a human milk protein concentrate: compositional changes during skimming, debacterization and concentration steps
Mélanie Sergius-Ronot (Quebec, Canada)

OC15 Human cytomegalovirus thermal sensitivity analysis questions
Holder pasteurization as the best option to pasteurize human milk
Antoni Gaya (Palma, Spain)

12:00 a.m-1:30 p.m. Lunch and Poster Session (from P25 to P49)
Coordinator: Sertac Arslanoglu

1:30-2:00 p.m. Oral Communications

Moderator: Anne Grovslien

OC16 Basic characteristics of human milk donors in the first serbian human milk bank at the Institute of Neonatology in Belgrade
Radmila Mileusnic-Milenovic (Belgrade, Serbia)

OC17 Comprehensive lactation management and donor human milk: potential for newborn survival in India
Sila Deb (New Delhi, India)

OC18 An integrated model for strengthening access to human milk in Kenya
Minnie Kibore (Nairobi, Kenya)
### SESSION VI. HUMAN MILK BANKING WORLDWIDE AND NEW RESEARCH

**Moderators:** Radmila Mileusnic-Milenovic, Gillian Weaver

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<tr>
<th>Time</th>
<th>Session</th>
<th>Speakers</th>
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<tr>
<td>2:00-2:20</td>
<td>Nature or Nurture? Human milk to reduce neurodevelopmental and growth inequalities</td>
<td>Enrico Bertino (Turin, Italy), Alessandra Coscia (Turin, Italy)</td>
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<tr>
<td>2:20-2:40</td>
<td>Aligning global policies and standards for safe donor human milk</td>
<td>Kiersten Israel-Ballard (Seattle, WA, US)</td>
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<td>2:40-3:00</td>
<td>Challenges and possibilities on setting up milk banks in specific countries</td>
<td>Anne Grovslien (Oslo, Norway)</td>
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<tr>
<td>3:00-3:20</td>
<td>Metabolomics, microbiomics and multipotent stem cells (3M's) in human milk</td>
<td>Vassilios Fanos (Cagliari, Italy)</td>
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<tr>
<td>3:20-3:40</td>
<td>Discussion</td>
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<td>3:40-4:00</td>
<td>Closure and Remarks</td>
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GENERAL INFORMATION

Simultaneous translation from English into Italian will be provided if a significant number of Italian attendees will be reached.

REGISTRATION FEES

EMBA Member € 98.36 + VAT 22% = € 120.00
NON EMBA Member € 163.93 + VAT 22% = € 200.00
Student, Volunteer, Unwaged € 81.97 + VAT 22% = € 100.00

The fee includes:
- Access to the two – day sessions
- Congress kit
- Scientific Programme
- Abstract Book
- On line certificate of attendance (available after the end of the Congress)
- Lunch and Coffee Breaks

HOW TO GET REGISTERED

On the Organizing Secretariat website www.biomedina.net in the myLogin Area. Once registrations will be over; the online registration form will be replaced by the message: no more registrations available and no waiting list. Online registration is the only possible way to get registered; requests by phone, fax or email will not be accepted.

PAYMENTS' METHODS

The payment methods allowed:
- credit card (safe transaction on the Banca Sella circuit)
- Mybank online bank transfer (safe transaction on the Banca Sella circuit)
- Bank transfer (details for the bank transfer will be sent at the end of registration procedure)

At the end of the registration form, on the online platform, the system will show you the data for the payment.

CANCELLATION AND REIMBURSEMENTS

For cancellation up to 20 days before the starting of the meeting, we will reimburse 50% of the fee. No other reimbursements will be made after this deadline. Anyway, it is possible to change the name of the participant until the beginning of the Congress.

In case of cancellation of the event due to reasons not strictly depending on the Organising Secretariat, Biomedina will reimburse the total fee but not expenses the participant has supported to attend the Meeting.

CERTIFICATE OF ATTENDANCE

A certificate of attendance will be available online after the meeting in myLogin area on www.biomedina.net.

MEETING VENUE

NH TORINO SANTO STEFANO Hotel
Via Porta Palatina, 19
10122 Torino
GENERAL INFORMATION

How to reach the venue:
Information available on the hotel website

HOTEL ACCOMMODATION
Biomedical Travel di Biomedical srl
Via L. Temolo, 4 – 20126 Milano
Tel.: 02/45498282 - Fax: 02/45498199
E-mail: biomediatravel@biomedical.net

ORGANIZING SECRETARIAT
Biomedical srl – Alice Torrigiani
Tel 02/45498282 int 230
E-mail: alice.torrigiani@biomedical.net

INFORMAZIONI GENERALI

La lingua ufficiale del congresso è l'inglese. È previsto il servizio di traduzione simultanea dall'inglese in italiano solo nel caso di raggiungimento di un numero significante di partecipanti italiani.

QUOTE DI ISCRIZIONE

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<th>Type</th>
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<tr>
<td>Non Socio EMBA</td>
<td>163,93 + 22% = 200,00</td>
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<td>Studenti e Volontari</td>
<td>81,97 + 22% = 100,00</td>
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La quota di iscrizione comprende
- Accesso ai lavori congressuali dal 10 al 11 ottobre 2019
- Kit congressuale
- Programma Scientifico
- Libro degli Abstract
- Crediti ECM solo qualora il partecipante rispetti i requisiti necessari (obbligo di frequenza del congresso per almeno il 90% delle ore formative, timbratura in entrata e in uscita per ogni giorno, procedura verifica apprendimento e soddisfazione)
- Attestato di presenza online. Attenzione: l’attestato di presenza sarà scaricabile on line dal partecipante dopo il termine del congresso
- Lunch e Coffee Break previsti a programma

REGOLAMENTO ISCRIZIONI

Al sito www.biomedical.net – nella pagina dedicata all’evento - è attivo, fino ad esaurimento posti, il pulsante iscrizioni. Ad esaurimento posti disponibili la scheda di iscrizione online verrà sostituita con un messaggio di iscrizioni al completo; non sono previste liste d’attesa.
La modalità online sopra indicata è l’unica prevista, non potranno quindi essere accettate iscrizioni telefoniche, tramite fax e/o email.

MODALITÀ DI PAGAMENTO

È possibile iscriversi effettuando il pagamento con:
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- bonifico online Mybank (transazione sicura con circuito Banca Sella)
- bonifico bancario (i dati per effettuare il pagamento vengono inviati al termine dell’iscrizione)
INFORMAZIONI GENERALI

Collegandosi alla piattaforma iscrizioni, dopo aver compilato i dati richiesti, il sistema in automatico visualizzerà l’importo e gli estremi del pagamento.

ESSENZIONE IVA - FATTURE INTESTATE ALLA PUBBLICA AMMINISTRAZIONE

I partecipanti che necessitano di fattura intestata ad enti della Pubblica Amministrazione, devono registrarsi online inserendo il CODICE UNIVOCO AZIENDALE.
Il codice è fornito solo ed unicamente dall’ufficio di competenza della propria struttura di lavoro, senza tale codice non è possibile procedere con l’iscrizione.
Le iscrizioni con fattura intestate alla P.A. risultano immediatamente confermate e per il pagamento seguono i tempi previsti dagli Enti, pertanto i partecipanti non dovranno più anticipare la quota di iscrizione.

CANCELLAZIONI E RIMBORSI

Per le rinunce che perverranno alla Segreteria Organizzativa fino a 20 giorni prima dell’inizio del corso verrà rimborsato il 50% della quota d’iscrizione. Dopo tale data non è previsto alcun tipo di rimborso.
Inoltre non saranno rimborsate quote di iscrizioni non usufruite, per le quali non sia pervenuta la relativa rinuncia entro i termini stabiliti.
In qualsiasi momento è comunque possibile sostituire il nominativo dell’iscritto.
Qualora l’evento venga cancellato per cause che non dipendano dalla Segreteria Organizzativa, la stessa non rimbosrerà spese sostenute dal partecipante ad eccezione della quota di iscrizione.

CREDITI ECM

Il corso è stato accreditato da Sin Provider n. 556, presso il programma Nazionale di Educazione Continua in Medicina del Ministero della Salute per le seguenti categorie professionali:
Medico Chirurgo
Infermiere / Infermiere Pediatrico
Ostetrico/a
N. Evento ECM: 272716 N. Crediti: 3,6
Obiettivo formativo: 1 - Applicazione nella pratica quotidiana dei principi e delle procedure dell’evidence based practice (EBM - EBN - EBP)

Per avere diritto ai crediti è necessario
- aver frequentato il 90% dell’attività formativa dell’evento
- aver timbrato a inizio e fine di ogni giornata
- aver compilato il questionario di soddisfazione e apprendimento disponibili al sito www.biomedia.net (area riservata “myLogin)

Una volta superato il questionario sarà possibile scaricare direttamente dal sito il proprio attestato ECM. Come da Comunicato Agenas del 23 giugno 2014, si specifica inoltre che è possibile effettuare una sola (e non ripetibile) compilazione del test di verifica in modalità on-line. Per ulteriori informazioni http://ape.agenas.it/


ATTESTATO DI PARTECIPAZIONE

Tutti i partecipanti regolarmente iscritti avranno diritto ad un attestato di partecipazione. L’attestato non verrà consegnato in modalità cartacea ma dovrà essere stampato dal partecipante a partire dal giorno di chiusura dell’evento nell’area myLogin del sito www.biomedia.net.

Per richiedere le credenziali di accesso, se smarrite, si prega di inviare una mail all’indirizzo iscrizioni@biomedia.net

5th International Congress
European Milk Bank Association (EMBA)
INFORMAZIONI GENERALI

SEDE DEL CONGRESSO
NH TORINO SANTO STEFANO Hotel
Via Porta Palatina, 19
10122 Torino

Come raggiungere la sede:
Informazioni disponibili sul sito

SISTEMAZIONE ALBERGHIERA
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E-mail: biomediatravel@biomedia.net

SEGRETERIA ORGANIZZATIVA
Biimedia srl
Alice Torrigiani
Tel 02/45498282 int 230
E-mail: alice.torrigiani@biomedia.net
HUMAN MILK OLIGOSACCHARIDES: IMPACT ON MICROBIOTA AND INFANT OUTCOMES

Lars Bode

University of California, San Diego, US

Human milk oligosaccharides (HMOs) are complex sugars (carbohydrates) that represent the third most abundant component of human milk after lactose and lipids. More than 150 different and structurally distinct HMOs have been identified so far and accumulating data indicate specific structure-function relationships – in other words: different HMOs have different functions. HMO composition varies between different women and recent research focuses on how fixed and modifiable maternal factors influence HMO variation. Once ingested, HMOs resist degradation and reach the distal parts of the gastrointestinal tract. Here, HMOs serve as natural prebiotics and help shape the infant gut microbiome with immediate and potential long-term consequences for health and development, including infant growth, body composition and potential risk of childhood obesity. However, HMOs are more than just “food for bugs”. HMOs serve as antimicrobials and antiadhesives that keep potential pathogens in check. HMOs also have direct effects on epithelial cells as well as on immune cells, both locally in the gastrointestinal tract as well as systemically. Some of the effects of HMOs are highly structure-specific and dose-dependent, suggesting that they interact with specific host and/or microbial receptors. Specific HMOs are required to exert these effects while other, structurally distinct HMOs cannot mimic these effects. Other HMO effects require a particular “mixture” of HMOs with specific ratios of different HMOs to each other. One HMO alone is ineffective; instead a group of different HMOs is required to act together in modulating the composition and activity of microbial communities and/or a complex immune system response. HMOs were first discovered in the mid 1950s and HMO research has come a long way since and has been greatly accelerated over the past few years due to advances in analytical technologies as well as in methods to generate individual HMOs at large scale for research and application. However, we are still at the very beginning of uncovering the complexity of HMOs and understanding their full potential in influencing immediate and long-term infant health and development.
THE THERAPEUTIC ANTICANCER POTENTIAL OF HAMLET: WHERE ARE WE NOW?

Catharina Svanborg

*Lunds Universitet, Lunds, Sweden*

Human milk is a rich source of molecules that defend and nurture mothers and babies. A wide variety of disease-fighting molecules are present in milk and their combined effects protect breast-fed children against infections. Less well-known is the fact that breast milk contains molecules with a protective potential against other lethal diseases, such as cancer.

We were reminded of the importance of human milk, when we discovered that a fraction of human milk also kills cancer cells. We were studying the antibacterial effects of breast milk, looking for new natural antibiotics and were taken completely by surprise when one milk fraction actually killed cancer cells. This was remarkable, as cancer cells are defined by their ability to grow and not to die. Analyzing >40 different cancer cell types, we showed that the milk fraction preferentially killed cancer cells, with a broad effect. These early findings suggested that it is possible to find efficient death switches in cancer cells and that these switches can be used to develop new therapies.

This discovery is a fascinating example of the versatility of protective molecules from human milk. Something in breast milk was activating the defunct death switch in cancer cells. We identified and named the cancer-killing complex HAMLET (Human Alpha-lactalbumin Made Lethal to Tumor cells). It consists of two breast milk ingredients: one is the most common protein in breast milk, alpha-lactalbumin and the other the most common fatty acid, oleic acid.

Based on many years of science and more discoveries, it is now possible to produce larger amounts of HAMLET, from the purified constituents of human milk. These advances have made it possible to test HAMLET as a treatment in animal models and in clinical studies. Recently, we have identified a smaller part of the HAMLET molecule that can be produced synthetically, and are exploring this as a drug candidate.

HAMLET has potent therapeutic effects. In animal studies, local HAMLET treatment limited the progression of brain tumors and bladder cancer. HAMLET has also been proven to work as a treatment against colon cancer in mice and also showed promising activity as a prophylactic agent.
in intestinal cancer models, suggesting that HAMLET or other HAMLET-like molecules might be developed to prevent tumor development in genetically susceptible individuals.

Studies in humans have shown that HAMLET can eliminate skin papillomas (tumors caused by viruses), and local injections of HAMLET in human patients with bladder cancer caused shedding of tumor cells into their urine. Most fascinating, the cell death affected the tumor tissue but healthy adjacent tissue was not damaged, and the patients suffered no toxic side effects. This was a crucial step in establishing that HAMLET mainly targets tumor tissue in cancer patients.

Extensive studies into the mechanism of action of HAMLET have shown that the complex is “stealing” its way into tumor cells, though the lipid membrane and that it accumulates in the nuclei of the tumor cells. HAMLET stops tumor cells from making new essential cellular building blocks and prevents them from multiplying. This prevents the tumor from growing and taking over of healthy tissue space and destroys vital tissue functions.

HAMLET offers a unique vision for the improvement of cancer-specific therapies. New cancer therapies need to be selective and efficient and HAMLET has shown both of these characteristics. The next steps will entail producing industrial-scale quantities of HAMLET, fulfilling all of the regulatory and toxicological requirements for drug development, and undertaking extensive clinical trials. Ultimately, HAMLET may offer hope to the cancer patients around the world who currently lack new and effective therapies. Considering HAMLET's chance beginning, a simple study of antibacterial properties in human milk, the project has come a very long way, indeed.
PRESENTATIONS

ANTIVIRAL PROPERTIES OF HUMAN COLOSTRUM: IDENTIFICATION OF NEW ACTIVE COMPONENTS

David Lembo
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Oxysterols are cholesterol oxidation derivatives. Those containing an additional hydroxyl group on the side chain of the cholesterol molecule result from a physiological enzymatic synthesis and include the majority of oxysterols present in the circulation. Among these, 25-hydroxycholesterol (25OHC) and 27-hydroxycholesterol (27OHC) are characterized by a broad antiviral activity and are now considered involved in the innate immune response against viruses. Despite the emerging role of these sterols in the innate antiviral defences, no data are available on their presence in human breast milk (BM) to date. In this study, we investigated the content of oxysterols of enzymatic synthesis in BM of twelve donor mothers at different stages of lactation (i.e. in colostrum, transitional milk, and mature milk) by gas chromatography-mass spectrometry analysis. The side-chain oxysterols 25OHC, 27OHC, and 24S-hydroxycholesterol (24SOHC) were actually present in BM in all stages of lactation, but the concentration of 27OHC showed a remarkable peak in colostrum. Antiviral assays revealed that all the colostrum samples contained 27OHC concentrations that were active in vitro against two relevant pediatric viral pathogens: the human rotavirus and the human rhinovirus. Overall, this study discloses new antiviral components of BM and suggests a passive transfer of these protective factors to the infant via breastfeeding, especially in the first few days of lactation.
PRESENTATIONS

EFFECTS OF EARLY NUTRITION ON HEALTH AT ADULTHOOD IN PRETERM BORN SUBJECTS

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Rates of preterm birth have increased the last decades and with improvement in perinatal and neonatal care a growing cohort have survived to the neonatal period and are now entering adulthood. Clinical and experimental evidence suggests that preterm birth is associated with impaired or arrested structural or functional development of key organs/systems making preterm infants vulnerable for cardiovascular and chronic renal diseases at adulthood. Cardiovascular, metabolic and chronic renal disease are part of non-communicable diseases, a leading cause of mortality and morbidity worldwide. They are recognized as having early origins through altered developmental programming due to adverse environmental conditions during development. Preterm birth-related stress and early nutrition are key influencers of developmental programming. This presentation focuses on the evidence for cardiovascular, metabolic and renal changes, the role of either deficiency or excess of perinatal nutrition, and potential pathogenic mechanisms, including arrested development, accelerated cell senescence and epigenetic alterations. Breast milk feeding is an important factor of optimal developmental programming.
Up to one in 20 babies in neonatal units develop necrotising enterocolitis (NEC).¹ NEC is a serious condition and some infants may require surgery. The annual cost of treating NEC in premature babies in the UK is £13.5 million.² Donor human milk (DHM) is the ‘next best alternative’ to breast milk and particularly beneficial for preterm or low birthweight infants, who are at increased risk of NEC. Compared with DHM, formula milk is associated with a nearly twofold increased risk (risk ratio: 1.87, 95% CI: 1.23 to 2.85) of NEC in preterm infants.³

However, DHM is frequently rationed, perceived as costly and used sub-optimally. There is little evidence concerning the cost-effectiveness of DHM and decision-makers do not know how services should be optimally configured as practice varies widely throughout the UK. As a result, neonatal units in the UK face a geographical lottery when accessing screened DHM for their patients. The need to assess the cost-effectiveness of DHM compared with formula milk, has been highlighted by the James Lind Alliance, National Institute of Health and Care Excellence and the British Association of Perinatal Medicine.

I will provide an overview of the steps to conduct cost-effectiveness analyses, with particular focus on some of the key challenges, including:

1. Access to screened DHM
2. Lack of robust clinical data
3. Opportunity costs
4. Perspective – health care, patient or societal
5. Time horizon
6. Lack of data on costing (including identifying, measuring and valuing resource use)
7. Lack of data on outcomes such as health state utility values for estimating quality-adjusted life years
8. Poor reporting of analytical methods used in previous economic evaluations
9. Generalisability and relevance of findings to policy makers.
This presentation will also provide an outline of my proposed work programme:

1. To systematically review the evidence base on the clinical and cost-effectiveness of DHM.
2. To examine service provision, explore the costs of running UK milk banks that provide DHM and to explore women’s experiences of DHM.
3. To use patient-level data to estimate the impact on neonatal and longer-term hospitalisation costs of using DHM in preterm infants.
4. To determine preferences for outcomes that infants receiving DHM might experience.
5. To explore the longer-term impact of DHM on costs and benefits.
6. Engage with UK decision-making makers and forums to inform policy.

References:

The optimal enteral feed for newborn infants is maternal milk.\(^1\) Ideally this will be the mother’s colostrum followed by maternal transitional and then mature milk feeds. This applies equally to those born preterm or with clinical conditions, assuming enteral feeding is indicated. The availability of donor human milk (DHM) from a human milk bank (HMB) facilitates exclusive human milk feeds and provides the preferred option in the absence of sufficient maternal milk in accordance with recommendations from ESPGHAN\(^2\).

When babies are born preterm, low birth weight or sick there is often an associated delay in the mother’s ability to establish lactation\(^3\). The provision of evidence based help and information together with access to suitable equipment will support a mother to be able to optimise her milk supply. Human milk that is expressed and collected in excess of the infants’ requirements may be stored for future use and potentially also for donation to a human milk bank\(^4\).

This presentation will provide evidence based recommendations for optimal support and practical help for new mothers as well as for the safe collection, storage and handling of maternal milk for neonates whilst being cared for in a NICU and beyond. Included will be methods for best establishing and maintaining lactation throughout the infant’s stay\(^5\). In addition, recommended storage times, decontamination and disinfection methods for equipment and the use of a checklist will be discussed. Together these help all members of the NICU team and the parents ensure the infants receive optimal volumes of maternal milk and that babies are discharged fully breastfeeding wherever possible and desired.

2. Arslanoglu S et al, Donor Human Milk for Preterm Infants: Current Evidence and Research Directions JPGN Volume 57, Number 4, October 2013
THE IMPORTANCE OF BREAST MILK AND HUMAN MILK BANKS FOR PRETERM BABIES – THE PARENTS’ PERSPECTIVE

Silke Mader, Chairwoman of the Executive Board, European Foundation for the Care of Newborn Infants (EFCNI)

For parents of a preterm baby everything turns upside-down from one day to another with challenging and unexpected situations. Silke Mader, Co-founder and chairwoman of the European Foundation for the Care of Newborn Infants (EFCNI), knows from her own experiences that a family needs much more than medical care - parents need to be empowered and involved in their parental role from the beginning and they also need support in various practical aspects such as breastfeeding. Breastfeeding under such circumstances may become very difficult – if not impossible – and many parents struggle with the limitations to their parental roles.

Various studies have shown that especially ill and preterm babies benefit from receiving breast milk directly after birth rather than starting off on formula. When mother’s own milk is not or only insufficiently available, quality controlled donor milk is the second-best option. This is where human milk banks fulfill a key role to ensure safe donor milk for babies in need. Currently, there are no general recommendations or guidelines for the set-up and organisation of human milk banks in Germany, Austria, and Switzerland; however, there is an increased emphasis on developing uniform recommendations and on raising awareness for the need of milk banks and milk donors.

EFCNI initiated an international project with the aim to support clinical centres in Germany, Switzerland and Austria in the setup and operation of human milk banks. For this purpose, an interdisciplinary project scientific advisory board has compared and summarised current guidelines from several European countries. Based on their work and experiences, they have developed a position paper containing recommendations for promoting human milk banks as well as a toolkit to give practical advice and insights for interested institutions in the setup and operation of human milk banks. These publications serve as a blueprint for adapting the project in Europe and beyond with the long-term aim to implement quality-controlled standards for human milk banks and thus, safe and optimal nutrition for preterm and ill babies. Furthermore, EFCNI workshops on the setup and organisation of human milk banks were carried out for healthcare professionals in 2018 and further workshops will take place in 2019.
State of the art. It is known that Holder pasteurization (HoP) affects some of the nutritional and biological components of human milk (HM). Studies have demonstrated that temperature cycle in HoP is not always controlled or calibrated. So, food industry, and diary industry in particular, are evaluating innovative methodologies alternative to HoP to better preserve the nutritional and biological properties of fresh HM, while assuring at least the same microbiological safety of HoP. The most studied processing techniques include High-Temperature-Short-Time (HTST) pasteurization, High Pressure Processing (HPP), and Ultraviolet-C (UV-C) irradiation.

Aim. The aim of this presentation is to communicate the EMBA recommendations on processing of HM, based on the most recent results obtained with these new technologies.

Conclusions. Although research on the most promising technologies, which will represent a reasonable alternative to HoP in the future (HTST, HPP, UV-C) is progressing, at the moment it is important to recognize that the consistency and quality assurance of the pasteurizers currently available on the market today represent a fundamental approach that was previously lacking in HoP practice.

EMBA recognizes that HoP is at present the safest compromise for the treatment of DHM; however, further studies are needed to improve this technology in order to minimize its effects on the biological components of HM. The new technologies evaluated and studied by the Working Group are being developed rapidly, and EMBA recommends that the final aim of these technologies should be an improved preservation of the nutritional and bioactive components of raw human milk, while assuring microbiological safety of the product, at least at the same level as optimized HoP.
Evidence indicates that human milk (HM) is the best form of nutrition not only to term but also to preterm infants conferring health benefits in both the short and long-term. However, HM does not provide sufficient nutrition for the very low birth weight (VLBW) infant when fed at the usual feeding volumes leading to slow growth with the risk of neurocognitive impairment and other poor health outcomes such as retinopathy and bronchopulmonary dysplasia. HM should be supplemented (fortified) with the nutrients in short supply, particularly with protein, calcium, and phosphate to meet the high requirements of this group of babies.

Standard Fortification, which is currently the most utilized regimen in neonatal intensive care units, still falls short in supplying sufficient protein for some VLBW infants.

<table>
<thead>
<tr>
<th>Fortification Method</th>
<th>Principle</th>
<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>1. Standard (STD) Fortification</td>
<td>Fortification method currently in use in most of the neonatal units. A fixed amount of fortifier is added to a fixed volume of HM according to the manufacturers’ instructions.</td>
<td>Practical, but has not solved the problem of protein undernutrition for VLBW infants</td>
<td>Despite STD fortification many VLBW infants continue to have suboptimal growth.</td>
</tr>
<tr>
<td>2. Individualized HM Fortification</td>
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</tr>
<tr>
<td>a. Adjustable (ADJ) Fortification</td>
<td>Protein adequacy is monitored by BUN twice weekly, cut-off levels of BUN are 10-16 mg/dl*. If the level is less than 10 mg/dl extra protein is added to the STD fortification.</td>
<td>Practical, not labor intensive</td>
<td>Doesn’t need expensive devices Monitors protein intake of each infant . Safeguards also against excessive protein intake. Proven to be effective in optimizing growth/ protein intake with a RCT A real individualization method taking into consideration each infant’s protein requirement.</td>
</tr>
<tr>
<td>b. Targeted Fortification</td>
<td>Macronutrient concentrations in HM are analyzed and based on the results milk is supplemented with extra protein and/or fat.</td>
<td>All macronutrients can be supplemented. Bedside HM analyzers are required May be labor intensive Supplementation is done according to the population recommendations, does not take into consideration individual infant's requirement</td>
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EMBA encourages the use of “Individualized Fortification” to optimize nutrient intake. “Adjustable Fortification” and “Targeted Fortification” are 2 methods of individualized fortification. The quality and source of human milk fortifiers constitute another important topic. There is work looking at human milk derived fortifiers, but it is still too early to draw precise conclusions about their use.

SELECTED REFERENCES


THE LACTACOL COHORT: IMPACT OF THE PROTEIN CONTENT OF BREASTMILK DURING HOSPITALIZATION OF PRETERM NEWBORNS, ON GROWTH AND NEURODEVELOPMENT UNTIL 2 YEARS OF AGE

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Preterm infants are a vulnerable population with a higher risk of impaired neurodevelopment. Due to its numerous health benefits, human milk is the recommended food by neonatologists.

While an association has long been demonstrated between growth velocity and optimal infant neurodevelopment, especially for formula-fed preterm infants, this is, however, not so clear for exclusively breastfed preterm infants. That is what we have termed “breastfeeding paradox” (1): despite milk fortification, breastfed preterm infants often show a suboptimal growth during hospital stay and an improved neurodevelopment at 2 years, as compared to formula-fed preterm infants.

Breast milk composition varies with many parameters related to mother and infant physiology. We hypothesized that the composition in macronutrients (especially protein) could impact preterm infant growth trajectory and neurodevelopment. To test our working hypothesis, we set up an observational monocentric cohort of breastfed preterm infants, the LACTACOL cohort. The conclusions of this clinical trial will be presented.

PRESENTATIONS

NATURE OR NURTURE? HUMAN MILK TO REDUCE NEURODEVELOPMENTAL AND GROWTH INEQUALITIES

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It is well known that the first 1000 days of life offer a unique window of opportunity for growth and neurodevelopment of every child, and poor postnatal growth has been associated with neurocognitive impairments in preterm newborns. The most critical period of brain growth for humans corresponds to the third trimester of pregnancy and for very low birthweight (VLBW) infants these developmental processes take place in the neonatal intensive care unit (NICU). Therefore, reducing the so called ExtraUterine Growth Restriction (EUGR) represents one of the main goals in premature infant care [1][2].

Nowadays EUGR is decreasing thanks to the establishment of better medical practices, the implementation of “care” and above all an improved nutritional strategy which accounts for approximately 50% of growth variability during hospital stay [3][4].

Indeed, the International Consortium of INTERGROWTH-21st researchers have recently found that attainment of neurodevelopmental milestones (relating to cognition, language ability and motor skills) in early childhood, is similar among children across diverse geographical and cultural settings, provided that their health and nutritional status are adequate just like physical growth [5]. The findings are unique because neurodevelopmental markers in early childhood have never been studied this way before.

The researchers assessed 1,307 healthy 2-year-old children of urban, well-nourished, educated mothers enrolled in early pregnancy in Brazil, India, Italy, Kenya and the UK, using a specifically developed psychometric tool, standard visual tests and WHO motor milestones. Results show that, across a comprehensive set of indicators of physical and early child neurodevelopment, less than 10% of the variability is based on the child’s genes (nature) while the rest is environment (nurture).

Consequently, health care, socioeconomic conditions, and nutrition play the most relevant role in determining lifelong outcomes for preterm infants. Human milk (mother’s own milk or donor milk) is always the best choice not only for term, but also for critical and preterm newborns, nevertheless there is great variability in the global distribution of Human Milk Banks, with reduced possibilities of being fed with donor human milk mostly in low income Countries. Thus, improving the use of donor human milk worldwide “as a bridge for successful breastfeeding” is an important health goal and could contribute to shaping the health of future generations.
PRESENTATIONS

References


CHALLENGES AND POSSIBILITIES ON SETTING UP MILK BANKS IN SPECIFIC COUNTRIES

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The lack of breastfeeding support and routines that keep mothers and babies apart has been a hindrance to ensure breastfeeding among babies admitted to large governmental hospitals worldwide. A donor milk bank can fill the gap until mothers own production comes in.

But to make sure that donor milk is not used as an alternative to mothers own milk other than the first few days there is a few things to consider. Sometimes even just improved breastfeeding support, change of routines and small investments in the units can be what will save lives rather than spending a huge amount of time and money on setting up large milk banks in limited settings.

Our experience from different countries has thought us to take into consideration different aspects that will ensure a more sustainable change.
ORAL COMMUNICATIONS
INTRODUCTION: The transfer of immune factors from the mother to the infant starts in utero and continues postnatally through breastfeeding leading to a proper infant’s immune system development. Human breast milk is the gold standard for neonates owing to its nutritional values and established immunological properties, that protect infants from middle ear infections, respiratory and gastrointestinal diseases. Recently, human breast milk was described as a source of Mesenchymal Stromal Cells (MSCs), a unique cellular population with renowned anti-inflammatory and immune-modulatory properties mainly mediated by the indolamine-2,3-oxigenase 1 (IDO1) enzyme. To date, MSMSCs have not been well characterized and nothing is known about their role in neonatal immunological development. Herein, we characterized MDMSCs phenotype and we investigated gene expression levels of IDO1 and Tumor Necrosis Factor-α (TNF-α), proinflammatory cytokine directly involved in IDO1 transcription's activation.

METHODS: Within 2 weeks after the birth of term infants, MDMSCs (n=4) were isolated from human breast milk and cultured in Dulbecco’s modified Minimum Essential Medium (DMEM) supplemented with 10% Fetal Bovine Serum in flasks precoated with 5μg/cm² fibronectin. To characterize MDMSCs, flow cytometry was performed and the expressions of CD105, CD90 and CD73, main MSCs surface markers, and HLA II (Human Leucocyte Antigen II), receptor responsible of non-self antigens presentation to immunological system, were evaluated. Finally, cells were processed for mRNA isolation and the gene expression of stemness makers Oct-4 and NANOG and of IDO1 and TNF-α were assessed by Real Time.

RESULTS: All MDMSCs lines investigated were positive for CD105, CD90 and CD73 surface antigens, while they were negative for HLAII. Moreover, all MDMSCs properly expressed both Oct4 and Nanog mRNA. Finally, IDO1 and TNF-α were highly expressed in all MDMSCs cell lines analyzed.

CONCLUSIONS: Our results demonstrated that MDMSCs posses an appropriated MSCs phenotype characterized by positive expression of CD105, CD90 e CD73. Since MDMSCs did not express HLA II, they could be used in patients different from donor without causing host vs graft rejection. TNF-α/IDO1 pathway expression suggest that MDMSCs possess immunomodulatory properties as observed in MSCs from other sources. In conclusions, our data open to the development of innovative approach based on human breast milk enrichment with MDMSCs, in particular for the treatment of premature neonates with an immature immune system.
ORAL COMMUNICATIONS

OC02
ANTI-ZIKA VIRUS AND ANTI-USUTU VIRUS ACTIVITY OF HUMAN MILK AND ITS COMPONENTS
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²Neonatal Unit, University of Turin, City of Health and Science, Turin, Italy
³Italian Association of Human Milk Banks (AIBLUD), Milan, Italy

Introduction

The benefits of human milk are mediated by multiple nutritional, trophic, and immunological components, able to promote infant's growth, maturation of its immature gut, and to confer protection against infections. Despite these widely recognized properties, breast-feeding represents an important mother-to-child transmission route of several infections. Different studies show that some flaviviruses can occasionally be present in breast milk, but limited information exists regarding possible risks of transmission of flaviviruses through breast-feeding. The aim of this study is to investigate the protective role of human milk and its derived components (exosomes and milk polysaccharides) against two emerging flaviviruses, namely zika virus (ZIKV) and usutu virus (USUV), and to analyse their variation throughout the different stages of lactation.

Materials and Methods

Thirty healthy mothers were enrolled in the study: 10 mothers donated as many colostrum samples, 10 mothers donated colostrum, transitional and mature milk samples, and 10 mothers donated 15 ml of mature milk each. The aqueous fraction of each sample was employed in the study. The evaluation of the anti-ZIKV and anti-USUV activity was initially performed with 10 colostrum samples in vitro and subsequently the changes in the antiviral action were evaluated with regard to the different stages of lactation. The putative step of ZIKV and USUV replicative cycle inhibited by colostrum was investigated with specific antiviral assays. Furthermore, exosomes and polysaccharides were derived from colostrum and mature milk respectively. After the characterization, their antiviral potency was evaluated in vitro.

Results

All samples were endowed with anti-ZIKV and anti-USUV activity, although to a different extent. Colostra were significantly more active than the transitional and mature milk samples. Mechanism of action studies demonstrated that colostrum does not directly inactivate viral particles, but it hampers the binding of both flaviviruses to cells. We also demonstrated that both human milk derived components, namely the colostrum-derived exosomes and the mature milk-derived polysaccharides, contribute to the antiviral action of breast-milk.

Discussion and Conclusion:

This study discloses the antiviral activity of human milk against ZIKV and USUV and demonstrates the contribution of two non-immunological components of human milk in mediating its protective effect. Since the potential infectivity of human milk during ZIKV and USUV infection is still unclear, these data could support the World Health Organization recommendations about the breast-feeding during ZIKV infection and could contribute to producing new guidelines for possible USUV epidemic.
IMPROVED OUTCOMES FROM FEEDING WITH DONOR PRETERM MILK

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Background: Recent studies highlight the unique contribution of human milk to the dramatic survival increase of the VLBW infants. Unfortunately, during the first days of life, only a small percentage of mothers gaining birth prematurely an effectively support their preterm infants with their own milk, which has high amounts of nutrients. When mother’s milk is insufficient neonatologists use donor milk from milk banks. However the use of this type of human milk for preterm has many limitations as it contains insufficient amount if nutrients especially proteins and calories. Aim: Is to identify the importance of feeding preterm infants with donor human milk from preterm mothers DMPM and empower the importance of HMBS presence in every maternity hospital.

Method: 18 VLBW infants treated with DMPM along with own raw milk (group A) compared to 42 VLBW ones treated with DM from full-term mothers in combination with their mother’s own raw milk (group B). In both groups as infants received HM>100 ml/kg/d, the milk was fortified with individualized targeted fortification especially for protein (Nutricia Human Breast Milk Fortifier) targeted fortification. there weren’t significant differences between the two groups in respect to Birth weight,Height,Head Circumference as well as Crib Score.

Results: Group A suffered from significant less episodes of sepsis compared to group B (p=0.037) and fewer episodes of feeding intolerance, but this deferences weren’t statistically significant (p=0.568). Group A remained less day in ventilation (p=0.0430 and p=0.659) respectively. DMPM treated infants regained earlier their their birth weight and reach sooner full enteral feeding, however, these differences didn’t achieved the level of significance. Moreover, DMPM treated infants were presented with better somatometric characteristics at discharge, compared to group two, but these differences were statistically significant only for body weight (p=0.038,p=0.66, p= 0.084). Probably due to the fact that all the infants of the study were treated with HM (mothers own or donor) a very small percentage (3.4%) of infants studied suffered NEC and ROP.

Conclusion: if postnatal growth failure is to be avoided, neonatologists must pay attention to the increased needs of nutrients, especially proteins, the first vulnerable days of life. The provision of DHM from premature mothers may be the solution for VLBW infants until the mother can support her newborn with her own milk. The study is being continued so as to prove the importance of donor preterm human milk to support VLBW infants.
ORAL COMMUNICATIONS

OC04
GROWTH, FEEDING TOLERANCE AND METABOLISM IN EXTREME PRETERM INFANTS UNDER EXCLUSIVE HUMAN MILK DIET

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Background: For preterm infants, HM has to be fortified to cover enhanced nutritional requirements and establish adequate growth. Most HM fortifiers are based on bovine protein sources (BMF). Since a few years a HM fortifier based on human protein sources (HMF) is available. However, the composition of the HMF differs to the composition of bovine products with a lower carbohydrate content and a higher fat content (Protein-energy-ratio: HMF 3.37g/100kcal, BMF 3.42g/100kcal, recommendation 3.6-4.1g/100kcal), which might affect growth and weight gain of preterm infants. The aim of this study was to investigate the impact of a HMF versus BMF on growth in extremely low birth weight (ELBW, <1000g) infants.

Methods: This was a retrospective, controlled, multicenter cohort study in infants with a birthweight <1000g. Two different fortification periods were compared: The HMF group received HM+HMF up to 32+0 weeks and was changed to BMF afterwards. The BMF group received HM+BMF from fortifier introduction up to 37+0 weeks. Fortification of HM was started at a minimal enteral intake of 100ml/kg. The HMF group was matched 1:1 for birthweight (within 100g) and gestational age at birth (within 7 days) with the bovine control group.

Results: 192 ELBW-infants were included (HMF n=96, BMF n=96) in the study. Median gestational age in the HMF group was 26+1 weeks (IQR 24+6-27+1) vs. 25+6 (IQR 24+5-27+3) weeks in the BMF group. Median birthweight was 752g (IQR 659-893g) and 773g (IQR 650-890g), respectively. Baseline characteristics were well balanced. After the introduction of fortification growth velocity up to 32+0 weeks was significantly lower in the HMF group (16.5g/kg/day) in comparison to the BMF group (18.9g/kg/day, p=0.009). All other growth parameters did not differ from birth up to 37+0 weeks. Time to full enteral feedings, duration of parenteral nutrition and central line days were significantly longer in the HMF group than in the BMF group. NEC incidence was 10% in the HMF and 8% in the BMF group (n.s.).

Conclusion: Growth velocity in ELBW infants was significantly lower in the HMF regimen from introduction of fortifier up to 32+0 weeks of gestation in comparison to the BMF regimen. This could be related to the composition of the HMF fortifier containing a high protein and fat proportion and a low carbohydrate proportion which might be unfavorable for ELBW-infants. Results from this study do not support superiority of HFM over BMF in ELBW infants.
ORAL COMMUNICATIONS

OC05
RELATIONSHIP BETWEEN HUMAN MILK VOLUME INTAKE AND CLINICAL OUTCOME IN VERY LOW BIRTH WEIGHT INFANTS
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BACKGROUND AND AIM: It is well known the crucial role of nutrition for premature infants’ health. The aim of the study was to determine the amounts of human milk needed to reduce the risk of developing comorbidities in very low birth weight infants (VLBW: birth weight <1500 g).

METHODS: A retrospective study was conducted on 273 VLBW, who had access to donor human milk if their mother milk was not available or sufficient, born at the author’s Institution from 2016 to 2018. For each infant, the human milk intake (HMI: maternal + donor human milk) was calculated, as the percentage of the total milk fed during hospitalization and as mean daily intake (MDI: ml/day). Basic characteristics, time to achieve full enteral feeding (FEF: ≥150 ml/kg/day), duration in days of parenteral nutrition (PN), ventilatory support and hospitalization and the occurrence of comorbidity (necrotizing enterocolitis, sepsis, bronchodyplasia, abdominal surgery, premature retinopathy and cholestasis) were recorded by computed medical chart. A multivariate regression was conducted to evaluate the association between HMI and the time to reach FEF, the duration of PN, ventilatory support and hospital stay. A binary logistic analysis to calculate the association between the HMI ≥25%, ≥50% and ≥75% and the development of comorbidities was also conducted.

RESULTS: The basic characteristics of infants included were: birth weight: 1188±252g, gestational age: 30.0±2.4 weeks. The MDI and HMI were respectively 118.5±52.8 ml /day and 62.8±26.0% (251 infants≥ 25%, 175 ≥50% and 91≥75%). No differences were detected in growth parameters during hospital stay related to HMI. For each 10% increase in HMI, a reduction has been observed in the duration of: non-invasive ventilation: 1.61±0.56 days, time to achieve FEF: 1.7±0.36 days, PN: 0.99±0.3 days and hospital stay: 3.0±0.5 days (p <0.002). For each 10 ml /day a reduction has been observed in the duration of: non-invasive ventilation: 0.3±0.3 days, time to achieve FEF: 0.99±0.18 days, PN: 0.56±0.15 days and hospital stay: 0.57±0.27 days (p<0.001). A reduction in the risk of occurrence of bronchodyplasia (OR -1.2, p = 0.01) and cholestasis (OR -1.3, p = 0.005) was observed in infants with HMI≥ 25% and the risk of sepsis (OR -0.6 , p = 0.02) in infants with HMI≥75%.

CONCLUSIONS: The use of donor human milk to supplement own mother milk when not available or sufficient, can reduce the hospitalization duration and the occurrence of comorbidities.
EXPLORING THE IMPACT OF MATERNAL STRESS ON GLUCOCORTICOIDS IN HUMAN MILK AND INFANT TEMPERAMENT

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Background: Human milk (HM) provides optimal nutritional support for neonates. Next to its nutritious value, HM contains various non-nutritive bioactive components, including the glucocorticoids cortisol and cortisone. Transmission of these factors via HM might shape infant development at the metabolic, behavioral and endocrine level, helping the infant to adapt to its postnatal environment. Currently remarkably little is known on how stress affects HM. In the Amsterdam Mothers Milk Study (AMS) we study the impact of maternal stress on nutritional and hormonal HM composition in the first month postpartum and how this relates to emotional child development.

Methods: The AMS research population (N=180, recruitment ongoing) includes mothers who delivered a healthy term infant and mothers whose infant is hospitalized for >2 days within the first week postpartum. HM is collected at 10, 17 and 24 days postpartum; three times per day 5mL of a full expression from one breast was collected in sterile tubes and stored at -20°C. Maternal scores on the perceived stress scale (PSS) were obtained at 25 days postpartum. Cortisol/cortisone levels in HM were determined using liquid chromatography-tandem mass spectrometry. Infant temperament was assessed at 3 months corrected age by the parent-based Infant Behaviour Questionnaire-Revised (IBQ-r).

Results: Infant hospitalization as compared to non-hospitalization is associated with increased maternal PSS scores (23 ± 7.07, N=19 vs 14.41± 5.71, N=35, p <.001, Cronbach’s =0.889). Next, we selected a healthy subset to study the relationship between maternal stress, HM glucocorticoid levels and infant temperament. In HM collected at 10 days postpartum, glucocorticoid levels follow the diurnal rhythm of maternal adrenocortical activity, but are not affected by perceived stress. However, PSS score of these mothers is positively associated with infant IBQ-r score at 3 months, specifically on the negative affect subscale (rs = 0.499, p = 0.005). This effect remains significant after controlling for education level, mode of delivery and household size ( = 0.042, p = 0.017) and is largely attributable to the falling reactivity and distress to limitations subscales. Conclusions Maternal stress in the first month postpartum contributes to the variance that determines infant temperament at 3 months of age, while HM glucocorticoid profiles were not related to PSS nor IBQ-r scores. Further analyses to determine how various biological and psychological measures of maternal stress relate to HM glucocorticoid/ nutrient profiles and infant emotional development are currently ongoing. Ultimately this will deepen our understanding of how HM contributes to early programming.
OC07
ADVANCING THE SAFETY OF HUMAN DONOR MILK WITH DIRECT PATHOGEN TESTING WITH NUCLEIC ACIDAMPLIFICATION
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Introduction. Breast milk is the ideal source of nutrition for all infants and effective in reducing necrotizing enterocolitis, sepsis, and other morbidities of prematurity. When mother’s milk is unavailable, donor milk is the best substitute. Contaminated donor milk poses a significant health risk to premature infants; hence, in addition to pasteurization, donor milk screening for transmissible viruses and bacteria is critical. While negative donor serologic tests at engagement or during interval screening of established donors, minimizes the potential for transmission, a finite risk of contamination during the donor life cycle remains. Of particular concern, is transmission during subclinical or latent phases of infection, or where no donor screening is available. Hypothesis. To improve the safety of the donor milk pool, we developed and validated a quantitative PCR-based nucleic acid amplification test (NAAT) for direct testing of donor milk (DTOM). We assayed for known viral pathogens including; HIV-1/2, HTLV I/II, HBV and HCV, an emerging viral pathogen Zika (ZIKV) and the bacteria Treponema pallidum, and Mycobacterium tuberculosis. Methods. Total nucleic acid was isolated from pooled human donor milk samples and quantified using a validated in-house protocol to detect pathogens. In brief, isolated nucleic acid was treated with DNase I and the cDNA generated by reverse transcription followed by pre-amplification PCR. The amplified products were used for RT-qPCR using customized OpenArray® plates containing target specific TaqMan® RT-qPCR assays (primers and probes) and the QuantStudio™ 12K Flex Real-Time PCR (RT-qPCR) systems. Primers/ probe TaqMan® RT-qPCR assays for human beta-globin and ribonuclease P served as internal positive controls. RTqPCR amplicon generation was monitored concurrently by the accumulation of fluorescent signal from each reaction.

Results. DTOM using NAAT in a high-throughput OpenArray® platform is feasible and has the sensitivity and specificity thresholds required to provide additional screening criteria for advancing the safety threshold for the human donor milk pool. Conclusion. The top priority for the provision of donor milk for the nourishment of very low birth weight and premature vulnerable infants is the safety of the donor milk supply. While serological screening for the identification of donors is crucial to initial and subsequent qualification, DTOM for known and emerging viruses and bacteria only further advances the safety of the human donor milk pool. Our data demonstrate that DTOM could be an emerging standard critical to the safe sourcing of donor human milk.
THE EFFECT OF DIFFERENT TIME-TEMPERATURE PROFILES ON BIOACTIVE PROTEINS DURING PASTEURIZATION OF DONOR HUMAN MILK

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Rationale: Donor milk is generally processed by holder pasteurization (HoP) at 62.5°C for 30 min. Although this treatment fits the safety requirements of human milk banks, it highly reduces the concentration of several human milk bioactive proteins. Long warming up and cooling down times (lag-times) during treatment may also negatively affect the bioactive properties of pasteurized milk. High-Temperature-Short-Time (HTST), a treatment with shorter processing times, may be a suitable alternative to HoP. This study aimed to compare the effects of different heat treatments with varying lag times on bioactive proteins and the safety of human milk.

Methods: HoP and four heat treatments with the same holding time as HTST (15 sec at 72°C), but with different heating up and cooling down times were conducted and compared. A lab-scale HTST pasteurizer was built to perform rapid pasteurization of 33 seconds for this purpose. The native protein concentration was measured with a BCA assay and further identification was obtained with LC-MS/MS. The enzyme-activities of BSSL and alkaline phosphatase (ALP) were also measured. To investigate the effect of all five methods on the bacteriostatic properties, human milk samples previously treated with the five heating methods were inoculated with 2100 CFU/ml E.coli K12 and S.aureus.

Results: HTST generally performed better than HoP. The total native protein content was found to decrease at increasing lag-times, with HoP showing the highest decrease (p<0.05). Shorter lag-times showed significantly higher retention of lactoferrin, whereas lysozyme remained mostly intact for all methods (p<0.05). All pasteurized samples had no ALP activity, while BSSL activity was very low(<20%). Raw milk had similar bacteriostatic properties to HTST treated samples, while for HoP samples, the multiplication rate of E.coli and S.aureus was double compared to both HTST treated and untreated samples (p<0.05).

Discussion: The bioactive properties of human milk were better preserved with HTST, than with HoP and the other investigated methods. The difference in lag-time (warming up and cooling down) was more important in the preservation of those proteins than the difference of the heating processing itself (time-temperature combinations) among the different methods. In conclusion, a treatment with considerably short lag-times, such as HTST, may reduce the thermal damage caused to the bioactive proteins compared to HoP, without affecting safety.
ORAL COMMUNICATIONS

OC09
NEWS FROM THE MAXIMOM (MAXIMIZING MOTHER’S MILK) PROGRAM OF RESEARCH IN CANADA
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Funded by the Canadian Institutes of Health Research, The MaxiMoM Research Program has been developed in collaboration with the Rogers Hixon Ontario Human Milk Bank, a large milk bank servicing the provinces of Ontario and Newfoundland in Canada. This program of research began with a large multi-centered randomized controlled trial of human donor milk for preterm infants. Although no differences were seen in neurodevelopment at 18 months corrected age of infants supplemented with donor milk compared to preterm formula, donor milk resulted in a significant protection from necrotizing enterocolitis in the neonatal period. Costing analysis from a societal perspective showed no increase in costs for donor milk supplemented children during hospitalization but lower health related costs post discharge to 18 months corrected age. The children in this study are now greater than 6 years old and have had detailed long term multimodal reassessments including health, body composition, neurodevelopment and neuroimaging. A second study from our program explored the impact of human milk fortification with a human milk-based compared to a bovine milk-based fortifier. Neurodevelopmental assessments for these children at 18 months corrected age have now been completed. Results from both of these long term studies will be presented. The MaxiMoM Program encompasses a parallel track of basic science research. From nutritional analysis of batches of donor milk from a two year period, we have new proposed guidelines for the nutrient composition of pooled, pasteurized human donor milk. We have published the impact of thermal processing on a panel of milk enzymes, cytokines, exosomes, oxylipins and fatty acids. We are now using some of these methodologies to study the impact of various methods of pasteurizing human milk including high hydrostatic pressure. From a practical perspective, we identified significant fat losses when donor milk is fed via a continuous infusion pump which has significant implications for feeding the preterm infant. From the perspective of feeding donor milk to the term infant, we have demonstrated the importance of supplementing with fat soluble vitamins.

The MaxiMoM Program has benefited from inter-disciplinary representation including students and scientists, physicians, dietitians, ethicists and families, amongst others. As a result of this collaboration we have studied some humanistic and societal aspects of donor milk. Our milk bank in Toronto serves a culturally diverse population and we have thus developed counseling recommendations for various populations. Finally, suggestions for future areas of donor milk research will be discussed.
Fortified human milk (HM) is recommended for preterm infants during the Neonatal Intensive Care Unit (NICU) hospitalization, but the extent which it supports optimal physical growth is unsure. Objective 1) to quantify associations between HM intake and growth outcomes at hospital discharge, and 2) to examine growth differences by maternal and donor milk (DM). Methods Secondary analysis of data collected 2015-2019 for a statewide quality improvement initiative in 9 Massachusetts NICUs. We included infants born <33 weeks’ gestation and 501-1500 grams who were receiving enteral nutrition on day of life 28 and at discharge and excluded infants with congenital anomalies; discharge >42 weeks’ postmenstrual age; and extreme measurements (z-score >4 or <-4). All hospitals routinely fortified HM and offered DM or formula when mother’s milk was unavailable. The main exposure was the percent of HM feeding (%HM) on days assessed.

For infants fed HM only, we determined the percent of DM feeding. Clinical measures of infant size (weight, length, and head circumference) were collected at birth and discharge. Main outcomes were z-scores at discharge (Olsen 2010, 2015); weight gain velocity (exponential model, Patel 2005), and average weekly rate of head growth from birth to discharge. We estimated associations of %HM and DM with growth outcomes using a linear mixed model, adjusting for gestational age, length of hospital stay, z-scores at birth for each parameter, and clustering by hospital and multiple gestations. Results Infants (N=1307) were 50% male, 70% singleton, and 43% white. At birth, median (IQR) weight was 1120g (887,1340) and gestational age 29 weeks (27,30). The median (IQR) length of stay was 57 days (43,77), and 86% of infants received >50% HM on days assessed. Weight, length, and head z-scores at discharge, weight gain velocity, and head growth were not associated with %HM, except for BMI z-score. Of infants fed HM only (n=539), those fed >50% DM had poorer growth compared to <50% DM; adjusted z-scores at discharge were: -1.0 vs. -0.06 (p=0.01) (weight); -1.6 vs. -1.0 (p<0.01) (length) and -1.1 vs. -0.3 (p<0.01) (head). Weight gain velocity was 11.9 vs. 13.5 g/kg/day (p=0.02) and head growth was 0.5 vs. 0.7cm/week (p<0.01). Conclusion In a setting of high HM provision overall, growth outcomes were similar regardless of the proportion of diet as fortified HM or formula, but intakes of >50% DM on days assessed were associated with poorer weight gain, linear growth, and head growth.
Background and Objective
Breastfeeding and kangaroo mother care (KMC) are well-proven interventions to prevent newborn morbidity and mortality. The use of pasteurized donor human milk (DHM) in absence of mothers own milk (MOM) is recommended as the next best alternative for vulnerable babies. However, local evidence on the combined effect of these interventions on infant feeding and neonatal outcomes is missing. Mother Baby Friendly Initiative plus (MBFI plus) is a model which integrates lactation support, KMC and provision of DHM for sick and vulnerable babies in the absence of MOM. The study evaluated the efficacy of MBFI plus interventions in improving exclusive human milk (MOM or DHM) feeding and neonatal outcomes.

Methods
An uncontrolled pre-post intervention superiority study at a tertiary and secondary care hospital in India. Study outcomes were measured before and after the implementation of the MBFI+ model. The pre-intervention group included healthy (n=2268) and very low birth weight (VLBW) infants (n=140) hospitalized from January ‘17 to June ‘17. Post intervention groups included healthy (n=2675) and VLBW (n=136) infants hospitalized from March ‘18 to August ‘18. The interventions included training of healthcare service providers on point of care quality improvement approach to provide robust breastfeeding and KMC counselling and support services, system strengthening of milk bank with national guidelines driven procedures, strengthening of behaviour change communication and community linkages from July ‘17 to Feb ‘18. This led to early initiation rates KMC practices, expression of breast milk within 24 hours of delivery and provision of safe DHM for needy babies.

Results
For healthy neonates in the post-intervention group breastfeeding as first feed significantly improved from 50% (pre-intervention) to 67.3% (p<0.001) (OR 2.02; CI at 95% (1.79-2.28)). Early initiation within 1 hour of birth improved from 7.7% to 24% (p<0.001)(OR 3.87;CI at 95%(3.25-4.60)) and exclusive human milk feeding at the facility improved from 44% to 64.8%(p<0.001)(OR 2.34;CI at 95%(2.09 2.62)). For VLBW neonates receiving MOM on first day of life improved significantly from 3% to 30% (p<0.001). Use of formula and dairy milk feed reduced from 4% to 0%. Exclusive human milk feeding at the facility improved from 80.7% to 92% (p=0.009), neonates receiving KMC improved from 32% to 65.3% (p<0.001), weight at discharge increased from an average of 1499gms to 1605gms (p=0.004), survival without late onset of sepsis improved from 63.5% to 70% (p=0.363).

Conclusion
An integrated approach should be promulgated as was found to be beneficial in improving the feeding and neonatal indicators.
OC12
EFFECTS ON GASTROESOPHAGEAL REFLUX OF A DONKEY MILK-DERIVED HUMAN MILK FORTIFIER VERSUS STANDARD FORTIFIER IN A POPULATION OF PRETERM NEWBORNS. ADDITIONAL DATA OF FORTILAT STUDY
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Introduction: fortification of human milk is recommended for the nutrition of premature infants to ensure an adequate nutritional intake. Recently, a newdonkey milk-derived human milk fortifier (DF) was developed and we tested its higher feeding tolerance compared with standard bovine-derived fortifier (BF) through an RCT performed in our Center (Fortilat study)1. Gastroesophageal reflux (GER) is physiological in the first months of life and tends to resolve spontaneously but in 5% of cases it complicates with gastroesophageal reflux disease (GERD). Cardiorespiratory symptoms (apneas, desaturations, bradycardias), associated with delayed gastric emptying symptoms of feeding intolerance that could be related to GERD. The evaluation of GER and gastric emptying were secondary outcome of the Fortilat study.

Objective: to evaluate the effects on GER of the use of DF compared with BF in a population of very preterm or very-lowbirth-weight newborns with cardiorespiratory symptoms.

Methods: Fortilat randomized controlled clinical trial enrolled 156 exclusively human milk fed preterms born at <32 weeks of gestational age and/or with birth weight <1500 g, randomized in 2 groups treated with BF (controls) or DF (fortilat). Sixteen newborns showed cardiorespiratory symptoms suggestive of GERD, of which 10 (5 controls, 5 fortilat) were still symptomatic on the 21st day after enrollment and, as protocol, were evaluated with MII/pH2 and gastric ultrasound.

Results: GER frequency was 3.05 (2.22-4.43) episodes/hour with proximal GER frequency of 1.19 (0.83-2.06) episodes/hour. The bolus clearance time (BCT) was 19.29 (16.29-23.36) seconds. The extension of the bolus reflux (BRE) was 3.42 (3.26-3.71) cm. The bolus exposure index (EIB) was 1.46 (1.18-3.04)%. The reflux index (RI), evaluated with pH-metry, was 3.24 (1.53-5.74)%. The gastric emptying time at t/2 was 46.02 (43.24-48.72) minutes. Control group showed an higher GER frequency than fortilat group: 4.82 (2.84-5.94) vs 2.02 (1.95-3.26) episodes/hour (p=0.036). No significant differences were observed in the other parameters analyzed: acid GER frequency, proximal GER frequency, BCT, BRE, BEI, RI, gastric emptying time.

Conclusions: The reduction of GER frequency in the Fortilat group suggests that DF improves feeding tolerance compared with standard human milk fortifiers.
1. Bertino E, et al. A Novel Donkey Milk-derived Human Milk Fortifier in Feeding Preterm Infants: A Randomized Controlled Trial. JPGN. 2019
OC13
VITAMINS INTAKE IN SUPPLEMENTED AND NON-SUPPLEMENTED HUMAN MILK DONORS
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Introduction: Maternal micronutrients intake is related to their content in breast milk, particularly B1, B2, B6, B12, C and D vitamins. In addition, breastfeeding women often take supplements during lactation, which have been observed to affect the content of micronutrients in milk. Given the special case of human milk donors, an adequate nutritional intake should be a priority.

Objective: The aim of this study was to compare vitamins intake in supplemented (SHMD) and non-supplemented (nSHMD) human milk donors and to determine their compliance with dietary reference intakes.

Methods: This prospective observational study includes 62 donors from the Regional Human Milk Bank at the Hospital 12 de Octubre (Madrid, Spain). Supplementation status was determined for each vitamin according to the specific vitamin composition of the supplement. We assessed vitamins (A, C, D, E, and B vitamins) intake by evaluating dietary records of five continue days including a weekend day with the DIAL® Software. Inadequate and lower than recommended vitamin intake was assessed by the Estimated Average Requirement and the Recommended Dietary Allowances of the Institute of Medicine, respectively. When both dietary reference intakes were not available (vitamin B5 and B8), the Adequate Intake was used. We estimated significant differences (p<0.05) by Student’s t-test/ Mann–Whitney U-test.

Results: Supplementary vitamin intake was observed in 64.5% of the donors for vitamin B9 and B12, in 41.9% for vitamin D, in 38.7% for vitamin B1, B2, B3, B5, B6, B8, C and E, and in 33.9% for vitamin A. nSHMD showed a significant lower intake in all investigated vitamins, compared to SHMD (nSHMD vs. SHMD: Vitamin A: 1045.2μg/day vs. 1715.8μg/day (p=0.001), D: 3.39μg/day vs. 7.27μg/day (p<0.001), E: 12.14mg/day vs. 25.11mg/day (p<0.001), B5: 6.15mg/day vs. 11.55mg/day (p<0.001), B8: 31.5μg/day vs. 77.33μg/day (p<0.001), B9: 335.4μg/day vs. 668.4μg/day (p<0.001)). Furthermore, nSHMD demonstrated a lower than recommended vitamin A intake and an inadequate E, B5, B8, B9 vitamins intake. Vitamin D consumption was inadequate in both groups.

Conclusions: nSHMD had a lower vitamin intake than SHMD, which led to a lower than recommended or even inadequate intake. Consequently, supplementation might reduce deficient consumption of most of the vitamins. However, further studies are needed to demonstrate the effect of human milk donor’s supplementation on donated human milk and blood vitamin concentration. This study was funded by Spanish Health Research Funding (grant FIS PI15/00995).
OC14

FOOD-PROCESSING APPROACHES TO GENERATE A HUMAN MILK PROTEIN CONCENTRATE: COMPOSITIONAL CHANGES DURING SKIMMING, DEBACTERIZATION AND CONCENTRATION STEPS

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Background: Optimizing the protein intakes of very low birth weight (VLBW, <1500 g) infants is crucial to prevent postnatal growth restriction and impaired neurodevelopment. Currently, bovine milk-based protein modulars are used to increase the protein content of infant feeds, however these products have several limitations for use in this vulnerable population.

Objective: (1) To develop a human milk-based protein concentrate using various food-processing approaches and (2) to determine the protein content and losses at each processing step.

Methods: Donor milk (DM) was collected from the Rogers Hixon Ontario Human Milk Bank. Initial processing steps included skimming the milk by centrifugation at 1700 x g for 15 min and using a microfiltration (MF) membrane (0.8 μm) to remove the bacteria. The DM was then concentrated by using ultrafiltration (molecular weight cut-off (MWCO of 10 and 50 kDa-final volume concentration factors of 4.0X) and diafiltration (4.7 diavolumes) processes. The protein content of milk samples, collected after each processing step, was determined using the Kjeldahl method.

Results: The mean protein content of the unprocessed DM (140 L) was 0.92±0.01 %(w/w). After centrifugation, 130L of skimmed milk, containing 0.94±0.01 %(w/w) of protein were collected. The skimming step resulted in a 6% loss of protein. A volume of 110L of skimmed milk containing 0.85±0.01 %(w/w) of protein was recovered after MF, which resulted in a 13% loss of protein. After completing the ultrafiltration and diafiltration steps, 7.5L of the human milk-based protein concentrate were generated with a protein content of 4.22±0.48 %(w/w) (10 kDa) and 5.1±0.20 %(w/w) (50 kDa). When expressed on dry basis, the protein content of the end product was approximately 50%, which is over 5 times greater than the protein content of unprocessed donor milk. Protein losses in the range of 11-12% were observed during concentration. Overall 36-37% of the HM proteins were lost.

Conclusion: Results from this analysis demonstrate that a human milk-based protein concentrate can be generated by using conventional food processing methods. Optimizing these processing steps will reduce protein losses and generate a protein modular, which may improve the growth and neurodevelopment of VLBW infants. Funding source: CHIR (#FDN143233)
In human milk banks it is a common procedure to pasteurize donated milk as a safety mechanism to eliminate possible infectious elements. Although heat treatment does not affect the macronutrient composition of milk, it affects many biological factors important for the development and maturation of the newborn. Consequently, the processing of breast milk for greater safety decreases its quality. To better preserve the biological factors, new technologies (including UV irradiation, high pressure processing, and high-temperature short-time treatment) are being evaluated. However, a simpler approach would be to optimize the conventional pasteurization technique, maintaining the destructive capacity on infectious elements and preserving the biological components as much as possible.

There is evidence in the literature showing that the currently recommended pasteurization temperature (62.5 °C, 30 min; Holder pasteurization) is excessive. Lower temperatures, between 56 °C and 62.5 °C, show a clear capacity to eliminate both bacterial and viral contamination (HIV, HTLV-I, polioviruses, CHIKV, WNV, etc.) while being less deleterious to the biological components of human milk.

The lack of published data in that range led us to study the effectiveness of different temperatures of pasteurization to eliminate human cytomegalovirus (HCMV) in human milk. Thus, we spiked raw milk samples from donor mothers with an inoculum of green fluorescence protein (GFP) expressing HCMV and incubated them in a PCR thermocycler. Then, cell cultures were treated with diluted samples and the viral infectivity was examined for GFP expression by fluorescence microscopy. No signs of HCMV replication were observed after treatments at temperatures equal or greater than 53 °C for 30 min, 20 min and 10 min, 58 °C for 5 min, 59 °C for 2 min, and 60 °C for 1 min. To confirm these results in a pasteurizer-like model, we spiked a constant amount of HCMV in 1 mL of milk in a dialysis membrane tubing that was introduced in disposable baby bottles containing 130 mL of milk. The bottles first underwent heating treatment in a water bath for 30 min at 56 °C, 57 °C, 58 °C, 59 °C, and 60 °C, and, afterward, they were cooled in an ice bath. We found no infected green cells at any of the investigated temperatures, whereas all the wells of control milk exhibited clear signs of HCMV infection in cell cultures. Thus, our results show that a conventional pasteurization below 60 °C is enough to inactivate HCMV completely. Consequently, we consider that, in order to provide a higher quality product, the current recommendation to pasteurize both mother’s own milk and donated milk at 62.5 °C must be re-evaluated.
ORAL COMMUNICATIONS

OC16
BASIC CHARACTERISTICS OF HUMAN MILK DONORS IN THE FIRST SERBIAN HUMAN MILK BANK AT THE INSTITUTE OF NEONATOLOGY IN BELGRADE

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Aim: Determine basic characteristics of human milk donors of the First Serbian Human Milk Bank in a two-year period.

Method: retrospective medical documentation analysis of the First Serbian Human Milk Bank at the Institute of Neonatology in Belgrade for the period 01. 01. 2017-31. 12. 2018. The donor’s job, the place of residence (central or peripheral city municipality), the delivery mode, the pregnancy mode (by natural means or in vitro fertilization), donor’s age, gestational weeks, the pregnancy number, the donation duration and the amount of donated milk were analyzed.

Results: During 2 years there were a total of 61 donors (28 in 2017 and 33 in 2018), one of which not in the study due to incomplete data. According to education, most donors have a high school education (66.67%), mostly from the field of a social-humanistic sciences (41.67% of the total). Donors from the city municipalities were predominant (95% of the total number). Vaginal delivery was present in a slightly higher percentage (53.33%) than Caesarean section. Pregnancy is started naturally with most donors (96.67%). The youngest donor was 22 years and the oldest 41 year old (median 31 year). The minimal gestation was 30 and the maximum was 41 gestational weeks (median 39 gestational weeks). The majority were donors after the first pregnancy (58.34%). The minimal number of donation days was 3, and the maximum 341 days (average 94.17 days). Minimal milk volume was 0.81 L, and maximum 83.26 L (average 11.002 L).

Conclusion: The average donor in the First Serbian Human Milk Bank is a woman with the first pregnancy, from a city municipality, highly educated of socio-humanistic sciences, aged 31, with naturally occurring pregnancies and delivery with 39 gestational weeks, with a donation of 94 days and an average amount of donated milk of 11 L.
India has a formidable task of providing care to newborns against a background of world’s largest share of births (20%) and neonatal deaths (30%). Under National Health Mission (NHM), a network of Special Newborn Care Units (SNCUs) at district hospitals have been created for improved access to specialized newborn care, in addition to the Neonatal Intensive Care Units (NICUs) situated at the tertiary care facilities. A sizable gap exists towards fulfilling nutritional needs of the preterm, low birth weight and sick newborns admitted at these facilities, as many of them are devoid of mother’s milk, due to inescapable circumstances. Much of this gap can be bridged with adoption of comprehensive lactation management services, to encourage and support optimal breastfeeding practices at these health facilities, along with provision of donor human milk, that can ensure continuous supply of safe human milk for improved survival and well-being of these babies. The role of donor human milk is not only limited to improved survival outcome, lower infection rate, improved neuro-developmental growth and reduced hospital stay for these babies, but is extended to the benefit of the mothers also, in establishing optimal breastfeeding practices which usually get impaired initially in the mothers due to various adverse situations surrounding sickness of the newborn. This has motivated the Government of India to initiate and support establishment of Comprehensive Lactation Management Centres (CLMCs) at the Medical Colleges and the district hospitals which have functioning NICU/SNCU with at least 20 beds. A CLMC along with lactation support services, is to provide all facilities to ensure that donor human milk is expressed, collected, processed and dispensed free of cost, following the most appropriate technology and standard protocol, for feeding of the baby admitted at NICU/SNCU. In June 2017, Government of India has published the national guidelines on Lactation Management Centres in Public Health Facilities, to encourage all the States to take up this initiative as an essential intervention for strengthening and supporting breastfeeding. In India, increasing access to DHM has the potential to help an estimated five million babies annually. As of 2018 -19, 60 CLMCs have been established in the States of Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Telengana, Uttar Pradesh and West Bengal with government support. As India is committed to better newborn survival outcomes, availability of DHM as a bridge to successful breastfeeding will translate into fetching palpable health benefits in newborns.
AC18
AN INTEGRATED MODEL FOR STRENGTHENING ACCESS TO HUMAN MILK IN KENYA
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BACKGROUND
Of known interventions, breastfeeding has the greatest potential impact on child survival. For vulnerable infants born low birthweight or preterm, who do not have access to their mother’s own milk, the World Health Organization recommends donor human milk (DHM) from a human milk bank (HMB) as the best alternative; however, no formal HMBs existed in Kenya or in the Eastern African region.

METHODOLOGY
To ensure all infants in Kenya have access to human milk, the Ministry of Health, with the support of PATH, recognized the need to establish an integrated HMB model with nutrition and newborn programming. This model, the Mother Baby Friendly Initiative plus (MBFI+), comprehensively integrates HMB services with breastfeeding promotion and Kangaroo Mother Care for optimal neonatal outcomes, through a phased approach; this is currently being implemented as a pilot at Pumwani Maternity Hospital in Nairobi, the largest public obstetric and neonatal hospital in East Africa. Phase I consisted of determining feasibility and establishing ownership. Phase II and III which ran concurrently, focused on operationalizing the HMB, research and evaluation. The current Phase IV is geared towards ensuring the safety, quality and operational stability of the HMB.

RESULTS
Phase I formative assessments (performed in Nairobi facilities and communities) demonstrated willingness and acceptability of DHM, when safety is assured. Additional stakeholder engagement was undertaken to instill ownership; country specific guidance to ensure quality control and safety were developed; and linkages with HMB experts and learning exchanges for policy makers to HMBs in South Africa were conducted. Phases II and III involved infrastructure development; capacity building, including technical training at Glasgow HMB in Scotland; operational research; advocacy and awareness creation and implementation of the updated criteria for baby friendly hospitals. Phase II and III ended with the official launch of the first formal HMB in East and Central Africa in March 2019. Phase IV is currently on-going and involves provision of on-site mentorship; strengthening quality assurance and improving systems to support equitable access to human milk; evaluating the impact and cost-effectiveness of the MBFI+ model and strengthening policy and regulatory support for the MBFI+ model.

CONCLUSION
A methodological, systems strengthening approach is essential for ensuring safety, quality and sustainable HMB systems, which are developed and adapted to the local context, for appropriate use of DHM and for the protection, promotion and support of breastfeeding. A model for the East Africa context is possible and should be scaled.
POSTERS
P01
PUMPING FOR PREEMIES IN PUBLIC: AMBIVALENT EMOTIONAL MATERNAL EXPERIENCES OF EXPRESSING IN MEDICALIZED PUBLIC SPACES
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Coupled with the global increase in premature birth has been a global recognition of the importance of human milk, particularly for vulnerable infants. Maternal anxieties about breastfeeding prematurely-born infants are coloured by anxieties relating to the relationship between the body and alien technologies, in ways that invite the application of technocratic and cyborg theories. A pumping mother is (or is not) a productive body, whose routine becomes governed around the rhythms of a machine. Those who pump for their preemies (as well as those who pump for other mothers’ infants) negotiate two kinds of cyborg: their own infants, whose survival may be dependent on tubes and pumps and monitors, and their own bodies when attached to pumps and tubes and bottles, often in very public spaces in hospitals. This research sought to better understand the experiences of mothers of premature infants, some of whom never considered breastfeeding, let alone doing so through the mediation of an electric breast pump, and often in very public hospital settings. At the same time a particular product, human milk, provides a primary link between herself and her baby, and the most urgent form of care that she can provide. Her expression of human milk makes her not only a concerned mother doing what is best for her infant, but (as healthcare providers frame her), the supplier of not just nutrition but medicine, making the underlying duality between baby and pump, public and private, a classic psychological/social/cultural case of ambivalence.
THE DESIGNATION AS BABY FRIENDLY HOSPITAL ENHANCES THE ROLE OF A HUMAN MILK BANK IN NEONATAL INTENSIVE CARE UNIT (NICU)

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Introduction: The goal of the Baby-Friendly Hospital Initiative is to increase breastfeeding rates by removing barriers to breastfeeding in the hospital setting. By following the 10 steps to achieving Baby-Friendly status, a hospital actively supports breastfeeding. Donor milk banking is a logical extension of Step 6 of the Baby Friendly Hospital Initiative and is a good indicator of a hospital’s respect for breastfeeding and its understanding of the unique components of human milk (HM).

Aim: To assess the difference in the number of donors and the quantity of donated and processed HM before and after the designation of “Elena Venizelou” as Baby-Friendly Hospital, which was achieved in 2011. Two time periods were assessed:

(A) before the designation (2008-2010) and (B) just after designation (2011-2018).

Method: We counted the number of donor mothers as well as the volume of donated human milk (DHM) collected, screened, stored, processed and distributed by the human milk bank of “Elena Venizelou” Maternity Hospital in Athens.

Results: There were significant differences in the numbers of donor mothers and the quantity of HM processed in the Human Milk Bank between the two time periods assessed. There were a total number of 22 donor mothers in period A compared to 501 donor mothers in period B. We also observed a larger volume of DHM processed during period B (4.856lt) compared to period A (120lt). Following the Baby Friendly designation we found that the number of breastfeeding donors mothers and DHM have significantly increased.

Conclusion: The Baby Friendly Hospital initiative has a very positive impact on the role of Milk Banking. Donor human milk banks are much more than a simple center for the collection, storage, processing and distribution of DHM, as they cover other aspects and represent a real opportunity to promote and support breastfeeding. It is necessary to designate more Baby Friendly Hospitals and Human Milk Banks, which support the donation of HM and breastfeeding.
Background: Donor human milk (DHM) is the third best choice for newborns after breastfeeding and mother’s own milk (MOM). The aim of the study was to present the variability of patients who received DHM during the Neonatal Intensive Care Unit (NICU) hospitalization, including time of its usage and volume of portions. In addition, the evaluation of stimulation of lactation and the method of feeding during hospitalization and on the day of discharge.

Materials and Methods: A retrospective analysis of available data was conducted for all infants admitted to the NICU in University Hospital between 10/02/2017 and 31/12/2017. One-way analysis of variance in the intergroup scheme, Kruskal-Wallis variance analysis with the Jonckheere-Tepstra test, correlation analysis using Pearson’s r and Spearmann’s rho, frequency analysis using the Fisher’s exact test were used to conduct analyses.

Results: 133 newborns received DHM. 3 groups of neonates were identified: <32 0/7 week of gestational age (GA), 32 0/7 - 36 6/7 weeks of GA and > 37 0/7 week of GA. Number of days when DHM was supplied were similar in all groups and do not differ depending on the GA of newborn infants. Stimulation of lactation in mothers of newborns treated in NICU was conducted by a lactation consultant from the first hours after delivery. Children with a gestational age > 37 weeks have almost a threefold greater chance of abandoning breast-feeding than the others (odds ratio (OR) = 2.89, 95% CI: 0.69 - 12.20). Children with a gestational age >32 weeks have a slightly higher chance of feeding exclusively with mother’s milk than the others (OR = 1.42, 95% CI: 0.58 - 3.52). All newborns were fed mother’s own milk, term and near term were breastfed but premature babies were fed mainly with milk withdrawn from the mothers’ breast, even on the day of discharge.

Conclusions: Neonates born before 32 0/7 week of GA received the smallest volume of DHM, but the time of supply was almost the same in all groups regardless of GA. Stimulation of lactation, which allowed to obtain the appropriate volume of MOM lasted for 5-7 days. Exclusively breastfeeding or feeding only MOM were possible for all infants. The supplementation of enteral nutrition with DHM allowed to end total parenteral nutrition until the first week of life. The majority of children received only MOM on the day of discharge from the NICU. There are no explicit recommendations regarding the DHM supply in NICU.
POSTERS

P04
WEB-BASED HUMAN MILK BANKING STANDARDIZATION MANAGEMENT SYSTEM BY ANALYZING EXPERIENCE, KNOWLEDGE AND NEEDS OF KOREAN DONORS AND RECEIVEITS
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Purpose: A web-based milk bank standardization management system was constructed through a secondary analysis by experts on the experiences, knowledge and needs of Korean donors and recipients.

Methods: Convenience sampling was done total 20 korean donors and recipients, personal interview was done by using a smart-phone and the texts were recorded and fully transcribed, then the full texts were re-analyzed into four categories.

Result: The four categories of donors are tree aspects(motivation, feeling, difficulties), donation(baby order, period & duration, amounts), knowledge, and demands, and the four categories of recipients are tree aspects(motivation, feeling, satisfaction), recipient(period, purchasing times, total amount, feeding type), knowledge, and demands. Web standardization management system contents include human milk bank, breastfeeding donation story, Freeze-drying and pasteurization methods, newborn healthcare FAQs and other Resources.

Conclusion: The donors and the recipients want the community based human donor milk bank be established and operated, for this the public relations for the increase the public awareness is prerequisite, providing information and educational supports from the nursing care providers are needed generally. It is required to establish a Korean milk bank through a standardized web-based human bank for Korean donors and recipients.

Keywords: human donor milk bank, pasteurized human donor milk, human milk donor, human milk recipient, categorical content analysis, web

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P05
IMPACT OF ESTABLISHMENT OF COMPREHENSIVE LACTATION MANAGEMENT CENTRE ON INTAKE OF MOTHER’S OWN MILK IN NICU
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Background: LHMC, a tertiary hospital in New Delhi, India, catering to 14000 deliveries annually, established National Comprehensive Lactation Management Centre (CLMC) with aim of promoting exclusive breastfeeding till 6 months of age, enabling mothers to provide expressed breastmilk for their infants in NICU and supplement Pasteurized Donor Human Milk (PDHM) when Mothers’ own milk (MOM) is not sufficient. CLMC operationalization included a) Meticulous counseling and motivation of mothers b) Pumping support for stimulation or expression of milk in NICU &/or at CLMC c) Establishment of milk kitchen in NICU for PDHM disbursement

Objective: To study the impact of CLMC on intake of MOM at 3 designated time points namely: at initiation of enteral feeds, at time of attaining full feeds (defined as 150 ml/kg/day) and at discharge.

Methods: Study period was divided into 3 phases:

a) Phase 1: Jan ‘17- June ‘17: Prior to establishment of CLMC (background data)
b) Phase 2: July ‘17- Dec ‘17: CLMC established with counseling initiated by dedicated lactation counselors
c) Phase 3: Jan ‘18- Mar ’19: Milk kitchens established for PDHM disbursement Breakup of enteral feeds in terms of MOM, PDHM and Formula, at the time of initiation, at attaining full feeds and at time of discharge was recorded in each phase.

Results: Over 27 months, 31685 infants were born with 6654 (21%) preterm infants. Around 40% (n=2662) of preterm infants (< 34 weeks) were admitted in the Neonatal unit. Proportion of preterm neonates being initiated on full enteral feeds at birth and median time to reach full feeds remained same in all 3 phases being 85% and 5 days respectively.

a) Feed breakup at initiation Proportion of infants receiving MOM within 24 hours of birth did not change but those receiving formula declined (99 to 57%) with 41% receiving PDHM by end of phase 3.

b) Feed breakup at attainment of full feeds By phase 3, exclusive MOM feeding increased from <50% to 72% with just 30% receiving either PDHM or formula.

c) Feed breakup at discharge At discharge, Exclusive MOM feeding increased from 67% in phase 1 to 95% in phase 3. Remaining 5% received predominant formula feeds.

Conclusions: CLMC continues to work towards augmenting intake of MOM. There is substantial progress in terms of proportion of infants receiving MOM at attaining full feeds and at discharge. However, neonates receiving MOM at initiation is still very low and needs to be addressed.
P06
BREAST MILK FROM PROLONGED LACTATION AS A DONOR MILK
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Introduction: When maternal milk production is insufficient, or when the mother is unable to express milk, preterm infants are fed donor milk from Human Milk Bank (HMB) however, there are concerns with slower growth. The nutrient content of breast milk varies greatly between mothers and depends on her diet, the gestational age at delivery, the lactation stage, the time of day, the size of the milk portion and whether it is foremilk or hind milk. However, one of the factor which has the greatest impact on breast milk content is the duration of lactation.

The aim of this study: was the evaluation of macronutrients and lactoferrin concentration, in breast milk from prolonged lactation between 12th and 48th months postpartum and consider significantly impacts the delivery of proteins and energy to preterm infants by using breast milk of prolonged lactation.

Material and methods: The macronutrient composition of nearly 100 breastfeeding mothers was determined using Midinfrared milk analyzer (Miris, Sweden). The concentration of lactoferrin in skim milk samples was determined using the ELISA test.

Results: Analysis of the composition of long-breastfeeding mother’s milk allows one to assess the nutritional value. In the group of mothers breastfeeding for more than 2 years, the concentrations of fat and protein were the highest in comparison to other analyzed groups. Our results also demonstrate the very high immunology potential of human milk of prolonged lactation. The observed changes of macronutrient and lactoferrin concentrations shows similar milk value in prolonged lactation to colostrum.
P07

COMPARISON OF OXIDATIVE STATUS OF HUMAN MILK, HUMAN MILK FORTIFIERS AND PRETERM INFANT FORMULAS

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Preterm and low birth weight infants require specific nutrition to overcome the accumulated growth deficit, and to prevent morbidities related to postnatal growth failure. In order to guarantee an adequate nutrient-intake, mother’s milk, when available, or donated human milk, are usually fortified with additional nutrients, in particular proteins. Fortification with processed ingredients may result in additional intake in oxidative compounds, deriving from extensive heat treatments that are applied during processing. This study aims to compare the in vitro antioxidant activity and oxidative compound content conveyed by different preterm infant foods and fortifiers, namely raw and pasteurized human milk, two different preterm infant formulas, two bovine milk-based fortifiers and two experimental donkey milk-based fortifiers. The antioxidant activity of the infant foods and human milk fortifiers considered in the present research were evaluated as Trolox equivalent antioxidant capacity (TEAC), radical scavenging activity on the radical DPPH and in vitro antioxidant activity using red blood cells as indicators (CAA-RBC). As far as the oxidative content is concerned, the formation of malondialdehydes and protein carbonyls were assessed by HPLC and UV-spectrophotometric method respectively. Univariate and multivariate statistical analyses revealed significant differences between the different products. In particular, the choice of the protein source (hydrolysed vs. whole proteins) may greatly impact the resulting total antioxidant capacity of the preterm meal. The addition of fortifiers to human milk may result in higher antioxidant capacity; among bovine milk proteins, hydrolysed whey proteins resulted to provide higher antioxidant capacity than whole proteins. In general, the use of human milk minimizes the amount of oxidative compound in the diet in comparison to infant formulas, irrespectively of pasteurization or fortification, especially when malondialdehyde content is taken into account. The characterization of macro and micronutrients, bioactive compounds, as well as contaminants, deriving from food alteration, is of primary importance in order to guarantee high quality food products and adequate protein intake, especially when intended for infants, as formulas and fortifiers.
A COMMUNITY BASED STUDY ON THE NUTRITIONAL COMPOSITION OF HUMAN MILK AMONG INDIAN LACTATING MOTHERS IN RELATION TO THEIR DIETARY HABITS AND NUTRITIONAL STATUS IN INDIA

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Breast milk or human milk provides optimal nutrition for growing infants and is globally considered a pillar of child survival because of its protective and nutritive effects. Access to breast milk, which is both immunologically and nutritionally rich, is important for vulnerable neonates, such as those born preterm or in a resource-limited setting. The composition of breast milk varies among different mothers. This study aimed to assess nutritional status and nutrient composition of breast milk in Indian Lactating Mothers. Fifty Indian Lactating Mothers (20–35 years of age) at 0 to 12 months postpartum, free from medical disorder/medication living in New Delhi, India were randomly selected. The mothers were categorized according to month of postpartum i.e. 0-3m, 3-6m, 6-9m, 9-12m and >12m. This study was done in two parts. First, Dietary assessment was done using Twenty Four Hour Dietary Recall and Food Frequency Questionnaire. Second, the milk was collected from these mothers and analysed using the Miris HMA for Macro nutrients, mineral profiling was done and micro nutrients were analysed. The anthropometric assessment of the mother and child was also done.

Majority of the children were stunted and underweight as per LAZ and WAZ anthropometric indices. Around 26% of the mothers had normal BMI as per Asian cut off and only 6% were malnourished as per MUAC. The nutrient adequacy was assessed and observed and was found to be lower than estimated requirement per day as per Recommend Daily Allowance (RDA) of nutrients for Indians, 2010. The content of zinc & phosphorous were significantly higher in the diet. The fat content was significantly higher than the requirement.

The breast milk samples were analyzed for energy, protein, carbohydrate, fat, retinol and selected minerals. The energy, protein, fat and CHO content of the breast milk were significantly less than reference values for the Indian Lactating Mothers. Surprisingly, the Retinol content of the breast milk was more than reference values. The mineral content of the breast milk were less than the reference value, however iron content was significantly higher. The values were markedly different from those as reported by Dr. C Gopalan in 1989. The diet, lifestyle and food habit of Indian women has seen a remarkable change during these past three decades. We plan to undertake a nationwide study which will collect comprehensive data and aid in establishing a baseline for the above mentioned values.
P09
IODINE INTAKE ASSESSMENT IN SPANISH HUMAN MILK DONORS. COMPARISON OF TWO METHODS FOR ITS DETERMINATION
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Introduction: Breast milk iodine concentration depends on maternal iodine intake. In 2001, the Institute of Medicine (IOM) set the Dietary Reference Intakes (DRI) for Iodine, but the recommendations in lactating women are currently controversial. On the other hand, in 2007 The World Health Association (WHO) published the epidemiological criteria to evaluate the lactating women’s iodine dietary intake based on the median urine iodine concentration (UIC). Iodine is an essential micronutrient for the neurodevelopment of premature infants. There is no available information about the iodine intake in human milk donors.

Objective: The aim was to evaluate the milk donors’ iodine intake through the UIC and a dietary record, following the WHO and IOM recommendation, respectively. And to study the relationship between both methods.

Methods: We conducted a cross-sectional study in a Regional Human Milk Bank in Spain, from May 2017 to January 2019. A total of 38 donors recorded their food and supplements intake for 5 days including a weekend day and collected a spot fasting urine sample at the beginning of the study. Iodine mean daily intake (MDI) was estimated using DIAL-Software® and UIC was analyzed using a 7500 series ICP-MS (Agilent Technologies®). An intake of less than 209 mcg/day and a median UIC of less than 100 mcg/L were considered inadequate/insufficient according to the IOM and the WHO, respectively. Descriptive statistics and Spearman correlation were carried out using SPSS version 21.0, considering p-value <0.05 as statistically significant.

Results: In human milk donors the median (IQR) UIC was 113 (83-166) mcg/L, indicating iodine sufficiency in the diet of the studied population, according to the WHO. Nevertheless, the median (IQR) iodine MDI was 194 (111-309) mcg/day. Following the recommendations of the IOM, iodine intake showed to be inadequate in 55.3% (21/38) donors. We found a significant positive correlation (r=0.382; p=0.018) between iodine intake by dietary record and UIC.

Conclusions: The studied population was iodine-sufficient according to UIC, although the estimated iodine intake was inadequate in more than 50%, following the recommendations of the IOM. There is a positive correlation between estimated iodine intake by dietary record and UIC in human milk donors.

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P10

MICROWAVE TREATMENT FOR THE PREVENTION OF CYTOMEGALOVIRUS INFECTION VIA BREAST MILK

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Objective: Mother’s own milk (MOM) is the best nutrition for preterm infants except for MOM from human cytomegalovirus (HCMV) seropositive mothers. Very premature infants are at a high risk of developing sepsis-like syndrome, cholestasis, and so on. It has been examined how to eliminate HCMV infection via MOM, while the loss of MOM properties be minimized. Microwave (MW) radiation for MOM is possible anywhere even in developing countries. Therefore, we performed this basic research to know if MW would be a candidate for HCMV prevention strategy in NICU settings. Study Design: HCMV Towne strain was added to formula and heat procedures with Holder pasteurization (HP) and MW 500W for 20, 30, 40, 60 sec were done. SlgA, lactoferrin, TGF-β2, and free fatty acid (FFA) concentrations were measured. Results: There are no HCMV plaque at 40 sec of MW. In terms of bioactive properties by MW procedure, SlgA and lactoferrin were higher and FFA was lower (p values are 0.09, 0.04, and 0.027, respectively) than those values by HP. We did not find any differences in TGF-β2 among control, MW, and HP. Conclusion: MW 500w for 40 sec is a candidate for prevention strategy of HCMV transmission. A RCT should be performed in near future.
P11
EFFECT OF HOLDER PASTEURIZATION (HOP) ON MACRONUTRIENTS AND ENERGY CONTENT OF POOLED DONOR HUMAN MILK
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Background: DHM is the best option for preterm nutrition when mother’s milk is unavailable. For its proven benefits on the life and health of premature babies, DHM should be part of the essential newborn care. The fortification of human milk is necessary to ensure adequate growth and consequent good neurodevelopment.

HoP is routinely practiced in human milk banks to ensure safety of DHM but can impact the macronutrient content. The aim of this study was to explore the effect of HoP on fat, protein, lactose and energy content of donor milk and compare our data with literature.

Methods: protein, lactose, lipids and energy of 100 DHM pools were analyzed before and after HoP using HM analyzer Miris AB, with infrared spectroscopic method. The mean macronutrient contents before and after HoP were compared using paired t-tests and the variations in the macronutrient content were calculated as delta %.

Results: we observed a reduction in fat: 3.12±1.64 vs 2.55±0.85 with delta % value 14.9±13.0 and p value <0.001, T protein: 1.05±0.26 vs 0.89±0.20 and delta% 8.9±63.0 with p value <0001, energy content: 61.38±18.66 vs 55.00±8.27, delta% 8.1±9.4 and p value 0,001, while no significant changes were observed for lactose content: 6.35±0.80 vs 6.43±0.58, delta % -6.5±56.7 and p value 0,3735. Therefore, after HoP the fats reduced by 14.9%, the calories by 8.1% and the true proteins by 8.9% while HoP had no impact on the lactose content. Data in literature on the effect of HoP on DHM macronutrients are variable and the only more constant element, even if not reported in all studies, is the non-variation of the carbohydrate content.

Conclusion: HoP decreased protein, fat and energy content of DHM. The lactose has not been affected after the HoP. Although these results are not relevant for the purpose of the fortification, since the DHM should be fortified to assure optimal growth, after having assessed a remarkable variation in the macronutrient content in comparison with other studies, the adjustable fortification based on the composition data might be more correct. In addition, despite the fact that HoP is actually the method recommended by the international human milk bank guidelines because it provides a compromise between microbiological safety and nutritional biological quality of DHM, the studies on alternative methods capable of preserving the milk’s nutritive and bioactive components are desirable.
P12
EFFECT OF HOLDER PASTEURIZATION ON MACRONUTRIENTS AND IMMUNOGLOBULIN PROFILE OF POOLED DONOR HUMAN MILK
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Objective: To study the effect of Holder pasteurization on macronutrients and immunoglobulin profile of pooled donor human milk. Methods: This descriptive study was conducted in a Human Milk Bank of a tertiary care teaching Institute in south India. Thirty random paired pooled donor human milk samples (before and after pasteurization) were analyzed for macronutrients (protein, fat, carbohydrates) using Infrared spectroscopy. Similarly, immunoglobulin profile (IgA and IgG) before and after pasteurization was quantified using ELISA. Results: The mean values of protein, fat and carbohydrates in pooled donor milk pre pasteurization were 1.6, 3.6 and 6.1 g/dl compared to post pasteurization values 1.4, 2.7 and 5.9 g/dl respectively. Pasteurization reduced protein, fat and energy content of pooled donor milk by 12.5%, 25% and 16% respectively. However, carbohydrates were not significantly reduced. Pasteurization decreased IgA by 30% and IgG by 60%. Conclusion: Holder pasteurization of pooled donor human milk decreases protein, fat and energy content and also reduces the levels of IgA and IgG.
P13
THE INFLUENCE OF FREEZING AND HOLDER PASTEURISATION ON HUMAN MILK COMPOSITION
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Background. Donor human milk is widely used for feeding premature and sick newborns when the milk of their own mothers is insufficient. Donor human milk banks have strict rules governing the preparation of donated milk. Holder pasteurisation is the most commonly used method for the microbiological safety of donated milk. Milk is stored in freezers before consumption. Procedures employed in human milk banks influence the nutritional and biological quality of milk. Existing data about the influence of storage and pasteurisation on human milk composition still remain inconsistent. The purpose of our study was to evaluate how freezing and Holder pasteurisation affects macronutrient, energy and bioactive protein content in human milk.

Methods. The study was conducted at the Neonatal Centre of Vilnius University Children’s Hospital between October 2017 and July 2018. Paired human milk samples from 42 hospitalized women within 14–16 lactation days were collected. Macronutrients (protein, fat, carbohydrate), energy and bioactive proteins (lactoferrin, lysozyme) concentrations were evaluated twice, in fresh milk and after milk had been frozen at -40ºC for up to 10 months, then thawed and pasteurised. The Miris human milk analyser (mid-infrared spectrophotometry method) was used to evaluate the macronutrient and energy content of human milk samples. An immune-enzymatic ELISA assay was used to estimate lysozyme and lactoferrin concentrations in human milk.

Results. Forty-two paired human milk samples were analysed. Human milk freezing and pasteurisation did not influence macronutrient and energy content in human milk (p > 0.05). Concentrations of lactoferrin and lysozyme were significantly lower in thawed, pasteurised milk compared with frozen, fresh milk (p < 0.05). The average loss of lysozyme and lactoferrin was 35% and > 99%, respectively, post pasteurisation.

Conclusions. Freezing and Holder pasteurisation caused a significant loss of bioactive proteins but did not change the macronutrient content of human milk. It is important to look for new methods of milk processing in order to minimise the loss of the bioactive components of human milk.
The influence of breastmilk expression pattern on the nutritional value of milk donated to human milk bank

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The composition of breast milk varies depending on the stage of lactation, time of delivery - preterm or on time, time of day and even during a single feeding. Honorary donors provide milk expressed according to any pattern consistent with their capabilities and needs. The goal of this study was to assess the influence of breast milk expression pattern on the composition of milk donated to human milk bank. The data was collected retrospectively by the mixed qualitative and quantitative questionnaire sent to donors recruited in Regional Human Milk Bank in Warsaw during the years 2015-2018.

Donors determined the frequency of milk expression at different times of the day and how this pattern changed during cooperation. The questionnaire included questions connected with factors affecting the composition of milk. Rate of response was 42% (n=52). The results were compared with donor milk nutritional value. One-way ANOVA and t-Student statistical tests were used (significant if p< 0.05). There were no significant differences in the contents of protein, lipid, carbohydrate and energy value between donors that were directly breastfeeding (n=27) and expressed breast milk feeding (n=25).

During the first period of donation, expression in the morning (6-12 am), increased the fat content to 3.47 ± 0.94 if often expressed vs. 2.64 ±0.95 if sporadically expressed vs. 3.22 ±0.65 if never expressed in the morning (p = 0.047). The energy value was changed, respectively 65.53 ±8.72 vs 57.78 ±8.28 vs. 62.48 ±6.43 (p = 0.042). Expression in the evening (6-12 pm) increased total protein content to 1.00 ±0.13 if often expressed vs. 0.94 ±0.24 if sporadically expressed vs. 0.71 ± 0.11 if never expressed in the evening (p = 0.013). The energy value was increased, respectively 62.38 ±9.41 vs 60.95 ±11.38 vs. 47.16 ±20.78 (p=0.041). The compared groups did not differ significantly in terms of the age of the child, time of delivery and the length of cooperation with human milk bank. Day and night changes at the end of cooperation were eliminated - there was no statistical significance.

Our study revealed that the macronutrients content is not dependent on the way of feeding (direct vs. expressed breast milk feeding). Nutritional value of donor milk is sensitive to day and night changes, especially in the first weeks of donation. Milk expression in the morning can increase the fat content while expression in the evening - protein content.
**P15**

**IMPACT OF HUMAN MILK PASTEURISATION ON DIGESTIVE KINETICS AND INTESTINAL LIPID UPTAKE USING A COMBINATION OF IN VITRO MODELS FOR PRETERM INFANTS**

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**Introduction**

Human milk is a complex biological fluid recognised as the gold standard in neonatal nutrition, especially for preterm infants since it could reduce complications of prematurity and it supports growth and brain development. Donor human milk, pasteurised for safety reasons, is the first option to feed preterm infants when mothers’ own milk is unavailable. However, pasteurisation negatively impacts on milk quality because of the denaturation of several biological components. The aim of the present study was to evaluate in vitro the impact of breastmilk pasteurisation on preterm infant gastrointestinal digestion and to assess its effect on lipid intestinal uptake.

**Methods**

Digestive kinetics of pasteurised human milk (PHM) and raw human milk (RHM) were evaluated using a static in vitro digestion model that we adapted to simulate preterm digestion ability. Proteolysis was evaluated by sodium dodecyl sulfate polyacrylamide gel electrophoresis and lipolysis was determined by thin layer chromatography. Caco-2/TC7 cells, an intestinal absorption model, were subsequently incubated with diluted PHM vs RHM-digestion media. Lipid uptake was quantified by digital image analysis of lipid droplets after Oil Red O staining and by measurement of triglyceride secretion in basolateral medium. Expression of some genes involved in intestinal lipid absorption was also studied.

**Results**

During in vitro digestion, lactoferrin, β-casein and α-lactalbumin proteolysis as well as lipolysis kinetics were not significantly different between PHM and RHM at the end of the intestinal phase. The number of pixels of lipid droplets in Caco-2 cells were diminished in pasteurised conditions after 16h of incubation with digested milk, although this effect did not reach statistical significance (p=0.10). Number of droplets per image was identical for both milk types (p=0.51), while the mean droplet area tended to be smaller in the pasteurised condition without reaching statistical significance (p=0.08). Triglyceride secretion measured in the basolateral medium of Caco-2 cells was similar in PHM compared with RHM (36.1 vs 42.9 µmol/ L respectively; p=0.26). Furthermore, no difference between PHM and RHM was found concerning expression of some genes involved in intestinal lipid absorption.

**Conclusions**

No significant difference in lipolysis kinetics and lipid absorption was reported between PHM and RHM. This suggests that human milk pasteurisation has no major impact on lipid intestinal uptake when studied in these in vitro models. PHM seems to be a good alternative to RHM from a nutritional point of view.
P16
IMPACT OF A NOVEL HUMAN MILK FORTIFIER FROM DONKEY MILK ON THE KINETIC OF HUMAN MILK MACRONUTRIENTS DIGESTION AFTER IN VITRO DYNAMIC DIGESTION
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Fortification of human milk (HM) is a standard practice for feeding very low birth weight infants (VLBWI). VLBWI often have growth deficiency and feeding intolerance (FI). Due to the biochemical similarity of donkey milk (DM) to HM, a new DM-derived fortifier (DF) was developed. A clinical trial was recently performed, aimed at comparing the effects of HM fortification with DF to HM fortification with commercial bovine milk–derived fortifier (BF), in VLBWI. DF resulted in reduced FI, bilious gastric residuals and vomiting episodes with respect to BF. The aim of the present work was to assess whether the different types of fortification affect the digestive kinetics of HM macronutrients during in vitro dynamic digestion. Preterm HM milk samples fortified either with DF or with BF, at isoproteic and isocaloric conditions, were digested in vitro using preterm gastrointestinal conditions. Samples were collected at different digestion times and were characterized for their particle size distribution, confocal microscopy and protein profiles (SDS-PAGE).

Large particles were found in HM+DF before and during the initial gastric digestion, with particles being disintegrated only after 60 min of gastric digestion. In the intestinal phase, the evolution of the particle sizes was rather similar between HM+DF and HM+BF. During the entire digestion, similar protein hydrolysis was observed for the two fortified milks. In particular, caseins were hydrolyzed at the end of the gastric phase, unlike whey proteins, which were mostly digested in the intestinal phase. Despite the two fortifiers greatly differed in terms of protein structure (extensively hydrolyzed for HM+DF vs. whole proteins for HM+BF), we found a similar HM protein digestion in the two types of milk. A possible role of the higher particle size found in the HM+DF in the reduction of the FI episodes observed in the clinical trial is discussed.
P17
EFFECT OF LACTATION PERIOD ON MACRONUTRIENTS AND ACIDITY VALUES IN DONOR HUMAN MILK
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Introduction
The analysis of macronutrients (fat, protein and lactose) and acidity are used as a quality control of donor human milk. Currently, different criteria have been described for some of these parameters (protein content and acidity values) in the different guidelines of human milk banks. Furthermore, most studies use milk samples expressed in the first months of lactation but scarce data are available about prolonged lactation period. Objective The aim of this study was to describe changes in the macronutrient concentration and acidity values of donor milk in different months after postpartum (0-4; 9-12; 19-24 and > 36) to support the development of evidence based guidelines regarding how long lactating women can donate human milk to a milk bank.

Methods
This retrospective study was based on data obtained between April 2015 and October 2018 from the database of a regional milk bank. A total of 4298 batches (3371 donors) of donor milk suitable for pasteurization were analyzed. Total fat, protein and lactose concentrations were measured by Fourier Transformation Infrared Spectroscopy in a mid-infrared milk analyzer (MilkoScan FT2, FOSS S.A, Spain) properly calibrated for analysis of human milk. Acidity was assessed by the Dornic technique. For comparisons, data were analyzed using Kruskal-Wallis test and Bonferroni post hoc test. Significance was set at p<0.01.

Results
The median (IQR) fat concentration (g/dL) was 3.56(3.03-4.12), 3.10(2.36-4.01), 4.08(3.09-4.77) and 4.90(3.05-6.34) after 0-4, 9-12, 19-24 and > 36 months postpartum respectively. The median (IQR) protein concentration (g/dL) was 1.80(1.72-1.91), 1.75(1.68-1.82), 1.80(1.65-1.90) and 1.95(1.79-2.39) after the same periods described previously and finally, the median (IQR) lactose concentration (g/dL) was 7.19(6.67-7.62), 7.39(6.96-7.71), 6.95(6.36-7.51) and 6.41(5.87-7.52). The median (IQR) acidity value (#Dornic) was 3(3-4), 3(2-3), 2.5(2-3) and 2(1-3) after the periods studied.

Conclusion
The lactation period influenced significantly the concentration of macronutrients and acidity values of donor milk batches. Globally, after one year of lactation, the concentration of fat and protein increased whereas the lactose content and the acidity values decreased. It is important to understand how human milk changes during extended lactation in order to create evidence-based recommendations regarding the potential nutritive value of donor milk.

This study was supported by RETICS “Maternal and Child Health and Development Network”.

5th International Congress
European Milk Bank Association (EMBA)
P18

OCCURRENCE OF OCHRATOXIN A IN BODY FLUIDS OF MILK BANK DONORS

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Ochratoxin A is a nephrotoxic, hepatotoxic, teratogenic and potentially carcinogenic mycotoxin produced by moulds of the genera Aspergillus and Penicillium. In addition, ochratoxin A shows immunosuppressive activity and inhibits DNA and RNA synthesis in cells. It occurs in many products consumed daily: breakfast cereals, grain, coffee beans, wine, beer or wheat gluten. The aim of the study is to detect the occurrence of ochratoxin A and compare the amount of ochratoxin A found in body fluids of breastfeeding women. Tested body fluids are milk, urine and blood serum. The research material was obtained from 13 women, donors of surplus milk from the Milk Bank from Torun. Extraction of ochratoxin A in the test samples was carried out using OchraPrep (R-Biopharm Rhône Ltd-OTA) affinity columns and the chromatographic analysis was performed by high-pressure liquid chromatography with fluorescence HPLC-FLD detection.

The results of the analysis showed the occurrence of ochratoxin A in 2 out of 13 (15.38%) milk samples with values between 0.01 ng/ml and 0.014 ng/ml, and the average of 0.0018 ng/ml. In urine, ochratoxin A was found in 10 of 13 (76.92%) samples. The minimum level of ochratoxin A in positive samples was <0.013 ng/ml, while the maximum was 0.042 ng/ml, average 0.016 ng/ml. The tested mycotoxin was present in all 13 (100%) serum samples. Its values varied between 0.291 ng/ml and 2.38 ng/ml (mean 0.6 ng/ml).

The serum of two of the examined women contained ochratoxin A at the level exceeding the average content of this mycotoxin (0.777 ng/ml and 2.38 ng/ml). In the case of these two women in question, ochratoxin A was detected in all body fluids. Based on the results obtained, the following conclusions can be drawn: the milk of the examined women is slightly contaminated with ochratoxin A. The average level of ochratoxin A in the blood serum of the study group is close to the average level of ochratoxin A in the blood serum in a number of countries (determined at 0.7 ng/ml).

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P19

ANALYTICAL SCENARIO FOR THE DETERMINATION OF MACRO-, MICRO- AND TRACE ELEMENTS IN THE SAMPLES OF HUMAN MILK

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Human milk is the optimal food for infants, as it contains the right balance of all essential nutrients and bioactive factors. For children undergoing intensive and long-term treatment, natural nutrition is treated as a supportive therapy. For this reason, if the mother’s own milk is not available, donor milk stored in milk banks is the first option. Milk from particular donors probably significantly differs in terms of macro-, micro- and trace elements content. Moreover, it could potentially contain unknown amounts of toxic elements. The lack of methods for determining these elements in human milk is a certain limitation in research on this topic. The aim of the study was to propose a methodology for determining the total content of selected elements in human milk samples and to test the developed method for the analysis of samples. Tested material comprised 32 human milk samples from a 24-hour milk collection, coming from women exclusively breastfeeding during their first month of lactation. Foremilk and hindmilk samples were collected from four time periods (06:00–12:00, 12:00–18:00, 18:00–24:00, and 24:00–06:00) to minimize possible circadian influences on selected elements concentrations.

In the implemented project, particular emphasis was placed on optimizing procedures for the quantitative evaluation of selected macro- and microelements as well as toxic elements in human milk. It was decided to analyze the following elements within the project: calcium, phosphorus, iron, zinc, selenium, nickel, lead, arsenic and cadmium. Firstly, a procedure for preparing milk samples for elemental analysis was developed. The next step was to optimize the methods for the determination of selected elements. For this purpose, mass spectrometry with inductively coupled plasma (ICP MS) was used. With the use of optimal method for the preparation of milk samples and optimal measurement conditions, it was possible to obtain satisfactory limits of quantification for selected isotopes of elements that occurred in the samples at very low concentrations. In order to determine the analytical capabilities of ICP MS, the content of selected elements in the certified reference material was determined.

Fortunately, preliminary studies did not reveal the presence of toxic elements in the milk (Pb, Cd, As). What is worrying, there was no selenium found in the milk, which may be associated with deficiencies of this element in the diet of Polish mothers.

The developed research methodology can be used in further research on human milk.
POSTERS

P20
EFFECT OF DONOR HUMAN BREAST MILKS ON MDA-MB-231 HUMAN BREAST CANCER CELL LINES
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Human breast milk (hBM) provides functional nutrients to infants. Accumulating evidence demonstrates that hBM contains many bioactive anti-inflammatory factors. However, limited information is available on the modulation of monocyte-mediated innate immune responses by hBM. The purpose of this study is to investigate the effect of hBM on the expression of the MDA-MB-231 breast cancer cell lines. Poly adenosine diphosphate–ribose polymerase (PARP) protein cleavage is induced by caspase-3 or caspase-7 enzyme activity, a cysteine protease. Caspase-3 and caspase-7 enzymes are normally present as inactive precursors, and when delivered to the cell death signal, they are cleaved and become active. To determine whether PARP cleavage by breast milk was induced by caspase enzyme activity, Western blotting was used to investigate the production of active caspase-7 fragments. Breast milk treatment of MDA-MB-231 breast cancer cell lines showed that the amount of GAPDH as a control protein was not changed, but truncated caspase-7 protein was increased in a concentration-dependent manner. These results indicate that breast milk induces apoptosis of breast cancer cells through caspase-7 enzyme activity.

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MicroRNA (miRNA) are small (~ 22 nucleotides) ncRNA molecules that regulates expression profile by mediating post transcriptional silencing of mRNA. They are involved in various physiological and pathological conditions and also reported as key diagnostic biomarkers. Tissue specific expression profiles and the presence of miRNA in various body fluids indicates a highly regulated and sophisticated channel for cell-cell communication. The presence of regulatory signalosomes mediating communications between mother and the infant, Milk exosomes were first reported in 2007, since then various studies have been conducted to profile milk derived miRNA. Dietary miRNAs are bioavailable to human beings. The presence of miRNA in mother’s milk indicates post-natal genetic interaction between the mother and her nursing infant. In present study, we performed a rigorous Insilico mining of publicly available databases for known miRNA in breast milk and a rigorous bioinformatic analysis of reported miRNA by fully functional open source tools to elucidate a comprehensive list of their putative and validated targets and functional annotations. A total of 102 polymorphic forms of 56 mature miRNA were reported in 136 studies conducted using breastmilk. Gene ontology functional annotation reveals that the targets are constituted mainly of transcription factors, immune modulation and DNA methylation. Furthermore, to reduce false positive rates of target predictions by various algorithms, set theoretic operations (e.g. unions and Intersections) were applied wherever required. Insilico predictions are cost effective means to identify putative miRNA targets. The pipeline analysed in the present study will pave the path for future research in miRNA expression profiling of breastmilk and portends to open new avenues to identify non-invasive biomarkers and neonatal developmental regulators.
DONOR MILK IS LOWER IN TOTAL FAT, SATURATED FAT, DOCOSAHEXAENOIC ACID AND ARACHIDONIC ACID THAN MOTHER’S MILK FED TO VERY LOW BIRTH WEIGHT INFANTS

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Background: Given widespread use of donor milk for infants born at a very low birthweight (VLBW) it is important to determine whether it provides equivalent nutrition to mother’s milk. Donor milk fat may be affected by processing (freeze/thaw container changes, pasteurization), and donor characteristics.

Objective: To compare the fatty acid composition of donor milk and mother’s milk fed to VLBW infants.

Methods: Samples were collected of mother’s milk (weekly) and pasteurized donor milk (Holder 62°C for 30 min) fed in hospital to infants born <1250 g enrolled in the OptiMoM RCT (NCT02137473) between August 2014 and March 2016.

Milk fatty acids were quantified by gas chromatography with flame ionization detection. Total fat was quantified using the Miris human milk analyzer.

Results: Milk from 100 mothers (119 infants) was categorized as colostrum [0-3 days post-partum, mean 2.1 (SD 1.2), n=18], transitional [7-13 days post-partum, mean 9.0 (1.8), n=81], early-mature [14-40 days post-partum, mean 23.2 (5.0), n=93] and later-mature [41 to 84 days post-partum, mean 47.1 (5.9), n=45]. Batches of donor milk (n=53) were produced from a mean of 3.4 (0.7) women, donating at 115.9 (84.3) days post-partum. Total fat of donor milk was significantly (P<0.05) lower than transitional, early-mature and later-mature mother’s milk [3.3 (0.1) vs 3.9 (0.1), 3.8 (0.1) and 3.9 (0.2) g/dl] but not colostrum [3.2 (0.2) g/dl]. This was driven by significantly lower levels of saturated fat in donor milk [mean difference 0.6 (0.1) g/dl] than in transitional, early-mature, and later-mature milk. Donor milk had significantly lower levels of docosahexaenoic acid (DHA) than colostrum, transitional, or early-mature milk [9.6 (0.9) vs 14.0 (1.3), 13.3 (0.7) and 12.7 vs 0.7 mg/dl] but was not different from later-mature milk [10.5 (0.1) mg/dl]. It also had significantly lower levels of arachidonic acid (ARA) than transitional milk [19.7 (1.3) vs 25.3 (1.0) mg/dl], but not than colostrum, early-mature or later-mature mother’s milk [23.2 (2.0), 19.7 (0.9) and 19.0 (1.0) mg/dl].

Discussion: Donor milk has lower levels of total fat, saturated fat, DHA and ARA than milk collected at various points postpartum from mothers of VLBW infants. This may reflect the maturity of donor milk, and loss of fatty acids through processing. Given the role of fat in provision of energy, and of DHA and ARA in supporting immune and nervous system development, strategies to reduce losses are worthy of investigation. [Funding CIHR-FHG#129919, FDN#143233].
Background: Supplementing human milk with additional protein may be required to support the growth of very low birth weight (VLBW, <1500 g) infants. Currently in Canada, only two bovine milk-based protein modulars are available to fortify feeds, however, both have limitations for use in VLBW infants. Objective: To explore the feasibility of using donor human milk to produce a protein modular and to determine whether its use can support normal growth in weanling rats. Methods: A human milk-based protein concentrate (HMP) was produced from defatted milk, followed by micro-, ultra- and dia-filtration, and high hydrostatic pressure (HHP) processing. Total protein and lactoferrin concentrations, and lysozyme activity of initial and final products were determined by Kjeldahl (nitrogen x 6.25), high performance liquid chromatography, and turbidimetric assay, respectively. Rats (n= 10/treatment) were randomized and fed for 4 weeks AIN-93G rodent diets differing in their protein source: (i) 100% casein (AIN-93G standard, control), (ii) 50% HMP concentrate and 50% casein, or (iii) 50% commercial bovine whey protein isolate and 50% casein. Body weight and food consumption of rats were collected daily. At the end of the intervention, fat mass was determined by magnetic resonance imaging, plasma amino acid profiles determined by ultra-performance liquid chromatography, and organs were weighed. Results: Raw donor milk contained (mean ± SD) 1.1 ± 0.1 g/100mL of protein (10.1 ± 0.5 g of protein/100g of milk solids), 0.1 ± 0.0 g/100mL of lactoferrin, and lysozyme activity was 2.3 ± 0.1 U/100mL. Post processing, the HMP concentrate contained 63.0 ± 0.3 g/100g of protein, 5.0 ± 0.5 g/100g of lactoferrin, and lysozyme activity was 1821.6 ± 103.0 U/100g. There were no significant differences in body weight, feed consumption, fat mass, or plasma amino acid profiles between rats fed diets containing the HMP concentrate and those fed the control diet. Full cecum weights were higher in rats fed the HMP concentrate (mean difference, 5.6; 95%CI, 4.5-6.7 g; p <.0001) but no other differences were found for other organ weights. Conclusion: Combining several membrane filtration steps and HHP processing concentrated human milk protein while retaining a significant fraction of lactoferrin and lysozyme. This preclinical assessment of HMP concentrate has determined the feasibility of its production and that its use can support normal growth in weanling rats. Funding Source: CHIR(#FDN143233)
THE PARADOX OF STERILIZATION FOR INFANTS FEEDING: WHAT SHALL WE DO?
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Introduction
In Europe, more than 500,000 premature infants are born every year and need to be fed with human milk or artificial milk. Both types of milk are defined as “food”. When breastfeeding is not possible, milk can be administered in different ways: here we focus on feeding bottles and teats.

Current Norms
When used in term, healthy infants, feeding bottles and teats are considered care articles and are under the regulations UE N.10/2011 and UE N.37/2019, which norm plastic materials intended to come in contact with food. For these products, sterilization is not required.
When used in sick term or preterm infants admitted to a NICU, feeding bottles and teats are considered medical devices, are under the regulations 93/42/CEE and 98/8/EC, and must be sterilized.

Sterilization Methods
There are two main sterilization methods: 1) Ethylene oxide; 2) Gamma or Beta Rays, which follow the norms UNI EN 5504 and UNI EN 11137-26 respectively.
1) Ethylene Oxide has been demonstrated to be cancerogenic, and it is forbidden for surfaces in contact with foods.
2) Gamma and Beta Rays represent a simple and effective method of sterilization, free of chemicals, and suitable for surfaces in contact with food.

International Regulation
According to the European Medicines Agency (EMA), “Ethylene oxide sterilization should be used only when safer alternative are not available.”
The International Agency for Research on Cancer (IARC) classifies Ethylene oxide as “carcinogenic to humans”.

The Paradox
In feeding “healthy term infants”, Ethylene oxide is forbidden because in these infants bottles and teats are considered “care articles”: this represents a consistent approach. In feeding “sick, preterm infants”, Ethylene oxide is allowed because in these high risk infants bottles and teats are considered “medical devices”: this represents an inconsistent approach.

Conclusions
In this unclear and paradoxical situation, where the same products (feeding bottles and teats) can be considered either food dispenser or medical devices or something in between, and where the legislation is not one hundred per cent consistent, protecting infants’ health is becoming a matter of our choice.
**POSTERS**

**P25**

**EFFECTS OF BREAST PUMP HYGIENE PROTOCOLS AND HUMAN MILK STORAGE METHODS ON THE DORNIC ACIDITY OF RAW HUMAN MILK**

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**BACKGROUND:** Dornic acidity (AD) is an usual control in Human Milk Banks (HMB) as well as it is an interessant parameter for the neonatal intensive care units (NICU)

**OBJECTIVE:** To describe the characteristics of breast pump hygiene protocolos and storage methods of colostrum (CL) and preterm milk (PM) donated to a HMB and to analyze its relation with AD.

**METHODS:** Retrospective analytic study. Collected data included CL and PM units donated to HMB from mothers with neonates admitted to NICU, from 1st January 2018 to 31st December 2018. Variables: AD, breast pump milk collection kit (BPK) sterilization protocol, storage method after expression and time from expression to processing (TEP). Statistical analysis with SPSS v 15.0

**RESULTS:** 321 units were donated by 7 donors. 263 units were LP (21'02 L) and 58 units were CL (2'9 L). Every donor used an electric breast pump. AD was 6'43 ± 2'06. 16'5% had AD>8 and 83'5% had AD≤8. 79'75% of the units were handled according NICU instructions (BPK sterilization once a week and milk freezing at -20ºC after a variable period of refrigeration at 4ºC) and 20'25% according HMB instructions (BPK sterilization before expression and milk freezing at -20ºC inmediately after expression). AD was 6'85±2'09 compared with 4'76±0'63 respectively. Mean Difference 2'08 (IC 95% 1'56-2'60, p<0'01). Milk units with BPK sterilization before expression had lower AD than those without it (7'07±1'81 vs 5'01±1'88. p <0'01). Milk units which were frozen at -20ºC immediately after milk expression had lower AD than those units first refrigerated (6'57±2'76 vs 6'38±1'76. p 0'46). Milk units with BPK sterilization before expression and frozen immediately had lower AD than those without it (4'73 ± 0'57 vs 6'85 ± 2'09. p <0'01) Thhere was not correlation between time of refrigeration at 4ºC (TR) and AD (r=0'2. P=0'06). Within units with sterilization before milk expression, AD was 4'61 if TR < 15 hours vs 6'03 if TR ≥ 15 hours (p <0'01).

TEP was 73'98 ± 8'83 days. Its correlation with AD was weak (r 0'25, p< 0'01). AD was 5'97 if TEP < 75 days vs 6'80 if TEP ≥ 75 days (p <0'01).

**CONCLUSIONS:** Units handled according HMB instructions had lower AD than those handled according NICU instructions. Sterilization before expression has special impact. Freezing immediately after expression and time from expression to processing has lower impact.
POSTERS

P26
BAMEPRO - NEW SOLUTION FOR THE MILK BANKS
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The company Bamepro As was founded in 2018 by Jeanette Grønnslett, pediatric nurse with experience from the newborn intensive care unit. The founder has got an idea for a solution for quality improvement work in the milk bank, and has started working on it.

The project is supported by innovation Norway and the municipality of Bodø and is anchored through the knowledge park in Bodø. The project is extensive and aims to develop a new and better solution for the milk banks, and to contribute to the creation of more milk banks in the world - and to help highlight the need for breast milk donation. The project is in early phase. Bamepro has partnered with LINK industrial design and Føn designlab to develop the concept.

The project is supported by Nordland Hospital HF, Bodø.

Bamepro wants to include the user perspective in the development of the solution, and wants to offer a solution that is developed with the users and which users can see the value of. Through Bamepro’s new solution, one of the main goals is to reduce the loss of donor milk throughout the milk bank process. Bamepro expects to have a solution ready at the earliest by the end of 2021.
HUMAN MILK LINK. A SERVICE TO BELIEVE IN, A CAUSE WORTH ACTING FOR
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For the past 3 years, Human Milk Link has collaborated pro bono with AIBLUD to promote human milk donations for mothers and premature babies in intensive care units. HML’s mission is to offer material support as well as advice and logistics services, to concretely support Italian Human Milk Banks. In Milan’s Mangiagalli and San Giuseppe Hospitals, as well as in Turin’s Sant’Anna Hospital, Human Milk Link has committed to help develop and spread the culture of milk donation, by constantly listening to mothers’ needs and engaging specialized midwives to optimize the services it provides:

#Delivering milk to hospitals’ Human Milk Banks: from the donor’s home to the hospital, our midwives guarantee that milk is transported in full respect of cold chain requirements. In this, the strong collaboration with Human Milk Banks is crucial to guarantee donors a more professional service.

#Delivering kits at home: HML has included in the kit it provides to collect and keep milk (breast pump, containers, labels) a freezer thermometer that acts as a “data logger”, indicating whether the milk was always kept at the right temperature or not. Even after short holidays or blackouts.

#Giving donors professional support: thanks to a specialized consultation with an HML midwives, each donor is led through every phase of the process so she can be sure she is collecting milk in the best environment and according to updated best practices.

#Providing services and support to new mothers: once HML is activated, a midwife visits the mother at home – not only to ensure the donation meets all requirements, but also to answer any question she might have about postnatal issues (such as breastfeeding, pumping, hygiene, baby’s needs, contraception, etc.). The collaboration between an Italian organization like Human Milk Link and AIBLUD is a great example of how the ideal conditions for local networks to grow may be created, to bring awareness amongst mothers and even wider audiences about the value of donations and AIBLUD’s motto: “every drop counts”. A motto that is so much more than a mere slogan. A strong and concrete motivation to act. Now.
P28

DOES FORTIFICATION OF PASTEURIZED DONOR HUMAN MILK INCREASE THE INCIDENCE OF NECROTIZING ENTEROCOLITIS AMONG PRETERM NEONATES? - A RANDOMIZED CONTROLLED TRIAL

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Objective: To compare the effect of fortified pasteurized donor human milk (PDHM) versus unfortified PDHM on the incidence of necrotizing enterocolitis (NEC) and immediate outcome among preterm neonates. Methods: This randomized controlled trial (RCT) conducted in a tertiary care teaching hospital, south India included 80 healthy preterm neonates randomized to two groups (Group A and B). Neonates in Group A and B were fed with fortified PDHM and unfortified PDHM respectively. Neonates in both groups were managed uniformly as per standard NICU protocol. The primary outcome was the incidence of NEC and the secondary outcomes included severity of NEC, incidence of sepsis, mortality, duration of hospital stay, number of days to reach full enteral feeds and weight gain. Neonates were followed up for 28 days or discharge whichever was earlier. Results: The baseline maternal and neonatal characteristics in both groups were comparable. There was no increase in incidence of NEC in fortified PDHM group compared to unfortified PDHM group (2.5% Vs 7.5%, p = 0.31). Severity of NEC, incidence of sepsis, mortality, duration of hospital stay, number of days to reach full enteral feeds and weight gain were also similar in both groups. Conclusion: Standard fortification of PDHM does not increase the incidence of NEC among preterm neonates.
P29
FEEDING BOTTLES TREATED WITH SILVER IONS: A NEW WAY TO IMPROVE MICROBIOLOGICAL SAFETY OF EXPRESSED HUMAN MILK?

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INTRODUCTION
Expressed mother’s milk is the best alternative when breastfeeding is not possibile.1-2 The preservation of expressed milk represents a critical issue in terms of microbiological safety. The value of the bacterial charge of Positive Coagulase Staphylococci, Enterobacteriaceae and Pseudomonas Aeruginosa is one of the qualitative indicators utilized by Human Milk Banks3. The aim of the study was the evaluation of antimicrobial activity of feeding bottles treated with Silver ions, in order to improve the hygienic standards of expressed human milk.

METHODS AND MATERIALS
Samples of pooled donated human milk collected in the period March 2015 - July 2016 were evaluated. Polyethylene and polypropylene feeding bottles were treated with Silver ions and sterilized with Beta Rays as recently patented by Labor Baby (Biber + ©). Samples of milk defrosted in a fridge were evaluated for Coagulase Positive Staphylococci charge (Baird Parker RPF Agar (Biolife, Italy) - method EN ISO 6888:1999). Data were analyzed at time zero and after 24 hours of incubation at 20°C ± 1°C on both untreated and treated feeding bottles. The results were compared by using the program Stat Plus ver.5 test T-Student two-tier.

RESULTS
A total of 45 samples of donated human milk (20 ml each) was analyzed (27 obtained from 3 pools of donated milk and 18 obtained from 3 individual donors). At time zero, the average bacterial charge of Positive Coagulase Staphylococci was 15.133 CFU/ml, and after 24 hours of incubation the average bacterial charge was 33.400CFU/ml in untreated feeding bottles, while it was 26.600CFU/ml in treated ones with a reduction of 37.23%. The reduction in bacterial charge was higher in the samples that were more polluted at time zero.

CONCLUSIONS
Feeding bottles treated with Silver ions have been proven to exert a bacteriostatic effect proportional to the initial bacterial charge of the sample. This special type of feeding bottles can represent a way to strengthen hygiene practices, and to improve milk safety in Human Milk Banks, in the NICU and at home.

P30

CHANGES IN PRETERM HUMAN BREASTMILK COMPOSITION ACCORDING TO LACTATION AND GESTATION

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Aim. This study measured the composition of preterm human breastmilk with the MIRIS Human Milk Analyser (HMA) and determined the relationship between protein, fat, carbohydrate, energy content and lactation period. Methods. We analysed 409 samples of 24-hour pooled human milk from 36 mothers who delivered preterm infants weighing under 1500 g at less than 32 weeks of gestational age. The milk’s protein, fat, carbohydrate and energy were measured by the MIRIS HMA. Samples were collected from 36 mothers at first (I), second (II), third (III), fourth (IV) and >fourth weeks after birth. Protein, fat and carbohydrate content were estimated and total energy content was calculated.

Results

The mean gestational age was 28.56±2.2 weeks, the mean birthweight was 1130.58±262.0 g.

Picture 1. Changes in protein composition in preterm human milk (* - p<0.05, compared with the results of I and II weeks; ** - p<0.001, compared with the results of I-IV weeks) Picture 2. Changes in fats composition in preterm human milk (* -p<0.05, compared with measurement results of II - <IV weeks) Picture 3. Changes in carbohydrate in preterm human milk (* -p<0.001, compared with measurement results of III - <IV weeks; ** - p<0.05, compared with the results of III - <IV weeks) Picture 4. Changes in energy in preterm human milk (* -p<0.05, compared with the measurement results of II - IV weeks)

Conclusions. The protein content of preterm human breast milk decreased with lactation. A relationship between newborn birth weight and breast milk composition were evaluated. A statistically significant negative moderate correlation coefficient was obtained between newborn birth weight and breast milk energy at week IV. This indicates that the higher newborn birth weight, the less energy was present in breast milk at week IV. The correlation between gestation duration and breast milk composition showed that after week IV the protein in the breast milk had significantly increased for mothers with prolonged gestation newborns. However, mothers, with prolonged gestation newborns, in the second week had less fat and energy in their milk.
P31
HOME MONITORING OF THE TEMPERATURE OF FROZEN DONOR HUMAN MILK
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BACKGROUND: Italian ministerial guidelines recommends to store donor human milk (DHM) in home freezer at temperature ≤-20°C. In Milan and Turin exists a domestic collection service for DHM (Human Milk Link) with different objectives including verify the integrity of the cold chain during storage and transport of DHM from donor’s home to Human Milk Bank (HMB).

OBJECTIVE: to collect and analyze temperatures of DHM during storage at donors’ home freezer.

METHODS: We included 277 donors of the HMB of Mangiagalli Clinic (Milan) and of Città della Salute e della Scienza (Turin). For a total of 880 registrations. A data logger connected to a temperature detection software (microREC) was used to collect the temperature range and mean temperature (°C) at donors’ home.

RESULTS: The temperature detected was: mean -20 ± 3.5, minimum: -24.8 ± 4, maximum: -11 ± 7.7. Among all detections, 50% showed a mean temperature >-20°C. In addition, in 52 episodes the temperature was #0 °C for a mean of 74.8 ± 78.4 minutes.

CONCLUSION: Home storage of DHM do not always meet the ministerial recommendations. Therefore it would be desirable to explore if the storage conditions can effects the microbiological safety and nutritional characteristics of DHM.
ESTIMATION OF MICROBIOLOGICAL SAFETY OF HUMAN MILK BANK TECHNOLOGY IN RUSSIA

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Background. The first human milk bank in Russia operates in the neonatal care unit and includes two types of technology: «Individual milk bank» (the stocks of expressed maternal milk for their own babies) and «Donor milk bank». The aim was to estimate the effect of storage duration at varying temperature ranges, the pattern of microbial isolates and the quantity of colony-forming units (CFU) in expressed maternal and donor breast milk.

Objectives and study. Eight hundred forty breast milk samples were obtained from 120 mothers. Fresh milk samples were cultured for bacteria immediately after collection, after stored in a room temperature for 3 hours (+23°C), after refrigerator storage for 24 hours (+4°C) and for 1 months (-18°C). Donor milk samples were assessed immediately after pasteurization and then after their refrigerator storage (-18°C) for 1 and 3 months.

Methods. The species identification of the microorganisms obtained was carried out on a MALDI-TOF-MS Biotyper MicroFlex mass spectrometer and in a VITEK canalizer.

Results. In freshly expressed milk samples of 66% of women the microbial non-pathogens of skin flora were detected, among which S.epidermidis was prevailed (103 -105 CFU / ml). There was no growth of microorganisms in stored breast milk after 3 hours (+23°C), 24 hours (+4°C) and 1 months (-18°C). Moreover, a decrease the bacterial count (p = 0.012) and S.epidermidis growth (p = 0.001) during milk storage for 24 hours (+4°C) and a decrease S.epidermis growth in breast milk after 1 months storage (-18°C) were found (p = 0.033). It is noted that immediately after Holder pasteurization, a statistically significant decrease the bacterial count occurs, from 66% to 4% (p = 0.001). The absence of growth the bacterial count during donor milk storage at -18°C for 1 and 3 months is shown.

Conclusions. It is proposed that expressed breast milk can be given safely to infants within storage during 3 h (+23°C), 24 hours (+4°C) and 1 months (-18°C) if heavy contamination is prevented at the time of collection. Pasteurization makes the milk almost sterile. «Individual milk bank» and «Donor milk bank» technologies can be recommended for widely use both at home and in neonatal hospitals.

Disclosure of interest This research was carried out with the support of Philips AVENT.
P33
A SYSTEMATIC APPROACH AGAINST BACILLUS CEREUS CONTAMINATION IN HUMAN MILK BANK

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Background: Bacillus cereus is a spore-forming gram-negative bacterium commonly found in food. It's ubiquitous in the environment and its spores resist the usual cleaning procedure applied both in food industry and hospitals. Holder pasteurization isn't effective against sporulating bacteria such as B. cereus, and some of its pathogens strains can cause severe local and systemic infections in newborns, especially in preterm infants, through ingestion of contaminated Pasteurized Donor Human Milk (PDHM). Aim: Evaluation of a systematic approach, applied in our human milk bank, to limit the B. cereus' contamination. Methods: The preventive approach adopted, consists of different steps combined together in order to reach the impoundment of the B. cereus contamination of PDHM. From an environmental point of view: spaces' sanitation are periodically conducted and verified with surfaces' swabs and air sampling; staff is equipped with gowns, caps and overshoes and aseptic hand-washing is performed during the entire process of milk manipulation; a specific “human milk flow” in which raw donor human milk and PDHM follow different in/out ways is created. Educational care of donors begins at the enrollment, when they receive detailed instructions about cleaning and washing practices and proceed at their home for the entire period of donation. Pasteurization of single donor pooled milk and systematic microbiological analysis of each pool after pasteurization are performed. Results: Environmental analysis, conducted after periodical sanitations and routinary hygiene's measures, resulted negative. Educational aspect permitted the reduction of persistent B. cereus contamination of human milk deriving from the same donor. Donors whose PDHM was persistently contaminated in 2017 were 43.5%, in 2018 28.6%. This strategy led to a progressive reduction of PDHM contaminated by B. cereus, from a 12.7% in 2017 to a 7.8% in 2018. Conclusion: The presence of B. cereus is a real problem in human milk banks and it should be prevent with the application of a systematic approach, and monitored through microbiological analysis of PDHM. Specifically it’s necessary to focus the attention upon educational aspect and the choice to perform single donor pasteurization in order to immediately identify and stem the source of contamination of PDHM. This strategy seems to be crucial in term of a successful reduction of B. cereus contamination in our Human Milk Bank.
**P34**
**INCREMENT IN MOTHER’S OWN MILK USAGE AMONG NICU NEONATES BY SEQUENTIAL INTERVENTIONS A QUALITY IMPROVEMENT APPROACH**

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Background: Human Milk is an undisputed gold standard for neonatal nutrition with Mother’s Own Milk (MOM) faring better than Pasteurized Donor Human Milk (PDHM), hence focus should be increased provision of MOM for the biologic baby, rather than PDHM substituting its inconsistent availability.

Objective: To augment MOM usage for feeding neonates admitted in a public health tertiary care NICU from a baseline average of 45% to at least 70% over 8 weeks by multidisciplinary interventions using a Quality improvement (QI) approach.

Design/Methods: Eighty bedded neonatal unit’s daily consumption of the type of milk was analyzed. A QI team comprising of NICU nurses, Lactational counsellors, resident doctors and authors was formed. Potential causes of low MOM usage among NICU neonates were evaluated using fishbone analysis. A variety of intervention measures including a) establishment of comprehensive lactation management centre (CLMC), b) antenatal and postnatal counselling of mothers regarding importance of breast milk, c) lactation counselling of NICU mothers by specially trained lactation counsellors, d) encouraging mothers to visit CLMC for breast milk expression using breast pumps, f) usage of mobile breast pumps in postoperative wards and labor suites g) provision of breast pumps to NICU and physician audit of daily enteral feed prescribing was introduced and subsequently tested by multiple Plandostudyact (PDSA) cycles. The outcome measure was percentage daily consumption of MOM, formula feeds & PDHM which was collected every morning from previous 24 hrs feed charting to compute a weekly average.

Results: Daily consumption of milk in the 80 bedded unit is 14-5 liters. Before the initiation of this QI study, utilization of MOM was 45% and formula 55%. Stepwise implementation of changes through 5 PDSA cycles was done over 8 weeks. A steady increase in MOM utilization from 45% to 70% and the decline in formula usage from 55% to 22% could be achieved over this period. Evaluation at 6 and 9 months in the postimplementation phase revealed sustenance of improved MOM utilization at 70% to 80%. A workshop to improve knowledge and skills about lactational counselling and use of breast pumps among residents and nurses was conducted by the QI team at 6 months of implementation to ensure sustained improvement.

Conclusion(s): Ongoing quality improvement measures along with the establishment of CLMC increased the usage of MOM from 45% to 70% over 8 weeks and the results were sustained even after 6 & 9 months.
Human milk is undoubtedly the preferred choice for neonatal nutrition. Presence of bioactive molecules with role in physiologic and pathologic pathways has enhanced the scope of human milk beyond nutrition. Being heat labile, these bioactive components have reduced activity post pasteurization and hence, MOM (mother’s own milk) outweighs PDHM (pasteurised donor human milk) in terms of both short and long-term benefits for the neonate. PDHM disbursement to 80 bedded NICU at our centre became fully operational since February 2018. A slowly growing reluctance for expressing breast milk was observed and reported by counsellors and NICU nurses amongst mothers whose infants were admitted in the NICU and were receiving PDHM. To understand this phenomenon a root cause analysis was performed by interviewing 50 mothers using a pretested questionnaire. Based on the results, this phenomenon of ‘PDHM dependence’ was substantiated.

A quality improvement project was initiated by a team consisting of residents, lactation counsellors and the authors with baseline assessment of daily PDHM dispensed to the NICU. Steps taken as part of multiple Plandostudyact (PDSA) cycles included a) One to one counselling of NICU mothers by lactation counsellors regarding importance of MOM b) NICU mothers encouraged to visit CLMC for breast milk expression using electric breast pumps 2-3 times every day and the same fed to their biologic babies, c) mobile breast pumps made available in postoperative wards and labour suites for initiating early stimulation and expression. In addition, coding of maternal lactation status daily by lactation counsellors and physician audit of daily enteral feed prescribing was introduced. A decrease in the daily demand of PDHM with increment in exclusive EBM feeding was observed. Comparison of amount of PDHM dispensed during April-June, 2018 with that during July -Sept, 2018 revealed a significant decline from 79 litres to 51 litres (35.5%) with a concomitant increase of MOM feeding on feeding chart analysis. Regular quarterly workshops to augment and reinforce knowledge and skills about lactation counselling and breast pump use for NICU nurses and doctors are underway. This study raises an important issue which we would like to term as ‘PDHM Dependence’ which could be detected and corrected at our centre with timely intervention. This is a significant learning and cautions upcoming CLMCs and LMUs in the country regarding continuous emphasis on the importance of counselling regarding MOM to ensure establishment of successful lactation and exclusive breastfeeding for first six months.
P36
A NEW MODEL OF DONOR MILK HOME COLLECTION SYSTEM: MADRID REGIONAL MILK BANK IN COLLABORATION WITH RONALD MCDONALD HOUSE CHARITIES OF SPAIN

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Madrid Regional Human Milk Bank (MRHMB) is placed at 12 Octubre University Hospital and was opened in 2007. Per year, more than 250 milk donors are accepted and 1800 litres are collected that benefit around 600 recipients from 6 state hospitals. Because of financial reasons, a donor milk home collection system was not developed. To make easier donor milk delivery, MRHMB accredited those state hospitals in Madrid that receive pasteurized milk to collect raw donor milk and assist milk donors. Both MRHMB and collaborator hospitals developed a quality management system based on the International Organization for Standardization. The mission of Ronald McDonald House Charities of Spain is to create, find and support programs that directly improve the health and well-being of children and their families. 3rd December 2018, Ronald McDonald House Charities of Spain and 12 Octubre University Hospital signed a collaboration agreement to create a milk home collection system. The foundation agreed to pay for all transportation costs. A specific procedure, documentation and quality indicators were developed. Ronald McDonald House Charities of Spain drivers were specifically trained by the responsible person of MRHMB. A unique vehicle was designed to perform transportation. Temperature was continuously monitored during milk transportation. A pilot stage was started in January 2019; an initial area of Madrid Region that would be attended was previously established. Only MRHMB professionals at 12 Octubre managed milk home collection system. From October 2019, professionals from collaborator hospitals will be trained by MRHMB professionals. From January 2020 it is expected that these hospitals manage their own milk donors’ home collection system. During this 4 month period, 23,4% (22 out of 94) new accepted milk donors could benefit from home collection system, 64 home collection services were performed and 10,3% (67,5/654,2) of donor milk was collected by using home collection system. Mean and standard deviation transportation time was 42 (25) minutes and mean and standard deviation temperature at arrival at milk bank was -11 (3,6). All glass bottles were frozen and intact at delivery at milk bank.
WHAT DO WE KNOW ABOUT TANDEM BREASTFEEDING?
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The research carried out in Poland showed there is about 10% of women which are nursing more than a year¹,². However, the lack of information regarding the composition of human milk over 12mo of lactation causes that mothers who breastfeed their children for a year or more often do not receive adequate lactation support, are criticized or even discouraged from further breastfeeding. Such a restrictive approach results in a complete lack of data on the composition of milk of women who breastfeed in tandem. Our previous study showed that milk over a year of lactation had higher content of protein, fat and higher energy value in comparison to preterm’s and term’s milk³ and there was significantly higher TAC, CAT activity, GPx compare to milk obtained from term’s infants mothers⁴.

The aim of the study was the analysis of macronutrients: fat [g/100ml], protein [g/100ml], carbohydrates [g/100ml], energy value [kcal/100ml] in milk samples from women who breastfeeding in tandem and after weaning the older child.

A longitudinal observation study was carried out with 13 tandem breastfeeding mothers at Human Milk Bank in Torun (Poland). A 24-hour milk collection was done (N=50). Analysis of macronutrients were performed using the MIRIS. Sociodemographic characteristics of tandem breastfeeding mothers was done. In milk samples of tandem breastfeeding mothers mean concentration of total fat, crude protein, true protein, carbohydrates and energy value was respectively 4,1±1,8 [g/100ml], 1,1±0,2 [g/100ml], 0,9±0,2 [g/100ml], 7,1±0,4 [g/100ml], 71,5±16,3 [kcal/100ml]. After weaning the older child the mean concentration of total fat, crude protein, true protein, carbohydrates and energy value was respectively 3,2±1,9 [g/100ml], 0,9±0,1 [g/100ml], 0,7±0,1 [g/100ml], 7,2±0,2 [g/100ml], 61,8±17,7 [kcal/100ml]. The study population was characterized by an average g.a. 40±1 weeks, 100% single pregnancy, 62% vaginal delivery type, mean age of breastfeed children: older child 37,4±8,4 months, younger child 8,3±5,5 months, frequency of breastfeeding: older 2,6±1,2; younger 11,9±3,2 per day. The mean weaning age of the older child was 35±11,5 months. All infants were introduced to solid foods after age of 6 months. 100% of respondents had higher education and declared good financial level. One mother was milk donor to human milk bank. Our results clearly indicate that human milk after 12 months of lactation does not lose its value. Knowledge about the composition of human after 12h month of lactation and the health benefits of the general breastfeeding period should be a premise to support women who decide to continue breastfeeding when their child turns one year old, or they would like to breastfeed in tandem.
THE QUALITY OF MATERNAL PROTEIN INTAKE AND INFANT’S ADIPOSITY

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Background and aims: Maternal nutritional habits influence fetal growth. Aim: to evaluate the role of the maternal protein intake during pregnancy and lactation on modulating milk macronutrient content and maternal and infants body composition at 1 month after delivery. Methods: We enrolled 76 exclusive breastfeeding mother/infant dyads. At 1 month after delivery we performed the analyses of fat mass%(FM) by air displacement plethysmography (BOD-POD and PEA-POD) and analyses of milk macronutrient content by using Human milk analyzer (Miris AB®). Maternal dietary intake was assessed by a food frequency questionnaire (EPIC Study). All mother were categorized according with daily intake of vegetal origin proteins (PVO) as: G1(PVO≥33%; n=28) and G2 (PVO<33%; n=48).

Results: No differences in maternal basal characteristics were found between groups [age: 33.9±4.9 years, pre-pregnancy BMI and weight-increase (kg): 21.5±2.9 and 12.4±3.7 respectively, GA at delivery: 39.0±1.2 weeks]. Maternal energy intakes were significantly higher in G1 vs G2 [2877±448 vs 2044±416 kcal/die respectively (p<0.001)]. Maternal FM and milk macronutrient content were similar between groups [G1: 34.5±5.9 vs G2:34.6±5.4%, proteins: 1.1±0.2 vs 1.1±0.1, lipids: 3.5±1.1 vs 3.8±1.2 and lactose: 7.4±0.4 vs 7.2±0.3 g/dl respectively for G1 and G2]. Infants weight was similar among groups at birth [3398±401 vs 3368±339 g] whereas it tended to be higher at 1 month in G1 compare with G2 [4637±476 vs 4412±588 g, respectively (p=0.09)]. Infants FM % was significantly higher in G1 vs G2: 20.8±4.0 vs 18.5±3.9% respectively (p=0.01).

Conclusions: An higher PVO was associated to higher maternal energy intake and higher infants adiposity. Could different microbiota play a role in infants adiposity?
BACKGROUND: The procedure for expressing milk has a great influence on its microbiological quality. This is a critical point to avoid donor human milk wasting and increase the efficiency of human milk banks (HMB). Most HMB guidelines emphasize the importance of an appropriate breast pump cleaning but give different or no indications. In Spain, we conducted a survey among HMB to determine what indications the donors receive about how to express milk for donation.

METHODS: A validated survey was sent to the person responsible for each of the 14 Spanish HMB in March 2019. A Google form was sent twice to each person, via email. The survey contained 18 questions. Statistical analysis with EXCEL 2011 vs 14.6.1.

RESULTS: Response rate: 100%.
Donors receive the instructions in the HMB (100%) or health facilities (28.6%; 4/14). Three of the HMB (21.4%; 3/14) do not offer specific training to staff who gives information about milk extraction to donors. Information is provided during the personal interview with the help of brochures (100%; 14/14). Donors usually extract at home (100%; 14/14) and in the Neonatal Units (78.6%; 11/14).

Recommendations for milk expression:
- Washing the nipple with water +/- soap: recommended in 35.7% (5/14) of the HMB.
- Wearing a cap: 64.3% (9/14) or surgical mask: 57.1% (8/14).
- Manual extraction: 92.9% (13/14); teaching manual extraction: 78.6% (11/14) of the HMB. Most donors use breast pumps.
- The HMB gives or lends breast pumps: 92.9% (13/14).
- Allowing the donor to use her own breast pump: 92.9% (13/14).

Recommendations about the care of breast pump milk collection kits:
- None: 7.1% (1/14)
- Washing the kit with water and soap: 100% (13/13). Only 61.5% (8/13) indicate to wash it after all extractions.
- Additional disinfection with boiling water (61.5%; 8/13), microwave bag (100%; 13/13) or chemical methods (23.1%; 3/13).
- Air drying: 69.2% (9/13); drying with a single-use towel: 53.8% (7/13).
- Storing kits in a clean, dry place: 92.3% (12/13).
- Periodical replacement of the extraction kit: 42.9% (6/14).

CONCLUSIONS: Human Milk Banks in Spain offer different indications to donors on how to express milk for donation. There are very few studies comparing the quality of milk obtained according to different expressing methods and the type of breast pump cleaning. It would be advisable to have standardised guidelines, based on the best available evidence.
Background: Breastmilk donation after perinatal loss has a positive impact on the grief experience and allows milk banks to have high quality breast milk. Our objective is to describe breastmilk donation from bereaved mothers in Spanish Milk Banks, in order to make an agreement position and acquire knowledge about breastmilk donation in this context.

Methods: It is a descriptive observational study. The information was collected in the first trimester of 2019 through an electronic questionnaire sent to the 14 Spanish Milk Banks. Collected data included: donors whose child had died and donated breastmilk from 1st January 2016 to 31st December 2018, time of death, time of the first and the last breastmilk extraction and donor milk volume. The qualitative variables are described by relative frequencies and the quantitative ones by central tendency and dispersion measures.

Results: A 100% rate of response was obtained. From 14 banks, 93% admitted milk pumped before death (stage I), 86% admitted milk pumped after death when there was a live nursing brother (stage II), 79% milk pumped after death during the breastmilk suppression (stage III) and 57% milk pumped after death without intention to suppress lactation (stage IV). 74 women donated breast milk to a bank after their child death. In 6.8% of the cases the death occurred antepartum or intrapartum and in 93.2% after birth. In 59.5% of the cases breast milk was pumped before the child death (44 donors from stage I), in 40.5% was pumped after the child death (30 donors: 7, 17 and 6 donors from stage II,III and IV respectively).
The median donation volume was 2.15, 2.5, 4.56 and 2.59 liters in stage I, II, III and IV respectively. The median time of donation after the child has death was 4 days (IR 3-8) in stage III and 71.5 days (IR 38.5-91) in stage IV. 71% of the banks considered that donating milk in these situations help these women overcome their grief, and 50% referred intention to improve care, especially changing milk bank protocols and information.

Conclusions: A high percentage of Spanish Milk Banks manage breastmilk donation from bereaved mothers. However there are different approaches among centers. Most of the Spanish Milk Banks recognize its importance and point out the need to make changes in order to improve care. The average donation volume of this donors is high, even when they pumped their milk after the child death.
POSTERS

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“THE ETERNAL AND THE PASSING TIME” THE MATERNAL MILK A DIVINE FORMULA BETWEEN MYTH, HISTORY AND SCIENCE
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“He put his son in her wife’s arms; she hugged him to her sweet-smelling breast, smiling between tears; the groom softened looking at her and he stroked her with his hand” Homer. Iliad VI - Poem In these lines celebrating the farewell between Ettore and Andromaca we can notice the primitive poetic gesture of breastfeeding a baby. Before science and religion, there is the Greek myth that explains the origin of things and men, as well as uses, customs and laws, that is the origin of Medicine. In prehistoric times breastfeeding was the only way known to humans of feeding children. In classical Greece, breastfeeding was a true cult sanctioned by human and divine laws. The apotheosis of mother’s milk can be found like Homer in Hecuba suckling Hector, in Euriclea suckling Ulysses, in Penelope suckling Telemachus, in Andromache nursing Astyanax and in Aphrodite nursing Eros. The Bible sublimates breastfeeding with Mary who suckles Jesus. In the Roman Imperial Age the languid Imperial matrons do not even dream of feeding the "Puer" with their milk. Breastfeeding is back in vogue with Christianity and remains there until the 18th century. In the Middle Ages also breastfeeding highlights the new Christian culture. Breastfeeding by nannies was widespread in the Court of France. It seems that the only King suckled by his mother was Louis IX called the Saint. Between the end of the 1700s and the beginning of the 1800s, breastfeeding is once again in vogue. In 1874, the French National Assembly promulgated the Rousseau Act to promote breastfeeding. In Florence in the 1950s the first Milk Bank was born in the Anna Meyer Pediatric Hospital. In 2004 in Crotone in the Department of Neonatology the Human Milk Donated Bank named after Ecuba was established, recognized by AIBLUD. According to this scientific, mythological and historical point of view we understand the importance of mother’s milk. The SIN, the OMS and UNICEF affirm the primacy of breast milk as a prerogative of the human species for the humans. Only in the human species during breastfeeding the mother and the baby look into each other’s eyes, forming that "admirable dyad" represented in the immortal paintings of the Milk Virgins. Breastfeeding is an act of love that borders on spirituality and breast milk is a "divine biological formula" that also fascinates in the Third Millennium for its perfection and the fantastic constellation of its components.
Background: The benefits of feeding human milk to infants, even in prematurity, have been well documented. Well organized donor milk processing has made the milk bank a good source of nutrition for premature or sick infants if their own mother’s milk is not sufficient or suitable. The Taipei City Hospital Milk Bank was established in 2005 and is the first nonprofit human milk bank to operate in Taiwan.

Methods: The milk bank has adopted standards of practice laid down by the Human Milk Banking Association of North America and United Kingdom Association for Milk Banking. We set a satellite site for donor milk collecting and distribution in the middle of Taiwan since Dec 2009. The clinical characteristics of the eligible milk donors, the recipients, and the donor milk were reviewed retrospectively.

Results: Between 2005 to 2018, total 4384 lactating women were recruited. 4.6% of them failed the questionnaire, mostly due to smoking and tattoo/acupuncture, and 10.2% didn’t pass the blood test with the reason of elevated liver function (47.3%) and abnormal white blood cell count (37.0%). 4013 (83.0%) eligible donors donated a total of 48201L (mean 12.0 L/donor) of breast milk. 195 (4.9%) of them donated for more than second times. The average pass rate of raw donor milk was around 76.2%. A total of 3495 infants had received bank milk, with their mean gestational age 32.1±3.73 weeks and mean birth body weight 1687±686 gm. The mean time of application for bank milk was 2.7 months. 64.2% of the recipients were inpatients. The donors and recipients from middle/southern Taiwan increased from 3.9% to 36.3% and 14.3% to 50.8% respectively after satellite site established.

Conclusion: Proper management and operation of a human milk bank can support breastfeeding, and provide a safe alternative to artificial formula for feeding preterm or ill infants in Taiwan. Satellite depot of milk bank can increase the accessibility and availability of bank milk.
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MILK BANKING, MILK SHARING AND MEDICALLY FACILITATED HUMAN MILK EXCHANGE: INTERDISCIPLINARY RESEARCH COLLABORATIONS BETWEEN THE UK AND MALAYSIA
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In Malaysia there is currently a fatwa (a religious ruling) against milk ‘banks’, which were deemed to be not compatible with Islamic milk kinship rules. However, alternative human milk exchange systems have developed in Malaysian neonatal units which are considered compatible with Islamic laws. Our collaborations uncovered problems in the UK system, while at the same time identified systems of donor human milk exchange which are considered to be compatible with Islamic milk kinship, encouraging further discussions regarding these issues globally. Ethnographic visits were made to three of the largest milk services across the UK (London, Chester and Glasgow) by all of the team members. In addition, masters level qualitative data was collected from mothers and staff in a major Malaysian neonatal unit. These data were qualitatively analysed by the entire team to determine key themes. These themes offer future directions for research.

We discuss results related to the milk, staff and for mothers and their family. Firstly, in Malaysia (as in France, but unlike in the UK) all mothers’ milk in the NICU is pasteurized. In Malaysia, as our MSc research shows, there is a lack of trust among healthcare providers, and therefore families, with ‘milk banking’. This is not an uncommon phenomenon within the Islamic world, especially considering the fatwa against ‘milk banking’. However, as we have recognized, there are many forms of Islam, and some forms of Islam deal with these potential exchanges by introducing families to each other. Others deal by not offering more than a certain number of milk feeds from a particular mother. But as we were also informed, the medical emergency that provides the very context for these exchanges, is also a consideration which creates possibilities for exchange to occur. Medically controlled introductions between families, what has been called ‘milk sharing’, which in Europe and North American is usually only associated with uncontrolled exchanges between families, has an important additional feature in that it allows for families to identify with and have some control over this form of bodily exchange. Moreover, since epigenetic research indicates that these exchanges can have cellular implications for individuals, this should be recognized and accommodated, and not merely controlled by an medical elite. Finally, we want to encourage a global recognition of the fact that European and North American forms of milk banking do not fit with the practices of all nations around the world, and that we need to have a culturally informed discussion about features of medically indicated and facilitated human milk exchange, so that infants and their families in need are helped in the best ways possible.
I am an MPhil Master student at the University of Oslo. I am completing qualitative thesis fieldwork research on milk banking/donation in the summer of June-September 2019. I would like to present a preliminary summary of results at this conference. Due to the timing, I do not yet know these results. I hope to raise awareness about the importance of banking/donation and determine the “state of play” in this region. Knowledge about international perspectives and challenges is key particularly in conflict areas and in an increasingly globalized world if we are to make progress in science together.

Project summary:
Objectives:
• Generate knowledge regarding local professional opinions of milk donation
• Determine the main obstacles to using donated milk for infants as perceived by perinatal health workers
• Contribute insight that helps health workers consult with patients about human milk
• Gain insight into breastfeeding perceptions of healthcare workers

Summary: The use of breastmilk instead of formulated milk can offer life-long health benefits for many vulnerable and healthy children. When mothers are unable to provide milk to their infants, donated milk can be an alternative. Modern systems of milk donation are not established in most countries in the Middle East/Western Asia. Publications regarding milk donation include studies in Ethiopia, Kuwait, Malaysia, and Turkey, but limited data are available for the region of Palestine.

Research about breastfeeding and milk donation perceptions among healthcare workers, and how patients are educated by these workers, needs to be further developed. Parents’ decisions are highly influenced by the recommendations of their provider, so this is an important perspective to research. Key themes breastfeeding, ethics, milk kinship, politics, formula, medicalization, and education are expressed in the literature and may or may not be the main obstacles or facilitators in the views of the local providers.

Method/Design: Participants will include those who work with breastfeeding and/or infants under 12 months, particularly those in neonatal intensive care units. This includes 10-20 physicians, midwives, nurses, and lactation consultants working at perinatal facilities in East Jerusalem, in addition to informational interviews from local persons. Data will be collected using in-depth semi-structured interviews lasting 45-90 minutes.

Thank you for understanding the unique presentation timing.
CHALLENGES IN ESTABLISHMENT OF A NEW HUMAN MILK BANK IN GREECE
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Human milk banks (HMBs) provide donor human milk to fragile and sick neonates, in cases of unavailable mother’s milk. Due to milk donation, vulnerable neonates have all the benefits of human milk for optimal growth, better neurodevelopment and reduced morbidities.

We recently founded a new HMB, the first in Northern Greece, in Thessaloniki, at General hospital ‘Papageorgiou’ and we present all the challenges and difficulties that we faced during the early steps of the project. Spatially, HMB is located next to Neonatal Clinic-NICU and Obstetric Clinic, so that milk transportation can be facilitated. The general board of the hospital truly supported the effort and a multi-scientific team - consisted of neonatologists, midwives, microbiologists, computer scientists, technicians, infection committee - organized and developed the HMB. Since the bank is a non-profit organization, financial issues for the purchase of the equipment and consumable materials, were important to be solved. In source limited countries like ours, it is important to offer social work and donations play a significant role in overcoming the operational expenses. The cost of the equipment was covered by the generous donation of ‘Stavros Niarchos’ foundation. Moreover, stuff selection and training, type of pasteurization, quality assessment and assurance were critical points to be determined.

Cooperation and guidance from the first HMB operating in Greece was important. We reviewed current literature to set written guidelines for all the procedures that are relative to donor selection and human milk transfer, handling and administration, although we noted many different approaches between European and American HMBs. The EMBA consensus statement was a useful tool for setting operational principles. We ensured safety and quality of all bank processes, by applying the principles of Hazard Analysis and Critical Control Points (HACCP). The operation of human milk bank was ISO certified (BS EN-15224) by Swiss Approval International (Nr 030-02-152-00019/1). We have applied to EMBA, to be a member of the big family of European HMBs. Our institutional practice for promoting breastfeeding expanded and included encouraging new mothers to donate milk and persuading recipient’s guardians to receive donated pasteurized milk.

Human milk banks should have established operational principles, that guarantee the safety of the procedures, according to European published guidelines and adapted to local health epidemiology and policies. It is important to share our practice experience for improved and more qualitative services.
CREATION OF HUMAN MILK BANK IN SENEGAL AS POSSIBLE EMPOWERMENT OF 1000 DAYS PROGRAM
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NutriAid International, an humanitarian organisation born in Turin (Italy) in 1996 focused on malnutrition in Africa, wants to implement a Human Milk Bank Project in Loul Sessene Hospital in Senegal. The aim of the project is to study the potential of Human Milk Bank as possible solution for children malnourished's treatment in Africa as great opportunity to implement the 1000 days program (the 1000 days between a woman's pregnancy and her child's 2nd birthday).

Added value:
- implementation of postpartum control on women could prevent post-natal infection etc: to select donor mothers could be the chance to implement postnatal care for women reducing health risk for new mums. This has a great value for woman's family and for community since the woman in these contexts – generally – has many children that risk to become orphans, is important also for her working activities to get money for family.
- cost reduction for health center to malnourished children treatment: treatment has an high cost for health center due to cost of drug. During drought period health centers could have not enough stocks to face the emergency or have not enough budget to buy drugs. Having a milkbank could reduce cost for health center and permit a better management of emergencies
- promotion breastfeeding in all the target area
- reduction of children mortality in the first months of life
- direct control on HIV transmission and other sexually transmitted disease: realize a human milk bank could became an opportunity to get massive screening on population and control the transmission of HIV not only between mother and children but also in the all community.
- Reduction of collateral project cost related to financial inclusion for new borns: the costs of missing the 1000-day window of opportunity are high. Children who are stunted, as a result of chronic malnutrition, are less likely to escape poverty, earning less in wages as adults. Experts estimate that maternal and child malnutrition costs the global economy billions each year in lower economic productivity and higher healthcare costs.

Critical issues or “possible” challenge?
- In rural contest people could be far away from health center and women could not be able to come to the centre to get milk.
- In a place where mother could be malnourished and have no milk, find giver mother could be an issue.
- The onset of milk bond in Muslim culture
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THE BREAST MILK BANK OF THE VERSILIA HOSPITAL: 14 YEARS OF ACTIVITY
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The project of the Bank of the breast milk (Bank of human donated milk - BLUD) structure suitable for collecting, treating, preserving and distributing the donated breast milk at the Versilia Hospital was born in 2003 thanks to the Association of Small Stars Onlus. Fundraising allows the purchase of the first instruments and BLUD becomes active in 2005. Since then, the Breast Milk Bank has consolidated. Donors increased from year to year; a home collection service was organized. Additional purchases over the 11 years of the Bank’s life have been regularly financed by Small Stars. The last purchase dates back to July 2016: a new pasteurizer was acquired to cope with the increased workload. For several years the Versilia Breast Milk Bank has been included in the regional network of Milk Banks (REBLUD), officially established with a regional resolution in April 2008, and coordinated by the Meyer Hospital in Florence. The other members are Siena Lucca Grosseto Arezzo. The bank of Versilia deals with the territory that extends from Massa Carrara to Cecina and supplies pasteurized milk as well as to its own department, to the small premature of the TIN of the University Hospital of Pisa, of the San Giovanni di Dio Hospital in Florence, of the Apuano Pediatric Hospital as well as at home for children who need it. We present the data relating to the liters of milk processed and the number of female donors who followed one another in the 14 years of activity.
HUMAN MILK BANKING REGIONAL NETWORK IN TUSCANY

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The regional network of human milk donated banks of the Tuscany Region (Re.BLUD), the first in Italy, has been active since June 2010. It consists of public facilities based at the Hospital S. Donato di Arezzo, the Hospital University Meyer Florence, the Hospital of Misericordia Grosseto, the Versilia Hospital Lido di Camaiore, the Campo di Marte Hospital Lucca, the Policlinico Le Scotte Siena. All the facilities are part of the Italian Association of Banks of Human Milk Donated (AIBLUD).

For the recruitment of donors, the ReBLUD collaborates with the Transfusion System of Tuscany, with which there are many organizational similarities.

The functional integration of the six Banks and Transfusion Centers is facilitated by an efficient computerized system; coordination of the Meyer AOU of Florence.

The mission of the Network is to guarantee a constant and adequate availability of milk to the regional Neonatology Centers that request it (currently the 8 Neonatal Intensive Therapy and 8 other Centers), spread the culture of donation, standardize, regulate procedures, distribute a safe product and quality, facilitate and optimize the use of donated human milk. To meet the growing demand for milk from Neonatology Centers, implement and optimize their use, the ReBLUD, with the patronage of the Institutions, in harmony with Regional Policies, is implementing the project of an integrated regional system, which includes not only Banks and Transfusion Centers, but also Obstetrics / Neonatology Centers, Consultors, the Pediatric Network and which synergistically promotes breastfeeding, donation, correct use of donated milk based on clinical priorities.

To this end, regional refresher courses are being held for operators in the maternal / child sector and a promotional activity is being developed that uses various communication tools at the regional level. The creation of a functional coordination between the banks harmonizes with the AIBLUD philosophy. ReBLUD: an operational model that could also be adopted in other Regions and at national level.
PUMWANI MATERNITY HOSPITAL LACTATION SUPPORT CENTRE AND HUMAN MILK BANK IMPLEMENTATION

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INTRODUCTION AND BACKGROUND
Pumwani Maternity Hospital (PMH) is the largest maternity hospital in Kenya. The hospital has a 150-capacity new-born unit. Of these 20 beds are kangaroo mother care (KMC) beds. Human milk banking (HMB) service was launched in PMH on 29th of March as an intervention integrating with kangaroo mother care and breastfeeding support and promotion. The hospital is going through the baby friendly hospital accreditation.

METHODS
The implementation process involved constituting a steering team, identification and modification of space within the newborn unit, equipment installation, sensitisation and training of staff on hazard analysis and critical control points, human milk banking pasteurisation and baby friendly hospital initiative.

RESULTS
A total number of 120 mothers have been interviewed, of this 81 were recruited and the rest disqualified for varied reasons. A total of 43 neonates have benefited from the donor human milk. The indications for requisitions are prematurity with delayed lactation or inadequate production for babies with perinatal asphyxia and prematurity, abandoned babies, sick or deceased mothers and delayed lactation in generally well babies.

IMPACT
There has been increased staff awareness on feeding recommendations for new-borns. Formula milk consumption has reduced, increased exclusive breastfeeding and early initiation of feeds.

CHALLENGES
An increased laboratory turnaround time led to missing out on potential clients and discarding milk. Mothers may be discharged before results are out. The HMB is not offering community-based services, this has created a gap for those mothers who might be willing to express from home. There is no system that enables the unit to share milk with other facilities that may have deserving neonates. Follow up mechanisms for the mothers who do not qualify and ensuring continued counselling to encourage the mothers to continue giving their own babies breast milk remains is challenging. There is equipment maintenance support difficulties having no country-based company pasteuriser agent. There is staffing shortage leading to inadequate coverage. Frequent power outages also affect the HMB processes.

CONCLUSION
Full integration of HMB services to NBU activities will ensure a smooth transition and enable sustainability of the project. Strengthening quality assurance systems will be key in ensuring safety of the DHM. Plans for the next phase with community involvement in donating should be formulated.
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