

PROGRAM



8th INTERNATIONAL CONGRESS EUROPEAN MILK BANK ASSOCIATION

MILK BANKS AT THE CROSSROADS OF CHANGES



VENICE
16-17 October 2025

Scuola Grande San Giovanni Evangelista

event
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Daniel Klotz, Germany
Delphine Lamireau, France
David Lembo, Italy
Guido E. Moro, Italy
Sushma Nangia, India
Olivier Palluy, France
Jean-Charles Picaud, France
Pasqua Quitadamo, Italy
Juan M. Rodriguez, Spain
Alessandro Rolfo, Italy
Patricia Sagrè Martínez, Spain
Jacinto Sanchez Ibanez, Spain
Lisa Stellwagen, USA
Stefaan Van der Spiegel, Belgium
Marina Vilarmau Prados, Spain
Kim Updegrove, USA
Gillian Weaver, UK
Aleksandra Wesolowska, Poland

08:30-09:00	Welcome from Authorities
09:00-09:20	OPENING LECTURE Winds of change for the European Milk Banks <i>Sertac Arslanoglu, EMBA President, Turkiye</i>
09:20-10:00	SESSION I. DONOR HUMAN MILK: NOT A FOOD ANYMORE <i>(15 minutes for each presentation)</i> <i>Moderators: Sertac Arslanoglu, Enrico Bertino</i> The new European regulation and its implementation <i>Stefaan Van der Spiegel, Belgium</i> Donor milk as SoHO and the role of EDQM Guide in adaptation <i>Jacinto Sanchez Ibanez, Spain</i>
09:50-10:00	Discussion
10:00-10:30	ORAL COMMUNICATIONS: SESSION I (OC 1-3)
OC 01	Global perspectives and advancements in integrating human milk banking into maternal and newborn care: policy, implementation, and innovation <i>Kimberly Mansen, USA</i>
OC 02	The impact of donors' diet and supplementation on the nutritional profile of donor human milk <i>Agnieszka Bzikowska-Jura, Poland</i>
OC 03	Building Confidence in Human Milk Analysis: Why Assay Verification Matters <i>Melissa Girard, Canada</i>
10:30-10:50	Coffee Break

10:50-11:50	SESSION II. NEW RULES, CONCERNS & CHALLENGES (15 minutes for each presentation) <i>Moderators: Aleksandra Wesolowska, Jean-Charles Picaud</i> Competent authorities and inspections in French Human Milk Banks <i>Olivier Palluy, France</i> Competent authorities in Spain for milk banks. Steps towards adaptation <i>Dolores Hernández Maraver, Spain</i> North American Donor Milk Regulation and Recommendations <i>Lisa Stellwagen & Kim Updegrove, USA</i>
11:35-11:50	Discussion
11:50-12:20	ORAL COMMUNICATIONS: SESSION II (OC 4-6) OC 04 Conceptualizing the Commercialization of Human Milk: A Concept Analysis <i>Heather Christine Rusi, Canada</i> OC 05 Sodium in Human Milk as a Diagnostic Marker of Ductal Blockage: A Comparison Across Mammary Gland Conditions and Donor Milk <i>Po Yu Hsieh, Japan</i> OC 06 Economic evaluation of the DonaMi Human Milk Bank in Lombardy: Cost and health benefit analysis <i>Orlando Cipolla, Italy</i>

12:20-12:40	SESSION III: The ITALIAN CORNER – Part 1 <i>Moderators: Alessandra Coscia & Claudio Fabris</i> <i>(15 minutes for presentation)</i> New processing techniques <i>Enrico Bertino, Turin & Guido E. Moro, Milan</i>
12:35-12:40	Discussion
12:40-13:20	ORAL COMMUNICATIONS: SESSION III (OC 7-10)
OC 07	Breastfeeding and donor human milk: A possible complementary feeding at the beginning of life <i>Riccardo Davanzo, Trieste</i>
OC 08	Cryogenic freeze-drying process of human milk <i>Alessandro Bacci, Udine</i>
OC 09	Regional Network of Donated Human Milk Banks (ReBLUD) and the Regional Blood Centre (CRS): A cooperation designed to increase the safety and availability of the precious food in the Tuscan Region <i>Maria Luce Cioni, Florence</i>
OC 10	Preterm donor human milk for feeding preterm infants: A feasible option with unique characteristics <i>Chiara Tabasso, Milan</i>
13:20-14:20	Lunch and Poster Session <i>Moderators: Serena Gandino, Daniel Klotz, Aleksandra Wesolowska, Rachel Buffin</i>

- 14:20-15:20 **SESSION IV. HUMAN MILK AS A THERAPEUTIC NUTRIENT**
(15 minutes for each presentation)
Moderators: Nadia Raquel Garcia, Laura Cavallarin
- Human milk oligosaccharides for the prevention of NEC**
Lars Bode, CA, USA
- Restoration of the gut microbiota with MOM for the infants fed DHM**
Juan M. Rodriguez, Spain
- "The Possible and the Actual" for feeding a preterm infant before discharge**
Clair-Yves Boquien, France
- 15:05-15:20 Discussion
- 15:20-15:50 **ORAL COMMUNICATIONS: SESSION IV (OC 11-13)**
- OC 11** **Impacts of supplemental donor milk versus infant formula in moderate-late preterm infants: New evidence from a randomized controlled trial**
Alice Rumbold, Australia
- OC 12** **The Effect of Feeding Type on Gut Microbiome Composition in Preterm Neonates with and without Necrotizing Enterocolitis**
Elza Salputra, Latvia
- OC 13** **Investigating Donor Human Milk Composition Globally to Develop Effective Strategies for the Nutritional Care of Preterm Infants**
Maryanne Perrin, USA
- 15:50-16:10 Coffee Break

16:10-17:30	SESSION V. PRACTICAL ISSUES OF MILK BANKING (15 minutes for each presentation) <i>Moderators: Guido E. Moro, Clair-Yves Boquien</i> Donor human milk: Pasteurized vs raw <i>Jean-Charles Picaud, France & Corinna Gebauer, Germany</i> Milk Banking as a Use Case for digitization: Relations, regulations, policies and practices <i>Tanya Cassidy, Ireland</i> Digitalization & milk banking: The French experience <i>Rachel Buffin, France</i> The lyophilization process: New perspectives for human milk banks <i>Delphine Lamireau, France</i>
17:10-17:30	Discussion
17:30-18:00	ORAL COMMUNICATIONS: SESSION V (OC 14-16)
OC 14	Storage of Human Milk In Unfrozen State Under High Pressure-Subzero Temperature Conditions <i>Katarzyna Mazur, Poland</i>
OC 15	Is High Hydrostatic Pressure the future for Human Milk Banks? <i>Léa Tran, France</i>
OC 16	Ultra-High-Pressure Homogenization of Donor Human Milk: Inactivation of <i>Bacillus cereus</i> and <i>Geobacillus stearothermophilus</i> Spores and Preservation of Some Bioactive Components <i>Vanessa Pleguezuelos Hernández, Spain</i>
18:00-19:00	EMBA General Assembly

08:00-09:00	SESSION VI. SOCIAL AND SAFETY ASPECTS (15 minutes for each presentation) <i>Moderators: Tanya Cassidy, Gillian Weaver</i> Milk donation from a social science perspective <i>Marina Vilarmau, Spain</i> Improving assessment of safe medication during lactation and importance for human milk donation <i>Aleksandra Wesolowska, Poland</i> Quality and safety systems <i>Patricia Sagre, Spain</i>
08:45-09:00	Discussion
09:00-09:30	ORAL COMMUNICATIONS: SESSION VI (OC 17-19)
OC 17	The Memory Milk Gift: Reframing Bereavement as a Legacy in Human Milk Banking <i>Laura Atherton, UK</i>
OC 18	Recognising the precious gifts of milk donors: What makes milk donors feel valued? <i>Laura Klein, Australia</i>
OC 19	The Effect of Early Life Exposure to Emergent Environmental Pollutants on Child Development: A Cohort Study Based on Taiwan Southern Human Milk Bank <i>Yung-Chieh Lin, Taiwan</i>
09:30-10:10	Coffee Break and Poster Session <i>Moderators: Nadia Garcia, Clair-Yves Boquien, Alessandra Coscia, Pasqua Quitadamo</i>

10:10-11:10	SESSION VII. GLOBAL MILK BANKING ISSUES (10 minutes for each presentation) <i>Moderators: Corinna Gebauer, Daniel Klotz</i> Innovation in milk banking: Indian Experience Sushma Nangia, India The GAMBA experience Gillian Weaver, UK Collaboration with WHO for expanding human milk banks in the EMRO region <i>Mohammad B. Hosseini, Iran</i> Influence of donor and maternal milk practices on infant health and growth: A systematic review <i>Daniel Klotz, Germany & Serena Gandino, Italy</i> Parents perspective for the new regulation and adaptation <i>Mandy Daly, Ireland</i>
11:00-11:10	Discussion
11:10-11:40	ORAL COMMUNICATIONS: SESSION VII (OC 20-22)
OC 20	Improvements in milk handling and processing: Robotic filling and sealing arm <i>Sharron Zabary, Israel</i>
OC 21	Human Milk Banks of Argentina. Presentation of the 9 years of work of the "Neuquén Human Milk Network" <i>Marisol Alonso, Argentina</i>
OC 22	The Situation of Human Milk Banks in Italy <i>Guido E. Moro, Italy</i>

11:40-12:20	SESSION VIII: The ITALIAN CORNER – Part 2 <i>Moderators: Guido E. Moro & Enrico Bertino</i> <i>(15 minutes for each presentation)</i> Digestomics and anti-viral activity of human milk <i>David Lembo, Turin</i> Human Milk Mesenchymal Stem Cells: Immunomodulatory and anti-inflammatory potential in NEC and RD <i>Alessandro Rolfo, Turin</i>
12:10-12:20	Discussion
12:20-13:00	ORAL COMMUNICATIONS: SESSION VIII (23-26)
OC 23	Perinatal predictors of Extrauterine Growth Restriction in preterm infants: The role of human milk feeding <i>Arianna Aceti, Bologna</i>
OC 24	Availability of Donor Human Milk in NICU: Impact on nutrition and clinical outcomes <i>Pasqua Anna Quitadamo, San Giovanni Rotondo</i>
OC 25	How breast milk and donor milk support preterm infants in Varese NICU <i>Valeria Trivellin, Varese</i>
OC 26	The influence of maternal diet on human milk composition during the first 1000 days <i>Sonia Deantoni, Turin</i>
13:00	END OF THE CONGRESS

IMAGINE- HMB PROJECT WORKSHOP

14:30-17:00

14:30-15:20	Presentation of the Project Overview, Challenges & Work Plans <i>Sertac Arslanoglu, Project Coordinator</i> Comparison of Guidelines & Literature Review Analysis <i>Nadia Garcia, AEBLH Coordinator</i> Discussion
15:20-15:35	Modelling the quality of human milk <i>Marco Deriu, Italy, Galatea Project</i>
15:35-15:50	Coffee Break
15:50-17:00	Workshop
17:00	CLOSURE

CONGRESS VENUE

The official language of the Congress will be English.

For Italian participants, simultaneous translation from English into Italian will be provided.

MEETING VENUE

Scuola Grande San Giovanni Evangelista
San Polo, 2454 - 30125 Venezia (Italy)

How to reach the venue:

<https://www.scuolasangiovanni.it/contattaci/>

REGISTRATION FEE

EMBA Member*	€ 140,00 (VAT included)
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For new members: in order to benefit from the discounted fee, it is necessary to have submitted the membership application to the Society by September 8th

The fee includes:

- Access to the Scientific Sessions
- Congress kit
- Proceedings of the congress
- Lunch & coffee breaks
- Certificate of attendance

HOW TO GET REGISTERED

On the Organizing Secretariat website <https://emba.congressonazionale.com>

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.



ABSTRACTS PRESENTATIONS

DONOR MILK AS SOHO AND THE ROLE OF THE EDQM GUIDE IN THE ADAPTATION TO THE NEW REGULATION

Jacinto Sanchez

The EU the new EU Regulation 2024/1938 classifies human milk (HM) as a substance of human origin (SoHO). Since its 3rd edition, The Guide to the quality and safety of tissues and cells for human application emphasized that, regardless of the regulatory status of HM, ensuring its quality and safety requires an approach similar to that applied to the tissues and cells. This approach establishes an appropriate framework for providing safe and effective services to patients.

The current under drafting 6th edition provide a comprehensive overview of the most recent advances in the field and technical guidance to ensure the appropriate quality and safety of SoHO for human use. It is intended to provide practical support to professionals involved in all stages in the handling and treatment of SoHO, starting from identifying potential donors to clinical application in patients and their follow-up.

The new 6th edition of the guide will have a common structure for all chapters where the information has been structured in four levels of information, when relevant:

- **General standards.** This first level contains the standards derived from the new EU SoHO Regulation, which outline the requirements associated with the different SoHO activities. The aim is to summarise and transpose these requirements into the appropriate Chapters. For EU member states (MS), these standards are mandatory. The term “must” is used in these standards, to indicate the obligation for compliance.
- **Good Practice Guidelines (GPGs).** The GPGs are intended to elaborate on the key elements that should be defined, implemented and controlled by the SoHO entities and establishments. The GPGs provides relevant technical guidance. For the EU MS, any guidance provided as GPGs is understood as mandatory. The term used within this level is “should”.
- **Recommendations.** This third level contain all the advice and guidance that is relevant to the chapter but is not considered significant enough to be classed as mandatory.
- **Supplementary information.** This fourth level includes all the relevant information that is supplementary to the three levels above. It will include, for example, text explaining the rationale for the standards, guidance and advice

The Guide also includes “SoHO monographs”. The monographs outline the specific technical requirements and specifications related to the established SoHO preparations and clinical indications. They reflect the current status of preparation methods and their corresponding safety and effectiveness for known clinical uses (i.e., consolidated processes for consolidated uses).

IMPLEMENTING THE SOHO REGULATION IN HUMAN MILK BANKS: THE FRENCH EXPERIENCE AND INSIGHTS OF NATIONAL STANDARDS AND REGULATORY INSPECTIONS

Olivier Palluy

The forthcoming Regulation on Substances of Human Origin (SoHO) is set to harmonize practices across human milk banks within the European Union. While this regulation offers a unified legal framework to ensure safety and quality, it also introduces substantial regulatory and organizational challenges. Milk banks will be required to adopt comprehensive quality management systems, integrate risk-based approaches, and develop a strong culture of quality and safety. This transition demands not only technical and financial resources but also a significant shift in institutional practices.

France offers a valuable case study in the early implementation of such a framework. As early as 2006, French milk banks were required to comply with a binding national quality standard, including mandatory inspections by the national health authority at intervals not exceeding four years. This regulatory structure established formal expectations for quality assurance and risk management in milk banking.

A key element in the success of this model has been the close collaboration between the French National Agency for the Safety of Medicines and Health Products (ANSM) and the Association of French Human Milk Banks (Association des Lactariums de France). This partnership has facilitated the consistent improvement of practices, the development of shared guidelines, and the dissemination of knowledge across institutions. It underscores the importance of cooperation between regulatory bodies and professional networks in achieving high standards of care and safety.

As the SoHO regulation is implemented across Europe, the French experience highlights both the practical challenges and the benefits of early adoption and structured oversight. It suggests that robust regulatory support, paired with professional collaboration, can significantly enhance the safety and efficacy of human milk banking systems.

COMPETENT AUTHORITIES IN SPAIN FOR MILK BANKS. STEPS TOWARDS ADAPTATION

Dolores Hernandez-Maraver. MD, PhD

Deputy Medical Director ONT. Head of SoHO Department

Donor human milk (DHM) is a vital nutritional and immunological resource for preterm and medically fragile infants, particularly those with very low birth weight (VLBW). It reduces the risk of necrotizing enterocolitis and supports optimal short- and long-term outcomes when mother's own milk is unavailable. Across Europe, milk banking has become increasingly recognized as a critical component of neonatal care, yet its organization, regulation, and coverage remain highly variable.

The entry into force of Regulation (EU) 2024/1938 on standards of quality and safety for substances of human origin (SoHO) represents a major paradigm shift for both competent authorities and milk banks across the European Union. There are many new features in the SoHO Regulation: the extension of its scope to all SoHO, the strengthening of safety and quality requirements, enhanced protection of donors and recipients, and adaptation to scientific and technological advances, assigning an essential role to the reference guides developed by the Council of Europe (EDQM) and the European Centre for Disease Prevention and Control (ECDC). The Regulation introduces a harmonised framework requiring greater alignment with other regulatory frameworks.

For competent authorities, one of the main challenges lies in establishing new infrastructures to oversee the authorisation, traceability, and vigilance of SoHO preparations, including human milk. These responsibilities demand additional resources, enhanced technical expertise, and effective coordination with national and EU-level frameworks.

For human milk banks, the Regulation creates significant operational and compliance challenges: stricter quality and safety requirements, mandatory reporting obligations, and the need to adapt processes to ensure full conformity with EU standards.

While the Regulation aims to improve safety, transparency, and trust in SoHO activities, its successful implementation will depend on how effectively competent authorities and milk banks can address these regulatory, logistical, and resource-related challenges. To this end, in anticipation of the entry into force of the SoHO Regulation, the National Transplant Organization (ONT) is implementing its model of cooperation and networking with stakeholders throughout the entire process, from the donation to the clinical application of human milk.

Conclusion: The new SoHO regulation represents a significant step toward equitable access to safe donor milk. However, its success will depend on national implementation, sustained investment, and alignment with clinical guidelines to ensure that all infants in need can benefit from this life-saving resource.

NORTH AMERICAN DONOR MILK REGULATION AND RECOMMENDATIONS

Lisa Stellwagen

The Human Milk Banking Association of North America is a member organization for 32 nonprofit milk banks in the US and Canada. Founded in 1985 and dedicated to their mission to feed and nourish the most fragile infants, HMBANA is a proud member of the international milk banking community.

HMBANA sets standards for milk banking in regard to donor screening, milk processing and many other aspects of donor milk banking. We will provide updates on our practices, recent innovations and pressure points. We will review current American Academy of Pediatric policies for human milk feeding for high-risk infants.

North American nonprofit milk banks operate under national and regional regulations. In the US, the Food and Drug Administration regulates milk banks as food manufacturers due to its single ingredient content. Similarly, in Canada, donor milk is regulated under the Food and Drugs Act and Regulations as a food. The US FDA and Health Canada and the Canadian Food Inspection Agency provide inspections.

Recent regulatory changes on the federal and state levels have caused confusion, duplication of effort, and increased costs of operation. We will review how HMBANA is working to make sure that nonprofit milk banks thrive and that 100% of the high-risk infants at risk of necrotizing enterocolitis have access to high quality donor milk.

NEW PROCESSING TECHNIQUES OF DONOR HUMAN MILK

Enrico Bertino¹, Guido Moro²

¹Neonatal Unit, University of Turin, ²Italian Association of Human Milk Banks

The main purpose of Donor Human milk processing in Milk Banks is to achieve the best balance between the microbiological safety and the preservation of nutritional and biological benefits of human milk. Nevertheless to reach this goal is still an open issue. Holder pasteurization (HoP), using a low temperature for a long time (62.5 °C for 30 minutes), is currently the processing method most widely adopted in Human Milk banks. HoP inactivates most of the pathogenic microorganisms with a reasonable margin of safety. However it has been reported to cause the loss and/or a reduction in the activity of important functional milk components, including immunoglobulins, lactoferrin, lysozyme, some cytokines and bile salt-stimulated lipase (BSSL).

Due to the present limitations of HoP in processing of HM, there is the need to evaluate alternative processing methods able to preserve better the bioactivity of a higher number of HM components, in order to improve the nutritional and biological quality of DHM.

At present High-Temperature Short-Time pasteurization (HTST, 72 °C for 15 s) and High-Pressure Processing (HPP, a non-thermal processing method that can be applied to solid and liquid foods) are the most studied methodologies. HTST is already utilized in some HMBs for daily practical activity and for research purposes. They seem to be superior to HoP for a better preservation of some nutritional and biologically protective components. Other emerging techniques are Ultraviolet C (UV-C) radiation, Microwave treatment, Combination of freeze-drying (FD) or lyophilization and gamma irradiation, Thermoultrasonication (TUS). They could be promising, but are still scanty of data to be introduced in HMBs practice.

Therefore future prospects for Human Milk Banks will include the use of new technologies that should assure microbiological safety of the final product at least at the same level as optimized HoP, with an improved preservation of the nutritional and bioactive components of raw human milk.

HUMAN MILK OLIGOSACCHARIDES (HMOS) FOR THE PREVENTION OF NECROTIZING ENTEROCOLITIS (NEC)

Lars Bode, PhD

Department of Pediatrics, Larsson-Rosenquist Foundation Mother-Milk-Infant Center of Research Excellence (MOMI CORE), and the Human Milk Institute (HMI), University of California San Diego, La Jolla, CA, USA

Necrotizing Enterocolitis (NEC) is one of the most common and devastating intestinal disorders affecting mostly preterm infants. Rapid onset, fulminant progression, and limited treatment options make it most desirable to prevent NEC before it strikes. Feeding human milk – mom's own milk or pasteurized donor human milk - significantly reduces NEC incidence compared to feeding infant formula, but interindividual variation in human milk composition may explain why some infants still develop NEC despite receiving human milk. Over the past decade, we and others have discovered that a specific human milk oligosaccharide (HMO), called disialyllactose-N-tetraose (DSLNT), reduces NEC-like symptoms and improves survival in animal models. In parallel, three independent human cohort studies have revealed that variations in DSLNT concentration in human milk are associated with NEC risk. The generated data provides unprecedented opportunities to (i) screen mothers' own milk or donor human milk for DSLNT concentrations below the NEC-preventing threshold to guide human milk pooling and clinical care decision making, and (ii) use DSLNT to supplement mothers' own milk, donor human milk, or preterm infant formula to reduce NEC risk in all infants. The presentation summarizes the path that led to the discovery of DSLNT as a NEC-preventing human milk component, outlines the opportunities to develop new supplements and innovative point-of-care technologies with specific focus on donor human milk banks, and discusses challenges and potential solutions on the way ahead.

RESTORATION OF MOM MICROBIOTA FOR DHM-FED INFANTS

Juan M. Rodríguez

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The microbiota of healthy infants born at term by vaginal delivery without receiving any medication and fed exclusively with milk from their own mothers is considered to be the prototype of the ideal microbiota for that age. However, this standard of optimal bacterial colonization may be altered by type of delivery, diet, antibiotic use and/or premature birth. Preterm infants have a very different postnatal experience, in general, than those born at term and, very often, they face an alteration of the normal vertical mother-infant transmission of microorganisms during and after labour. The human milk microbiota may restore this colonization imbalance during early life. However, most human milk banks pasteurize human milk due to current safety concerns and, particularly the potential presence of viruses which presence is not routinely screened in donors. Pasteurization of DBM kills the vegetative bacterial cells present in milk, including the microbes that are indigenous to human milk and play a beneficial role for the infant. Different strategies have been proposed to try to provide human milk bacteria to preterm neonates fed with donor milk (DHM). Most mothers of preterm infants can express at least small amounts of their own milk, including (MOM) and, although it may be of insufficient volume to meet the daily nutritional requirements of their infant, it can still provide long lasting health benefits. Recent studies have shown that inoculation of DHM with small amounts of milk from mothers of preterm infants, and subsequent incubation for 4-8 h, is able to restore the MOM microbiota in the donor milk. Such approach it is easy to implement in neonatal units although high hygienic standards during the process and an agreement on the criteria for acceptability would be required.

"THE POSSIBLE AND THE ACTUAL" FOR FEEDING A PRETERM INFANT BEFORE DISCHARGE

Clair-Yves BOQUIEN

Nantes, France

Human milk is recommended by nutrition societies for feeding preterm infants because of its many beneficial effects, such as protection against NEC, better psychomotor development, and better metabolic health. Another recommendation concerns protein enrichment to promote better growth in preterm infants, who often have low birth weight. In addition to our own experience gained in an observational study of preterm infants, the LACTACOL cohort, a review of the existing literature shows that many nutrients have been tested for enrichment of human milk prior to hospital discharge, including whey proteins, human milk oligosaccharides, polyunsaturated fatty acids, and probiotics. If we add to this the impact of maternal nutrition on milk composition, we can conclude that "the possible and the real" coexist in adapting the composition of human milk during the hospitalization of preterm infants.

DONOR HUMAN MILK: PASTEURIZED VS RAW

Jean-Charles Picaud, France & Corinna Gebauer, Germany

Fresh mother's own milk is the optimal food for all newborn infants, including infants with preterm birth. If a mother's own milk is unavailable, donor human milk from an established milk bank is the recommended alternative by the World Health Organization. Donor human milk undergoes pasteurization before being fed to infants to ensure the eradication of bacterial agents and prevent the transfer of potentially pathogenic organisms, including viruses. Currently, heat treatment with Holder pasteurization is the most commonly adopted pasteurization technique used by milk banks worldwide. Holder pasteurization decreases several biologically active factors with protective and beneficial properties. This reduces the immunoprotective capacity of donor human milk. To mention some of them: bile salt-stimulated lipase, lysozyme, IgA, IgM, IgG, IGF-1, and the probiotic beneficial activity due to non pathogen bacteria.

Feeding unpasteurized donor milk has a long tradition in some donor milk banks in Germany and Norway. In both countries, raw milk has been fed to very preterm infants for over 50 years without known disadvantages. The practice of feeding raw donor milk is possible due to strict donor screening and rigorous microbiological testing of the donated milk. However, there are currently no randomized controlled clinical trials that proves a benefits of feeding unpasteurized milk.

GLOBAL MAPPING OF DIGITAL DATA MANAGEMENT SYSTEMS FOR DONOR HUMAN MILK SERVICES

T. Cassidy^{1,2}, T. Nguyen^{3,4}, R. Ascherl⁵

¹Maynooth University, Ireland

²Irish National Health Alliance

³VinUni, Hanoi, Vietnam

⁴Alive & Thrive, FHI 360 Global Nutrition, Vietnam

⁵University of Leipzig, Germany

Introduction. As human milk banks transition from traditional pen-and-paper systems to digital platforms, effective monitoring systems become critical. Digital monitoring systems offer unprecedented opportunities for tracking, data integration, and quality assurance, yet also present challenges.

Understanding current digital monitoring practices is essential for identifying best practices, addressing implementation challenges, and ensuring consistent quality standards across the global milk banking network.

Methods. We developed a comprehensive online survey targeting the global HMB network of over 730 facilities. The survey was designed and tested with milk banking experts, including multi-language validation to ensure clarity across diverse international contexts. Key survey domains included: current monitoring system platforms, digital integration levels, data management protocols, system functionalities, and implementation challenges.

Distribution leveraged established milk banking networks and regional stakeholders to maximize response rates. The survey was hosted on SharePoint infrastructure and remained open since January 2025. Ethical votes were obtained from FHI 360 and University of Leipzig. Data analysis focused on digital platform adoption rates, system functionality comparisons, regional variations in digital integration, and identification of common implementation challenges. Descriptive statistics characterize the current state of digital monitoring across the global HMB network, with particular attention to system capabilities and user satisfaction.

Results. A total of 144 responses were received from HMBs globally. The majority (81%) were hospital-based facilities, with 10% community-based and 6% other classifications. Most facilities (78%) were located with highest-tier neonatal units.

Current monitoring systems showed significant variation: 67% used hardcopy paper-based logbooks, 56% employed computer-based logbooks (e.g., Excel), and 36% utilized dedicated digital platforms. Among those with digital systems, 51% were developed by HMB staff, 32% by hospital IT personnel, and 23% by external software companies. System accessibility remained limited, with 32% of digital platforms designed specifically for single facilities and only 11% readily available for purchase by other HMBs. Core monitoring functions included donor information storage (85%), recipient tracking (86%), pasteurization documentation (76%), and microbiological testing records (83%). However, advanced capabilities like financial reporting (19%) and interfacility connectivity (10%) were less common.

Time efficiency analysis revealed significant variations in data retrieval capabilities, with some systems requiring hours for basic operational reports while others provided near-instantaneous access to critical traceability information during safety incidents.

Significance. This research addresses a critical knowledge gap in understanding how digital monitoring systems are transforming milk banking practices globally. As digital traceability becomes mandatory in many jurisdictions, evidence-based guidance for system selection, implementation, and optimization becomes essential.

Findings will directly inform milk banking professionals about current digital monitoring practices, successful implementation strategies, and common pitfalls to avoid. The research will identify best practices for digital system integration while highlighting the importance of maintaining robust quality control and safety standards during technological transitions.

Results will support the development of standardized digital monitoring protocols, inform policy discussions about regulatory requirements, and facilitate knowledge sharing across the global milk banking community. By mapping a foundation for future research and collaborative efforts to enhance monitoring system effectiveness in donor human milk services, the current digital landscape, this study provides a foundation for future research and collaborative efforts to enhance monitoring system effectiveness in donor human milk services.

DIGITALIZATION & MILK BANKING: THE FRENCH EXPERIENCE

R.Buffin^(1,2), M.Mourgues⁽³⁾, I.Ndiaye⁽¹⁾, D.Lamireau⁽⁴⁾, C.Roussel⁽¹⁾, Jc.Picaud^(1,2)

⁽¹⁾ Lactarium Auvergne Rhone alpes (LARA)

⁽²⁾ French milkbanks association

⁽³⁾ Société Mediware

⁽⁴⁾ Lactarium Bordeaux Pessac

Background. Ensuring rigorous traceability in human milk donation is a public health imperative, particularly for protecting premature and medically fragile infants. In France, milk banks operate under a strict regulatory framework defined by the ANSM's guidelines, first introduced in 2007 and updated in 2022, which establish operational requirements for collection, processing, qualification, storage, distribution, and delivery of pasteurized donor milk [1].

Methods. In 2013, a French company specialized in biobank traceability (Mediware®) applied its expertise to milk banking. Following immersion in multiple milk banks, it developed a comprehensive traceability solution—from donor to recipient—that integrates critical datasets: donor and infant identification, standardized medical questionnaire, serological screening, bacteriological analyses, collection records, conditioning, pasteurization parameters, storage, distribution, and clinical administration. A dedicated administration module covering bottle preparation and administration enables full tracking during infant feeding. Interfaces capture pasteurization curves and laboratory results, while recent enhancements include geolocation of milk bottles for improved safety and oversight.

The DGOS (Direction Générale de l'Offre de Soins) allocated funding for the digitalization of France's largest milk banks, enabling deployment of a standardized software model across nearly all national facilities. A national digital platform is being rolled out to monitor real-time stock levels, establish safety reserves, and facilitate redistribution between milk banks during shortages, surpluses, or operational incidents.

In addition, a raw milk management module is under development within clinical units. Future developments include integration of a European-wide interoperability framework.

Regulatory Alignment. This initiative aligns with the forthcoming EU Regulation (EU) 2024/1938 on Substances of Human Origin (SoHO), adopted in June 2024 and entering into force progressively from August 2027 [2]. This regulation establishes harmonized safety and quality standards across all SoHO—including breast milk—and mandates standardized donor interviews, robust traceability, and digital-ready systems to strengthen surveillance and crisis preparedness across Member States [3].

Conclusion

The integration of this traceability system provides:

- Operational efficiency through optimized resource allocation and equitable access for vulnerable infants
- compliance with French regulatory standards
- Standardization of practices across milk banks
- Future-proofing via alignment with EU SoHO regulation, positioning milk banking within the broader European framework

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THE LYOPHILIZATION PROCESS: NEW PERSPECTIVES FOR HUMAN MILK BANKS

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Lyophilization, or freeze-drying human milk is an interesting method that allows for a significant extension of shelf life, as well as easier transport and storage at room temperature. In routine use, it is convenient due to immediate reconstitution with water. This method is the technique of choice for drying high-value products. It preserves bioactive components because of the low operating temperatures. However, it does not guarantee microbiological safety and must be absolutely combined with regulatory treatment processes such as Holder pasteurization.

This industrial process was developed in 1955 in France and has been ongoing since then. Indeed, in 2024, this activity moved near Bordeaux with completely up-to-date equipment in a new human milk bank. Our freeze dryer was specially built for this industrial activity and is a prototype. It can hold 1,200 vials of 100 ml human milk. The process takes place in three main stages: freezing at a low temperature of -50 °C; sublimation under low pressure and slightly increased temperature to allow frozen water to sublime; and desorption, where the temperature is raised to remove the last traces of water. At the end of the run, vials are stoppered within the dryer under full vacuum. A run lasts 90 hours. One batch consists of 4 liters, filled into 40 glass bottles of 100 ml before pasteurization. The greatest challenge was developing the formula. It took one year to determine the optimal temperature and pressure for each stage, scale up, and validate the process. Freeze-dried pasteurized milk is currently reserved only for overseas territories but could also be used in emergency situations, such as war or climate disasters, according to decisions by ministerial authorities. The main disadvantage of this process is its very high cost, both in terms of initial investment and routine operational expenses. Therefore, this precious product should be considered only for special indications and designed as part of a large industrial process to ensure good yield.

BEYOND ALTRUISM: ALTERNATIVE READINGS OF HUMAN MILK DONATION

Marina Vilarmau Prados

This work reflects on the donation of human milk from the perspective of the social and human sciences, taking as its point of departure an apparently obvious but fundamental statement: that all donation implies a relationship between subjects.

Thinking about donation entails acknowledging the existence of a donor —a lactating woman— and a recipient —whether another woman in the process of establishing her lactation, or a newborn who will receive the donated fluid. This configuration places us, from the outset, in the realm of the social.

Traditionally, human milk donation has been explained and legitimized through the category of altruism. This notion, widely disseminated in institutional and medical discourses, operates as a moral framework that naturalizes the gesture and softens the tension associated with the transfer of a bodily substance. However, it proves insufficient to grasp the phenomenon in all its complexity. Conceiving donation solely as a disinterested and morally elevated act prevents us from attending to other elements that undoubtedly shape the experience of donating.

Approaching milk donation as part of a relational and culturally charged network of meanings, as a gesture inscribed within a subjective structure that grants it singular significance, and as a lived, embodied experience, allows us to raise questions beyond the normative categories that seek to fix its meaning —and proposes a reading that situates human milk donation at the intersection of bodily experience, subjectivity, and culture.

IMPROVING ASSESSMENT OF SAFE MEDICATION DURING LACTATION AND ITS IMPORTANCE FOR HUMAN MILK DONATION

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The administration of pharmacotherapy to lactating women remains a major clinical and regulatory challenge due to the persistent exclusion of this population from clinical trials. Consequently, the lack of high-quality data on medication safety during lactation results in the interruption of breastfeeding and/or refusal of essential treatments. This has direct implications not only for maternal and infant health but also for the eligibility of donor human milk (DHM), where medication use remains a reason for donor exclusion in many countries, including Poland. As highlighted by the bioethical and legal context, the exclusion of women from clinical trials—rooted in FDA guidelines from 1977—has created systemic inequality in access to evidence-based care.

This lecture addresses the challenges and opportunities of including lactating women in biomedical research, the need for unified clinical guidelines for DHM donor assessment, and the broader implications for SoHO (Substances of Human Origin) regulation.

Recent international and European initiatives (e.g., PREVENT, PREGLAC, and the EMA ICH E21 Guideline on inclusion of pregnant and breastfeeding individuals in clinical trials) are driving change by advocating for default inclusion of pregnant and lactating women in vaccine and drug trials, provided risk thresholds are met. Over the last years, research has tried developing a comprehensive framework to address this knowledge and policy gap. This work integrates epidemiological data, laboratory methods, pharmacokinetic modelling, and patient engagement strategies. Drawing on both local and international collaborations (e.g., ConcePTION and the EMBA network), the teams had developed research tasks centred on medication safety and lactation. A key pillar of this programme is the UmbrellACT study protocol, which will be adapted from IMI-ConcePTION initiative and applied to research on psychiatric pharmacotherapy in lactating mothers. The planned doctoral project will focus on drugs such as pregabalin, bupropion, and atomoxetine, using advanced analytical methods (LC-MS/MS) to quantify drug transfer into breast milk and infant plasma. By generating maternal-infant dyad pharmacokinetic data and correlating it with clinical outcomes, the project aims to fill critical evidence gaps. Furthermore, the adoption of new adverse event definitions (developed under a parallel pharmacovigilance project and integrated into the MedDRA dictionary in 2023) improves the clinical relevance and regulatory utility of collected data. In parallel, a national survey conducted among Polish Human Milk Banks in 2025, coordinated by the Human Milk Bank Foundation, revealed wide discrepancies in the interpretation of medication safety.

This lack of harmonisation, combined with highly restrictive donor eligibility criteria, contributes to underutilisation of DHM and limits access for vulnerable infants. Evidence-based reassessment of medication exclusion lists—anchored in pharmacological risk, not assumptions—emerges as a critical step toward sustainable milk banking policy. Through the IMAGINE-HMB project, we actively contribute to shaping technical guidance and oversight criteria for DHM donation. Our work is anchored in emerging European standards, particularly the new SoHO Regulation, which for the first time recognises DHM as a SoHO.

IMPLEMENTING A QUALITY MANAGEMENT SYSTEM IN A HUMAN MILK BANK: ALIGNMENT WITH THE NEW SoHO REGULATORY FRAMEWORK

Patricia Sagré Martínez

The recent adoption of the European Regulation on Substances of Human Origin (SoHO) introduces a transformative regulatory landscape for Human Milk Banks (HMBs) across Europe. Under this new framework, donor human milk is explicitly defined as a regulated substance of human origin, requiring comprehensive systems to ensure safety, traceability and quality. Compliance with the EDQM guideline is mandatory to meet these regulatory expectations and to implement a Quality Management System (QMS). While these standards have undeniable value in strengthening and harmonizing milk banking practices, their implementation poses significant challenges for many HMBs, particularly those operating at a medium or small scale without dedicated technical teams or advanced digital infrastructure.

This oral communication will focus on the design and practical implementation of a QMS tailored to the resources and organizational structure of a regional HMB. The main phases of the process will be presented, beginning with an initial compliance gap analysis to identify areas requiring improvement. This will be followed by examples of how various components of a QMS, as outlined in Chapter 2 of the EDQM guide, were developed and integrated into daily practice.

Specific challenges encountered during implementation will be discussed, such as aligning existing informal practices with new formal requirements; engaging multidisciplinary staff in quality management principles; fostering a shift toward a proactive risk management mindset through the integration of structured risk analysis tools into routine activities; developing comprehensive training programs to support both the induction of new staff and the continuous training of existing personnel; managing newly implemented change control procedures to document and authorize process modifications; and drafting a comprehensive Validation Master Plan, among other considerations.

The solutions developed to address these challenges will be described to encourage practical knowledge-sharing, promote collaboration and inspire other HMBs in their efforts to comply with the updated regulatory requirements.

INFLUENCE OF DONOR AND MATERNAL MILK PRACTICES ON INFANT HEALTH AND GROWTH: A SYSTEMATIC REVIEW

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Background. Breastfeeding is the biological norm for infant nutrition. When feeding at the breast is not possible, infants may still receive expressed mother's own milk (MOM) and its beneficial properties. When MOM is unavailable or contraindicated, donor human milk (DHM) serves as the first alternative.

Methods of milk expression, hygiene practices, storage, and processing can alter milk composition and may influence infant outcomes. This systematic review evaluated evidence on how such factors affect health and growth in infants fed MOM or DHM.

Methods. Following Cochrane guidance, we conducted comprehensive database and snowballing searches of studies published up to March 2024. Studies evaluating different methods of human milk (DHM and MOM) expression, hygiene practices or settings during expression, processing, and reporting clinical outcomes on recipient infants were eligible. Two reviewers independently screened, extracted, and assessed bias using validated tools specific for each study design. Outcomes of interest were growth, mortality, morbidity, feeding tolerance, adverse events, CMV infection, retroviral infection, other infections; nutrient deficiencies, neurodevelopment, breastfeeding.

Results. From 29,320 MOM studies screened, 45 met criteria; from 14,979 DHM studies, 14 were eligible.

For MOM, no expression method or pump type conferred consistent benefit for breastfeeding or growth, though three studies reported improved growth with hindmilk. Evidence on the effect of processing methods on morbidity and mortality was inconclusive. Limited evidence was found on freeze-thawing's efficacy in reducing CMV transmission, while pasteurization proved more effective. No studies assessed clinical outcomes related to hygiene practices or expression settings.

For DHM studies, we compared clinical effects of DHM from mothers who gave birth prematurely versus at term, DHM that was treated with high-temperature pasteurization methods compared to standard holder pasteurisation and concentrated or homogenized DHM compared to standard DHM. Our analysis revealed a significant paucity of clinical data for several interventions and a complete lack of evidence for most research questions, indicating insufficient evidence to support the clinical efficacy of aforementioned interventions.

Conclusions. The use of hindmilk improves infant weight gain with some certainty of evidence. Hand expression of MOM has similar efficacy on the growth of recipient infants to that of electric pumping, also for mothers of preterm infants. Evidence on clinical outcomes of different MOM and DHM expression practices and treatments is very limited. This work highlights the need for future studies to address the significant gaps identified. Research prioritizing clinical outcomes is essential to guide milk-banking policies.

PARENTS PERSPECTIVE FOR THE NEW REGULATION AND ADAPTATION

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The critical role of human donor milk (HDM) in the care of preterm infants has been well-documented, as it provides essential nutrients and bioactive components that are not only vital for the growth and development of neonates but also protect against serious conditions such as necrotizing enterocolitis (NEC), Sepsis and Retinopathy of Prematurity. As preterm birth rates continue to rise globally, the demand for donor milk is expected to increase, necessitating changes in policy and regulation to ensure that it is accessible and safe for all families in need.

The recent introduction of new European Union (EU) regulations regarding human milk is set to significantly impact the availability and quality of HDM across Europe. These regulations, aimed at standardizing the collection, processing, and distribution of donor milk, promise to enhance safety protocols and ensure that the milk provided to vulnerable infants meets rigorous health standards. However, the implications of these regulations extend beyond just clinical safety—they will also influence the accessibility, affordability, and equity of HDM for families, especially in countries with underdeveloped milk bank infrastructure.

This presentation will explore the importance of HDM for families with preterm infants, particularly focusing on the short- and long-term health benefits it provides. The session will highlight key considerations for policymakers, healthcare professionals, and milk bank operators, particularly in balancing regulatory compliance with the need to maintain flexibility and responsiveness to local needs.

By understanding the intersection between the clinical needs of premature infants, the lived experience of families affected by a preterm birth, the evolving regulatory landscape, and the practical realities of donor milk access, this presentation aims to provide a parental perspective on how the new EU regulations can both positively and negatively shape the future of human donor milk use in neonatal care.

THE ANTIVIRAL ACTIVITY OF HUMAN MILK SURVIVES DIGESTION: NEW INSIGHTS FROM HUMAN DIGESTOMICS

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Human milk (HM) is the gold standard for neonatal nutrition, providing immunological and bioactive components with short- and long-term health benefits. Critically, HM confers protection against infections in both term and preterm infants.

Over the past decade, our research has investigated the intrinsic antiviral properties of HM, demonstrating its activity against pediatric viruses such as human cytomegalovirus (HCMV), human rotavirus (HRoV), and respiratory syncytial virus (RSV), as well as emerging viruses, including Zika and Usutu. Milk-derived components—such as extracellular vesicles, glycosaminoglycans, and oxysterols—have been identified as contributors to this antiviral activity. While our studies, and others in the field, have examined undigested HM, little is known about how gastrointestinal digestion influences its antiviral activity. This gap in knowledge is particularly relevant, since digestion may alter, preserve, or even generate novel bioactive molecules capable of exerting systemic antiviral effects.

The current study aims to analyze the antiviral activity of HM after a simulated *in vitro* digestion, and to identify novel antiviral components in this digested biofluid. Colostrum, transitional, and mature milk samples were collected from 16 preterm mothers, pooled according to lactation stage and donor serological status, and subjected to a validated *in vitro* protocol simulating the preterm infant digestive environment. The antiviral activity against HCMV and HRoV was evaluated using standard antiviral assays. Preliminary results confirmed the previously reported anti-HCMV activity of raw milk samples, and indicated that this antiviral effect is significantly enhanced following digestion, regardless of the mother's serological profile. Additionally, our results showed that the anti-HRoV activity of all milk samples was preserved throughout the entire digestive process. Control experiments ruled out digestive enzymes as the source of this antiviral activity, suggesting either the resilience of immunological and bioactive components or the generation of new antiviral agents during digestion. Ongoing studies are investigating the precise composition of the digested milk. Bioinformatic tools will be employed to predict a structure-function relationships and identify new milk-derived antiviral molecules.

By elucidating the mechanisms underlying the antiviral activity of digested HM, our study provides a crucial link between epidemiological evidence of reduced viral infections in breastfed infants and *in vitro* data on the HM antiviral potential, offering a deeper understanding of how HM contributes to neonatal protection. Additionally, our findings may represent new basis for the development of novel therapeutic strategies that mimic or potentiate the natural antiviral defenses of HM, with significant implications for vulnerable pediatric populations.

HUMAN MILK MESENCHYMAL STEM CELLS: IMMUNOMODULATORY AND ANTI-INFLAMMATORY POTENTIAL IN NECROTIZING ENTEROCOLITIS (NEC) AND RESPIRATORY DISTRESS SYNDROME (RDS)

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Human breast milk plays a crucial role in the optimal growth and development of term infants, and is even more vital for preterm neonates. Its specific profile of nutrients, enzymatic and hormonal components, anti-infective factors along with its cellular elements is unique and remains difficult to replicate in artificial formulae. Beyond its high nutritional value, breast milk should be regarded as a true biological system with both trophic and immunomodulatory functions. Increasingly evidence showed that human milk significantly reduces the incidence of a number of pathologies, including Necrotising Enterocolitis (NEC)—one of the leading causes of mortality among preterm infants, with a fatality rate of approximately 30%—and Respiratory Distress Syndrome (RDS), the most common form of acute lung disease in premature neonates that could lead to bronchopulmonary dysplasia (BPD) thus contributing to their morbidity and mortality. The cellular fraction of human breast milk includes human milk-derived mesenchymal stem cells (hMDMSCs), known for their immunomodulatory and regenerative potential. Interest in hMDMSCs results from the possibility of exploiting their features in the prevention and treatment of NEC and RDS. These cells represent a highly heterogeneous population with complex phenotypic and functional traits, which still require thorough characterisation. Recent studies further suggest that the epigenetic profile of hMDMSCs may be altered by maternal conditions such as pregnancy-related disorders (e.g. preeclampsia – PE, fetal growth restriction – FGR) or maternal inflammatory states, potentially reducing their biological benefits to the neonate. To date, our group has achieved significant progress in the phenotypic characterisation of hMDMSCs, defining and standardizing an “antigenic identity card” which is essential for future clinical applications.

In the present communication, will be presented and discussed novel data and recent findings about in-vitro models, preclinical investigations and clinical perspectives on hMDMSCs use in the prevention and treatment of NEC and RDS.



ORAL COMMUNICATIONS

OC 01

GLOBAL PERSPECTIVES AND ADVANCEMENTS IN INTEGRATING HUMAN MILK BANKING INTO MATERNAL AND NEWBORN CARE: POLICY, IMPLEMENTATION, AND INNOVATION

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Background: Neonatal mortality continues to drive the under-five mortality rate disproportionately, of which preterm birth complications are the primary cause. In 2020 alone, 13 million newborns (about 10% of all births) were born prematurely, resulting in 1 million deaths from its complications. Donor human milk remains the recommended alternative after mother's own milk to prevent necrotizing enterocolitis in these infants, however, gaps remain for the implementation of human milk banking and equitable provision of donor human milk and its integration into neonatal care and routine nutrition programming, especially in low- and middle-income countries (LMIC) where newborn mortality is most pronounced. A comprehensive approach, inclusive of safe and quality human milk banking services is required for transforming newborn care, as highlighted in the following proposed examples. Methods: In this panel, we provide brief updates and insights into the latest advances in policy, implementation, and innovation efforts seeking to advance and integrate donor human milk into broader global health agendas for improving maternal, newborn, and nutritional care among the most at-risk populations. The proposed "pulse panel" (5-10min pulse presentations with a question-and-answer period) includes the following areas of interest: Results/Discussion: 1) Updates and progress of the World Health Organization's Standards for Global Human Milk Banking and Donor Human Milk (Dr. Laurence Grummer-Strawn). The WHO plans to release standards for safety and quality of donor human milk, guided by a global group of experts and systematic reviews for optimal practices in donor human milk banking. 2) Advancing integrated maternal and newborn care for optimal nutrition outcomes with the Mother and Baby Friendly Initiative Plus (MBFI+) model of care (Dr. Kiersten Israel-Ballard). This multi-pronged, systems strengthening MBFI+ approach links specialized lactation support, newborn feeding, human milk systems (inclusive of human milk banking), maternal and newborn nurturing care, enhanced follow-up care, and treatment of malnutrition. 3) Aligned vision of the Africa Neonatal Association: a call to action for strengthening human milk systems in Africa, including integrating human milk banking into newborn care (Dr. Emily Njuguna). Leading neonatologists and pediatricians across Africa are joining forces to establish a cohesive roadmap for prioritizing human milk intake as a core intervention to save newborn lives across the continent through enhanced newborn care standards, practices, and cross-learning. A nutrition survey results showcasing access to human milk diets will be included. 4) Development of targeted and specialized lactation support curriculum to fill a critical skills gap for improving health systems provision of mother's own milk for the small and/or sick newborn in LMIC settings (Ms. Kimberly Mansen). Findings from multicountry pilot assessments of this comprehensive, lactation support training package for establishing, building and maintaining mother's milk supply and supporting the journey towards breastfeeding will be shared, as well as current implementation strategies. Conclusion: Although recent advancements in human milk banking and in provision of human milk have demonstrated momentum, cohesive efforts are urgently needed to transform sustainable, LMIC-specific systems to integrate human milk banking into newborn and nutrition care.

OC 02

THE IMPACT OF DONORS' DIET AND SUPPLEMENTATION ON THE NUTRITIONAL PROFILE OF DONOR HUMAN MILK

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Human milk (HM) is widely recognized as the optimal source of nutrition for infants, particularly for those who are premature or have specific health needs. When mother's own milk is not available, donor human milk (DHM) is considered the best alternative. However, the nutritional composition of DHM can vary significantly based on a variety of factors, including donors' diet and use of dietary supplements. Understanding how these dietary factors influence the nutritional profile of DHM is crucial for optimizing its benefits for vulnerable infants. This study aims to analyze the relationship between the dietary habits and supplementation practices of milk donors and the resulting nutritional content of DHM. The research included three groups of milk donors: from Poland (n=35), Italy (n=26), and the Netherlands (n=11), who were recruited from six human milk banks—four in Poland, one in Italy and one in the Netherlands. Samples of DHM and maternal nutritional information, derived from 3-day dietary records, were collected at three different postpartum intervals: 2-12 weeks, 13-16 weeks, and 17-24 weeks. For this analysis, we have focused on the results from the first period. The energy content and macronutrient composition of the DHM were analyzed using the MIRIS Human Milk Analyzer, while the quantification of 9 fatty acids, 11 vitamins of B vitamins, vitamin C, and 2 vitamins of vitamin D was conducted utilizing ultra-performance liquid chromatography combined with mass spectrometry. Additionally, the concentrations of selected mineral components (zinc, calcium, phosphorus, magnesium) were measured using an inductively coupled plasma mass spectrometer. Most donors gave birth naturally (n=43, 59.7%) while the others had cesarean sections. Just over half of the women (n=37, 51.4%) reported that they had been pregnant once. A total of 25 infants (34.7%) were born prematurely. The median gestational age was 38.0 (26.0-42.0) weeks. Regarding nutritional aspects, most donors (n=44, 61.1%) declared supplements use. After stratifying the study group into supplemented and non-supplemented participants, significant differences were observed in the total intake (diet + supplementation) of various nutrients, including vitamin E (p=0.006), vitamin D (<0.001), iodine (<0.001), and docosahexaenoic acid (<0.001). Interestingly, these differences did not translate into variations in the composition of the produced milk. No statistically significant differences were reported in the milk of both groups. The correlation analysis across the entire study group revealed that the HM concentration of DHA was correlated with the donors' intake of EPA (r=0.23, p=0.024), as well as vitamins B12 (r=0.25, p=0.037), B6 (r=0.34, p=0.004), and B1 (r=0.25, p=0.034). The concentration of HM alpha-linolenic acid, in turn, correlated with the intake of vitamin D (r=0.23, p=0.049), total omega-3 fatty acids (r=0.25, p=0.039) and cholesterol (r=0.24, p=0.045). The HM total fat content was positively correlated with the intake of MUFA (r=0.27, p=0.02) and negatively correlated with the energy derived from total carbohydrates (r= -0.24, p=0.046). The only dietary component of the donors that correlated with phosphorus concentration was iron (r=0.25, p=0.035), while calcium concentration was independent of the women's diet. In conclusion, this study highlights the importance of understanding the dietary habits and supplementation practices of milk donors in relation to the nutritional composition of DHM. While significant differences in nutrient intake were observed between supplementing and non-supplementing groups, these did not result in measurable variations in the milk's composition. Notably, certain correlations were identified between specific dietary components and the concentrations of key nutrients in human milk, such as DHA, alpha-linolenic acid, and total fat. These findings suggest that while diet can influence the nutritional profile of DHM, its impact may not be as straightforward as anticipated, emphasizing the need for further research to optimize the nutritional support provided to vulnerable infants.

OC 03

BUILDING CONFIDENCE IN HUMAN MILK ANALYSIS: WHY ASSAY VERIFICATION MATTERS

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Background: The quantification of bioactive components in human milk is crucial to advancing research on infant nutrition and immunity, given these factors' essential roles in supporting immune and digestive system development. To ensure the validity and reliability of generated data, optimizing and verifying detection methods is critical.

However, assay performance verification is resource-intensive and time-consuming. In the absence of standardized protocols or validated methods for human milk analysis, this research and development project aims to verify assays for quantifying immunoglobulin A (IgA), secretory IgA (sIgA), lactoferrin, lipase, and lysozyme to ensure accurate, reliable, and reproducible results.

Methods: The evaluated assays include in-house developed sandwich ELISAs for IgA and sIgA, and commercial kits for lactoferrin (ELISA assay), lysozyme (fluorometric assay), and lipase activity (enzymatic assay). For each test (n=6), performance verification involves: 1. Accuracy testing via spike-in recovery using known concentrations of target analytes in different human milk samples; 2. Repeatability assessment through 3–5 replicate measurements performed by the same operator on identical samples; 3. Optimization of dilution protocols for milk collected at different lactation stages (≤3 months and ≥6 months postpartum).

Additionally, the need for skimming (centrifugation at 3,000g for 15 minutes at 4°C) prior to analysis is evaluated for each assay. Methods are also assessed for their ability to detect bioactive components in pasteurized milk samples.

Results: Preliminary findings indicate that the presence or absence of milk fat significantly affects analyte detection. Fat appears to interfere with lactoferrin quantification, while lipids may sequester lipase, potentially reducing its measurable activity upon fat removal. Each assay requires tailored conditions—including proper milk dilution and skimming—to recover the expected amounts of spiked positive controls. The selection of an appropriate positive control is critical to ensure correct protein conformation, enzyme activity, and assay compatibility. **Conclusion:** This verification process enhances the robustness of bioactive component quantification in human milk and supports ongoing and future studies exploring its immunological and nutritional properties. The outcomes may contribute to the development of standardized analytical methods in this evolving field. Although most of the evaluated assays are commercially available, investing time and effort in their optimization and validation is worthwhile, as it ensures the credibility of the resulting data and the soundness of scientific conclusions. Once established, a well-characterized positive control will be an essential tool for ensuring assay quality and reproducibility.

OC 04

CONCEPTUALIZING THE COMMERCIALIZATION OF HUMAN MILK: A CONCEPT ANALYSIS

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Background: Donor human milk is recommended when infants are unable to be fed their mother's own milk or require supplementation. For-profit companies use technologies to create human milk products for infants in the neonatal intensive care setting without consistent guidelines and regulatory frameworks in place. This commercialization of human milk is inadequately conceptualized and ill-defined.

Research Aim: The aim of this study is to conceptualize and define the commercialization of human milk and discuss the need for policy guidelines and regulations. **Method:** Using a concept analysis framework, we reviewed the literature on the commercialization of human milk, analyzed the antecedents and potential consequences of the industry, and developed a conceptual definition. The literature review resulted in 13 relevant articles.

Results: There has been a surge in the development and availability of human milk products for vulnerable infants developed by for-profit companies. Commercialized human milk can be defined as the packaging and sale of human milk and human milk components for financial gain. Factors contributing to the commercialization of human milk include an increased demand for human milk and consequences include potential undermining of breastfeeding. The lack of guidelines and regulations raises concerns of equity, ethics, and safety.

Conclusion: The industry is rapidly growing, resulting in an urgent need for consistent guidelines and regulatory frameworks. If left unaddressed, there could be potential risks for donor milk banking, the future of breastfeeding, and infant and maternal health.

OC 05

SODIUM IN HUMAN MILK AS A DIAGNOSTIC MARKER OF DUCTAL BLOCKAGE: A COMPARISON ACROSS MAMMARY GLAND CONDITIONS AND DONOR MILK

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Background: Sodium (Na) concentration and the sodium-to-potassium (Na/K) ratio in breast milk are sensitive to epithelial tight junction integrity and have been proposed as non-invasive biomarkers of lactational dysfunction, including subclinical mastitis and ductal obstruction. However, their diagnostic utility across varied mammary gland conditions remains underexplored.

Objective: To evaluate the performance of Na, K and Na/K ratio in discriminating against ductal blockage from non-obstructed lactation, including normal, mixed, and donor milk, and assess their applicability as screening markers in clinical lactation support.

Methods: We analyzed 635 human milk samples from four groups: blocked ducts (n=94), mixed ducts (n=39), normal ducts (n=102), and donor milk (n=400). Na and K concentrations were measured using handheld ion-selective electrode analyzers. Statistical analyses included Quade's ANCOVA and ROC curve analysis to assess diagnostic performance, adjusting for infant age, gestational age, birth body weight, maternal age and storage duration.

Results: After adjusting, both Na and the Na/K ratio were significantly elevated in milk from blocked ducts compared to non-obstructed samples ($p < 0.001$). Donor milk, used as a reference for mature lactation, exhibited the lowest and most stable electrolyte levels. Na demonstrated excellent discriminative ability (AUC = 0.96), slightly outperforming the Na/K ratio (AUC = 0.92).

Conclusions: Na concentration and Na/K ratio in breast milk are sensitive, accessible, and practical markers for detecting ductal blockage.

Given that Na alone can be measured without additional calculations, its simplicity and strong performance support its use in early detection, especially in settings lacking access to specialized lactation care.

OC 06

ECONOMIC EVALUATION OF THE DONAMI HUMAN MILK BANK IN LOMBARDY: COST AND HEALTH BENEFIT ANALYSIS

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Human Milk Banks (HMBs) are a fundamental resource in the nutritional management of preterm or clinically vulnerable infants, significantly contributing to the reduction of severe complications such as necrotizing enterocolitis (NEC) and hospital-acquired infections.

However, their implementation requires substantial investment in infrastructure, personnel, technology, and logistics. This study aims to assess the economic sustainability of the DonaMi HMB, operating in the Lombardy region, through an integrated analysis of healthcare costs and benefits. The cost analysis considered all major expenditure components: dedicated facilities, human resources, equipment for milk collection, pasteurization and storage, as well as operational and transport costs. The average cost per 100 ml of processed and distributed donor human milk was calculated.

In parallel, a benefit analysis was conducted by comparing data from before and after the HMB implementation. Key indicators included NEC incidence, parenteral nutrition use, and length of stay in Neonatal Intensive Care Units (NICUs). Results show that, despite a significant initial investment, the systematic use of donor human milk led to a marked reduction in severe neonatal complications, with a consequent decrease in hospital stay duration and reduced use of high-cost therapies. The overall economic assessment indicates a net saving for the regional healthcare system, confirming the economic sustainability of the DonaMi HMB. In conclusion, the DonaMi project represents an effective and replicable model of clinical and organizational innovation, capable of combining care appropriateness, nutritional safety, and economic sustainability. Supporting HMBs should therefore be considered a strategic priority in neonatal health policies

OC 07

BREASTFEEDING AND DONOR HUMAN MILK: A POSSIBLE COMPLEMENTARY FEEDING AT THE BEGINNING OF LIFE

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Mother's own milk is the optimal source of nutrition for infants, particularly during the early months of life, due to its well documented benefits for immune, metabolic, neurological and social development. However, not all mothers are able or ready to breastfeed from the very first days after childbirth.

In such cases, donor human milk might be a valuable alternative to ensure continuity of human nutrition, especially for preterm, low birth weight infants and generally for vulnerable infants.

Donor milk can be intended as a valuable strategy to bridge the "milk gap" when mother's milk is not yet available. Emphasizing donor milk as a complement—not a substitute—to breastfeeding is a key strategy in promoting neonatal health and developing a breastfeeding culture.

OC 08

HUMAN MILK STORAGE

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Donor human milk is the best substitute for maternal milk for very low birth weight infants (VLBW). Although it has slightly lower protective effects compared to the mother's own milk, it helps to avoid the use of formula during the critical period for VLBWIs, thereby reducing the risk of necrotizing enterocolitis. Donor milk serves as a "nutritional bridge" from birth until full feeding with maternal milk becomes possible or until the end of the critical phase.

One of the emerging challenges in the use of donor human milk is its application in emergency situations, which may arise from natural disasters or human-caused events such as wars, migration crises, or nuclear accidents. In such contexts, infant mortality can be up to 70 times higher than the average rate.

The aim of this presentation is to describe an innovative preservation process that combines cryogenics, lyophilization, and the use of a protective atmosphere for storing single-dose units of treated milk. This method allows for a one-year shelf life at room temperature while better preserving the nutritional properties of donor milk compared to traditional pasteurization and inhibiting microbial growth. The preliminary analytical results are promising, as this process, compared to other preservation methods, significantly reduces oxidative phenomena in the lipid component, decreases proteolytic activity, and inhibits bacterial proliferation.

OC 09

REGIONAL NETWORK OF DONATED HUMAN MILK BANKS (REBLUD) AND THE REGIONAL BLOOD CENTRE (CRS): A COOPERATION DESIGNED TO INCREASE THE SAFETY AND AVAILABILITY OF THE PRECIOUS FOOD IN THE TUSCAN REGION

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ReBLUD is made up of the six Tuscan banks based in the cities of Arezzo, Florence, Grosseto, Lido di Camaiore, Lucca, Siena; it is coordinated by the IRCCS Meyer Children's Hospital of Florence; its aims and relations with the CRS are defined by the Regional Resolution of 2008 (1); it has been active since 2010; operationally it is based on the Recommendations of the Italian Association of Donated Human Milk Banks (AIBLUD) (2). The thirty Centres of the Tuscan Transfusion System, cooperating with ReBLUD (1-3-4) for the enrolment of donors, increase the opportunities of access to donation; the screening procedures are rigorous, appropriate to the peculiar characteristics of donated milk, a substance of human origin (SoHO), as well as a foodstuff. ReBLUD/CRS functional integration is facilitated by an efficient computerised system that guarantees product traceability and data tracking. The Network's mission is to guarantee an adequate and constant availability of milk to the regional Neonatology Centres (NICU) that request it, to spread the culture of donation, to regulate procedures, to distribute a safe and quality product, to incentivise and optimise the use of donated human milk in place of formulae, meeting the exclusive human breastfeeding needs of the most vulnerable newborns as a priority. In order to meet the growing demand for milk by NICU, implement and optimise its use, ReBLUD, with the patronage of the Institutions, in harmony with the Regional Policies (5), is implementing the project of an integrated regional system, which includes not only Banks and Transfusion Centres, but also Obstetric/Neonatology Centres, Consultatories, and the Paediatric network, to synergically promote breastfeeding, donation, and the correct use of donated milk according to clinical priorities. The aim is also to make more facilities (Neonatology centres that are not BLUD sites) suitable for the collection of donated milk, which will then be taken over by ReBLUD. To this end, regional refresher courses for maternal/infant workers are being carried out and a promotional activity using various communication tools at regional level is being developed. The average number of donors enrolled by ReBLUD is 310 per year, between 2018 and 2024 the number of registered donors remained stable despite the COVID-19 dip, the number of litres of milk processed is 2400 per year. In recent years VLBW infants hospitalised in the Tuscan NICUs have received exclusive human milk at the start of feeding in 98% of cases and full enteral nutrition in 89.4% of cases (6). Currently, the factor that may limit the use of donated milk in Tuscany is not the availability, but the cultural setting of some neonatal centres. The Tuscany operational model demonstrates how legally binding integration with CRS and community-Consultori sustains a safe, efficient donor-milk supply. Clear regional legislation, shared information systems and community-based promotion can be replicated by other regions of Italy (7) or countries aiming to expand equitable access to donor human milk.

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2. Sertac Arslanoglu, Guido E. Moro, Paola Tonetto et al. Recommendations for the establishment and operation of a donor human milk bank. *Nutrition Reviews* Vol. 81(S1):1-28; 2023

3. Regione Toscana. Delibera No. 378 of 2021 - aggiornamento del Sistema Trasfusionale regionale, conferma del ruolo nello screening delle donatrici di latte

4. Regione Toscana. Delibera No. 166 of 27/02/23- Organizzazione, strutture e funzioni del Sistema Trasfusionale, medicina trasfusionale e strutture operative della rete trasfusionale (allegato A)

5. Regione Toscana. Delibera N. 1141 del 17-12-2108. Promozione, sostegno e protezione dell'allattamento materno - Indicazioni operative per il miglioramento dei servizi. (Allegato A)

6. ARS Toscana; TIN toscane on-line; dati 2021; comunicazione personale M. Puglia, E. Berti (2022)

7. Gruppo di Lavoro ad hoc sul latte umano donato (LUD) «Disponibilità del latte umano donato in Italia». (Repertorio atti n. 209/CSR). Ministero della salute. Gazzetta Ufficiale della Repubblica Italiana serie generale n° 47 del 26/02/2025

OC 10

PRETERM DONOR HUMAN MILK FOR FEEDING PRETERM INFANTS: A FEASIBLE OPTION WITH UNIQUE CHARACTERISTICS

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Introduction: Donor Human Milk (DHM) is recommended, when mothers' own milk is not available or insufficient, as preferable alternative for feeding preterm infants which are more prone to develop comorbidities and extra-uterine growth retardation. The majority of human milk donors (HMDs) is generally constituted by lactating mothers of healthy-term infants (t-HMDs), while fewer mothers of preterm infants, whose milk is well-known to have a better macronutrient content, decide to become donors. **Aim:** The main purpose of the present study was to investigate the feasibility of donation for mothers who delivered prematurely, sharing our experience of a third-degree Neonatal Intensive Care Unit to describe the profile of preterm-HMDs (p-HMDs), milk quantity and quality. **Methods:** Data from January 2021 to December 2023, on preterm-HMDs' basic characteristics, length of donation, total milk volume donated, number of donation, mode and place of milk expression and collection, macronutrient content and microbiological quality were collected and analyzed compared to term-HMDs. A subgroup analysis of preterm-HMDs was carried out, according to gestational age (GA) [GA $\leq$ 32w and GA $\geq$ 33w]. **Results:** A total of N=199 human milk donors (HMDs), were included: 78.9 % term-HMDs and 21.1% preterm-HMDs. No significative differences in terms of donors' characteristics, with the exception of maternal age, mode and place of delivery were found. Shorter donation time (p=0.001) and lower number of donations (p=0.002) resulted in preterm-HMDs, despite the significantly higher total milk volume (p<0.002) collected. The mode of milk expression (personal vs hospital+personal pump; p<0.001) and the place of collection (home vs combined home +hospital; p<0.001) were significantly different between term-HMDs and preterm-HMDs respectively. Despite different mode and place of expression, the frequency of positive microbiological results was similar between fresh milk of term-HMDs and preterm-HMDs (46.7% and 40.0% respectively; p=0.415). Several types of microorganisms, with different prevalence, were identified in the two groups. Macronutrient content of preterm-HMDs was higher than that of term-HMDs, as expected. The analysis of the group of p-HMDs revealed similar milk volumes, donation times and numbers of donations in preterm-HMDs $\leq$ 32 GA compared to preterm-HMDs $\geq$ 33 GA. No significative differences in term of macronutrient content in the two subgroups of preterm-HMDs were found. **Conclusion:** Preterm human milk donation is a feasible option. Given the described characteristics, that make preterm donor human milk unique, it is advisable to promote preterm human milk donation. Therefore, human milk banks should provide counseling and promote milk donation from mothers who deliver prematurely.

OC 11

IMPACTS OF SUPPLEMENTAL DONOR MILK VERSUS INFANT FORMULA IN MODERATE-LATE PRETERM INFANTS: NEW EVIDENCE FROM A RANDOMIZED CONTROLLED TRIAL

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Background: The vast majority (>80%) of infants born preterm are born between 32-36 weeks' gestation ("moderate-late preterm"). These infants are at higher risk of feeding difficulties than infants born at term and often need supplemental nutrition in hospital until there is sufficient maternal milk available to meet their high nutrient needs. Evidence to guide use of donor milk as a supplement in moderate-late preterm infants is lacking as existing randomised controlled trials of donor milk have focussed on very preterm infants, who face the highest risk of necrotising enterocolitis. The aim of this trial was to compare the effect of donor milk versus term infant formula, used to supplement insufficient maternal milk, on the time to establish full enteral feeds and a range of secondary outcomes in infants born moderate-late preterm.

Methods: We undertook a multisite, blinded, randomised controlled trial at two Australian neonatal units from 6 July 2021 to 5 April 2023. Infants were eligible if they were: ≤4 days old, born between 32+0 and 36+6 weeks' gestation, with a birthweight ≥1500g, admitted to a neonatal unit, clinically stable and ready to commence or had commenced enteral feeds and had insufficient maternal milk available. Infants were randomly assigned to receive supplemental donor milk or term formula for up to 8 days, stratified by site and gestational age at birth. Infants were followed-up until 6-months corrected age (CA). The primary outcome was time to full enteral feeds (defined as 150 ml/kg/day). Secondary outcomes included feed intolerance, growth, body composition, breastmilk feeding and hospital readmissions to 6-months CA.

Results: 201 infants were randomized (99 to donor milk, 102 to formula). Among enrolled infants the mean birth gestational age was 34.6 weeks (SD 1.2), 56.2% were male and 37.3% were a twin or triplet. Time to reach full enteral feeds did not differ between groups (mean in donor milk group 5.7 ± 2.6 days, mean in formula group 5.8 ± 3.4 days, adjusted mean difference -0.07, 95% CI -0.90 to 0.76). Infants in the donor milk group had a lower rate of birthweight regain compared with the formula group (mean in donor milk group 10.7 ± 5.7 days, mean in formula group 8.4 ± 4.4 days, hazard ratio 0.65, 95% CI 0.47-0.88), however, by discharge, there were no differences between groups in weight z-score or change in weight z-score. All other secondary outcomes were similar between groups. After the 8-day intervention period ceased, there was high use of supplemental formula during the neonatal hospitalisation in both groups (41.8% and 45.1% in the donor milk and formula groups, respectively).

Conclusions: In moderate-late preterm infants with insufficient maternal milk available, supplemental donor milk given for up to 8 days did not reduce the time to full enteral feeds compared with term formula. Further trials of donor milk with an extended intervention period and longer-term follow are warranted in this large population of more mature preterm infants.

OC 12

THE EFFECT OF FEEDING TYPE ON GUT MICROBIOME COMPOSITION IN PRETERM NEONATES WITH AND WITHOUT NECROTIZING ENTEROCOLITIS

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Introduction: Necrotizing enterocolitis (NEC) is a significant cause of morbidity and mortality in preterm infants. Dysbiosis of the gut microbiome is increasingly recognized as a factor in NEC pathogenesis. Feeding type – mother's own milk (MOM), donor human milk (DHM), or formula – influences the neonatal microbiome. However, detailed comparisons of these feeding types in relation to microbiota composition in NEC and healthy preterm neonates are still limited. **Aim:** To investigate how MOM, DHM, and formula influence gut microbiota in very low birth weight preterm neonates (<32 weeks gestation, <1500g birth weight, <7 days old) with and without NEC. **Methods:** A prospective, single-centre cohort study was conducted from 2023 to 2024 at a tertiary NICU. Stool samples from NEC patients and control group were analysed using shotgun metagenomic sequencing with taxonomic profiling by MetaPhlAn2. Feeding groups were categorized as MOM, DHM, or formula and alpha and beta-diversity was evaluated. **Results:** The NEC (n=7, male = 3) and control group (n=33, male = 16) patients were comparable with mean (SD) gestational age 27+0 (24-30) vs. 27+5 (25-29) and mean (SD) birth weight 964 (673-1233) vs. 1014 (720- 1304) grams, respectively. At the class and genus level, formula-fed NEC patients showed dominance of facultative anaerobes typical of dysbiosis, such as Enterobacteriaceae-related genera. DHM-fed infants displayed variable profiles, consistent with the partial protection offered by pasteurized milk. MOM-fed NEC infants showed greater diversity and more favourable taxa such as Bifidobacterium, though NEC still occurred. Within the control group, alpha-diversity did not differ significantly between feeding types (Kruskal-Wallis $p > 0.7$ for all metrics), indicating similar microbial richness and evenness across MOM, DHM, and formula-fed infants. In contrast, beta-diversity within controls showed significant differences between feeding types (PERMANOVA $p = 0.033$, $F = 1.74$, $R^2 = 10.7\%$). When comparing only MOM vs. DHM in all patients (NEC and controls), there were no statistically significant differences in alpha metrics (Wilcoxon $p > 0.47$), but beta-diversity further confirmed compositional differences (PERMANOVA $p = 0.038$, $F = 1.78$, $R^2 = 5.3\%$). PCoA and NMDS plots illustrated distinct clustering by health status and feeding type. **Discussion:** These findings underline MOM's role in promoting a diverse, beneficial gut microbiota, partially replicated by DHM and least supported by formula. However, in our research, several limitations must be acknowledged: small sample size, particularly in the NEC group (n=7); lack of control for confounding factors, such as delivery mode and antibiotic use; and previous formula exposure in some DHM-fed infants, which may have predisposed them to dysbiosis before DHM introduction. Future research should address these through larger, multicentre cohorts with detailed longitudinal data to isolate feeding effects more accurately. **Conclusion:** Feeding type significantly impacts gut microbiota in preterm neonates. MOM supports optimal microbial diversity, DHM offers partial protection, and formula correlates with dysbiosis. NEC is associated with profound microbiome disruption across all feeding types.

OC 13

INVESTIGATING DONOR HUMAN MILK COMPOSITION GLOBALLY TO DEVELOP EFFECTIVE STRATEGIES FOR THE NUTRITIONAL CARE OF PRETERM INFANTS

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Background: Globally, nearly 15 million infants are born prematurely each year, disproportionately affecting low and middle-income countries. In the absence of mother's milk, the World Health Organization recommends using donor human milk (DHM) due to its protective effects, such as against necrotizing enterocolitis. Currently, little is known about the nutritional composition of DHM; how composition is influenced by milk banking practices; and whether preterm nutrient recommendations are achieved when DHM is used with commercially available fortifiers.

Objectives: We examined and compared a broad range of nutrients in milk from 600 approved milk bank donors around the world to create comprehensive, geographically diverse nutrient profiles for DHM (Aim 1). Milk bank-level practices for pooling donors were evaluated using simulation to identify effective strategies that can be used by milk banks to create more consistent nutrient profiles in DHM (Aim 2). Finally, we evaluated whether currently available commercial fortifiers meet nutrient recommendations when used with DHM and identified nutrients to enhance in the development of a DHM-specific fortifiers (Aim 3).

Methods: The sampling frame included human milk from 600 approved milk bank donors, collected from 8 milk banks in five diverse countries (Chile, Kenya, Poland, United States, and Vietnam). Macronutrients, vitamins, and minerals were assessed using validated methods appropriate for human milk. Computer modeling was used to simulate the impact of randomly pooling 2-10 donors and variability was quantified using a Nutrient Inequality Index (NII). Modeling was also used to evaluate how locally available fortifier products enhanced donor human milk compared to preterm nutrients recommendations from the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN).

Results: Most nutrients differed significantly between geographies which was primarily associated with whether the milk bank collected donations predominantly from the early lactation period (1-2 weeks postpartum) or from the mature lactation period. True protein and many minerals were higher in the early donation model while lactose and several water-soluble vitamins were higher in the mature donation model. Setting-specific differences not related to donation model were noted for some nutrients including B12, riboflavin, and choline. Randomly pooling 5 or more donors could achieve an NII < 1.3 for macronutrients; however, the NII would still exceed 2.0 for many micronutrients including biotin, riboflavin, B6, B12, pantothenic acid, iron, copper, zinc, DSLNT and lactoferrin. Unfortified DHM was rarely/never able to meet the lower ESPGHAN target for 18 of the 21 measured nutrients. Lower ESPGHAN recommendations for vitamins were met with bovine-derived fortifiers, but not with human-derived fortifiers, while protein and energy targets were met (and sometimes exceeded) with human-derived fortifiers, but not with bovine-derived fortifiers. Several minerals (copper, iron, selenium, zinc) were not met with the bovine-derived fortifiers, while some minerals (calcium, magnesium, phosphorus) exceeded upper ESPGHAN targets with the human-derived fortifiers.

Conclusions: This study provides rich nutrient descriptions for donor human milk that will inform the development of future milk banking models, practices and feeding interventions for the preterm infant.

OC 14

STORAGE OF HUMAN MILK IN UNFROZEN STATE UNDER HIGH PRESSURE-SUBZERO TEMPERATURE CONDITIONS - NEW METHOD OF PRESERVATION

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Breastfeeding plays a crucial role in infant development; according to the WHO, it should be practiced exclusively for the first six months and continued up to two years or longer. When maternal milk is unavailable, donor human milk (HM) provided by Human Milk Banks (HMB) is considered the optimal alternative. The standard processing method – holder pasteurization (62.5°C for 30 minutes) followed by freezing – ensures microbiological safety, but substantially diminishes the nutritional and bioactive properties of HM. This study aimed to evaluate the effects of hyperbaric storage at subzero temperatures (HS-ST) on the nutritional and biological value, as well as microbiological safety of HM. Samples were stored for up to 5 months under four pressure-temperature conditions that prevent ice crystal formation: 60 MPa/-5°C, 78 MPa/-7°C, 111 MPa/-10°C, and 130 MPa/-12°C. Throughout the storage period, the viability of the milk microbiota was assessed alongside changes in nutritional value and concentrations of key bioactive components, including secretory immunoglobulin A (sIgA), lactoferrin (LF), lysozyme (LYZ), and α -lactalbumin (α -LA). In addition, the study evaluated potential qualitative modifications of milk lipids and changes in antioxidant capacity. The results demonstrated that the macronutrients content – namely proteins, fats, and carbohydrates – remained stable across all tested storage conditions throughout the entire storage period. Similarly, the energy value of samples did not undergo significant changes, indicating preservation of both nutritional quality and caloric content. The concentrations of key bioactive proteins – LYZ, α -LA, LF, and sIgA – were maintained at levels exceeding 90% when stored at pressure up to 111 MPa/-10°C. In contrast, storage at 130 MPa/-12°C led to substantial reduction in LYZ and LF levels, by 39% and 89%, respectively.

Moreover, vitamin C content, total antioxidant capacity, and oxygen radical absorbance capacity were significantly better preserved under HT-ST, compared to pasteurized HM stored at -20°C. While the enzymatic antioxidant activities of catalase and glutathione peroxidase, declined under all storage conditions, the greatest losses were observed in pasteurized samples. Superoxide dismutase activity remained stable regardless of the storage conditions. HS-ST effectively inactivated milk microbiota. No bacterial growth was detected in 1 mL of samples after two days of storage at 111 MPa/-10°C and 130 MPa/-12°C, ensuring a level of microbiological safety comparable to that achieving through pasteurization followed by freezing.

In conclusion, HT-ST represents a promising alternative to conventional pasteurization and freezing. All experiments were conducted under conditions that closely simulate the operational environment of HMB, ensuring the practical relevance and applicability of the findings. This method not only ensures microbiological safety but also provides superior preservation of the nutritional and bioactive properties of HM, with potential to enhance the quality of donor HM distributed by HMBs.

OC 15

IS HIGH HYDROSTATIC PRESSURE THE FUTURE FOR HUMAN MILK BANKS?

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Holder Pasteurisation (HoP) is the gold standard for donor milk (DM) treatment in Human Milk Banks (HMBs) although it is known to destroy numerous critical DM components. A growing number of emerging techniques have been recently developed not only to ensure DM's microbiological safety but also to preserve its bioactive factors. High Hydrostatic Pressure (HHP) is a promising non-thermal method that is effective against *Bacillus cereus* spores and would better preserve DM heat-sensitive bioactive components.

Using in vitro and in vivo models, we applied HHP (350 MPa at 38°C) in pools of DM and assessed various aspects of the changes in bioactive factors, compared to HoP-treated DM and/or raw DM. We showed that HHP and HoP had similar effects on human milk oligosaccharides levels, but only HHP allowed to avoid increased levels of Maillard reaction products. HHP also maintained the level of main metabolic hormones in DM close to their concentrations in raw milk, when these levels were reduced by HoP. Lactoferrin was also better retained after HHP than HoP treatment, as well as DM bacteriostatic effect against *Escherichia coli* and bactericidal activity against group B *Streptococcus*. Viral inactivation of Human Coronavirus 229E and Hepatitis E in DM was not covered by either HHP or HoP processing. Short-chain fatty acids (SCFAs) in DM were not modulated by both HHP and HoP, which concentrations were maintained similar to those in raw DM. HHP was able to preserve vitamins A and E (α/γ -tocopherol) while HoP reduced the γ -tocopherol content. We also showed that DM metabolome was altered both by HHP and HoP, including increased levels of ceramides and nucleotides, and decreases of free fatty acids, phospholipid metabolites and sphingomyelins levels. In adult mice chronically supplemented with HOP or HHP-DM, we demonstrated higher tight junctions, nNos and Mucin 2 gene expressions, lower intestinal barrier permeability and lower gut contractions in the HHP-DM group, ending in better gut barrier integrity and glucose tolerance. Moreover, adult mice supplemented by HHP-DM also showed improved antioxidant defenses, by decreasing inflammatory markers and increasing antioxidant enzymes in their ileum and liver. Finally, in a postnatally growth restricted mouse model, pups receiving HHP-DM during lactation exhibited improved body weight gain compared those receiving Ho-DM, while intestinal morphology and permeability, and gene-expression of some intestinal markers, gut microbiota and caecal SCFAs levels remained similar.

To conclude, although in vivo studies on the effects of HHP-treated milk supplementation are still limited, HHP represents a promising alternative to HoP thanks to its ability to better preserve crucial bioactive factors in DM. Technical, regulatory, and logistical challenges must still be addressed to enable the large-scale implementation of this innovative method within HMBs.

OC 16

Ultra-High-Pressure Homogenization of Donor Human Milk: Inactivation of *Bacillus cereus* and *Geobacillus stearothermophilus* SPORES AND PRESERVATION OF SOME BIOACTIVE COMPONENTS **V. Pleguezuelos Hernández¹, K. Jalali², F.J. Pérez-Cano^{3,4}, À. Franch-Masferrer^{3,4}, A.X. Roig-Sagués², G. Soria Guerrero⁵, A.J. Trujillo-Mesa², M.M. Hernández-Herrero²**

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Background: Donor human milk (DHM) is the recommended alternative when maternal milk is unavailable for vulnerable newborns, especially preterm and very low birth weight infants. Ensuring its microbiological safety while preserving its bioactive components is essential. This study aimed to evaluate ultra-high-pressure homogenization (UHPH) technology as an alternative to Holder pasteurization (HoP), with the objective of achieving more effective inactivation of *Bacillus cereus*—a common cause of DHM rejection in human milk banks—and *Geobacillus stearothermophilus*, a highly thermoresistant microorganism, in order to produce sterile human milk. Additionally, the study assessed the impact of UHPH on two essential bioactive components: lactoferrin and secretory immunoglobulin A (sIgA).

Methods: Spores of *B. cereus* CECT 47 and *G. stearothermophilus* CECT 5144 were inoculated into DHM and treated using UHPH at 300 MPa with inlet temperatures (Ti) ranging from 20 to 70#°C. Inactivation was assessed using selective medium for *B. cereus* (37#°C, 24#h) and non-selective medium for *G. stearothermophilus* (55#°C). To evaluate bioactive components, samples were processed by HoP and UHPH at Ti = 30#°C (valve temperature, Tv≈ 122#°C) and UHPH at Ti = 40#°C (Tv≈ 135#°C), with exposure times < 0.5 s. Lactoferrin and sIgA were quantified by ELISA. Statistical analysis included ANOVA with Tukey post hoc (for microbial inactivation) and Mann–Whitney U tests (for bioactives), using STATISTICA v7.

Results: UHPH proved highly effective in inactivating spore-forming pathogens in DHM. Treatments at Ti≥30#°C achieved a complete inactivation of *B. cereus*, while full inactivation of *G. stearothermophilus* was only achieved at Ti≥40#°C. Regarding bioactive components, lactoferrin retention remained high across all treatments, with no statistically significant differences observed between HoP (81.9%) and UHPH at 30°C (88.8%) and UHPH at 40°C (84.6 %), indicating its stability under both processing conditions. In contrast, sIgA was more susceptible to UHPH, with significantly reduced retention values of 76.5 % for HoP, compared to 8.5 % and 5.1#% for UHPH at 30#°C and 40#°C, respectively (p<#0.05 for each comparison). Whereas HoP preserved a higher proportion of sIgA, UHPH treatments resulted in considerable losses, especially at higher temperatures.

Conclusions: Ultra-high-pressure homogenization (UHPH, 300 MPa) effectively inactivated *B. cereus* at Ti ≥ 30°C and *G. stearothermophilus* at Ti ≥ 40°C in DHM, supporting its potential as an alternative to heat pasteurisation. In UHPH treatments (300 MPa, Ti = 30–40 °C), while lactoferrin remains stable, sIgA is partially reduced. Even so, UHPH-treated milk is microbiologically safe and could allow the use of DHM that would otherwise be discarded due to contamination. It could also be stored at room temperature, eliminating the need for freezing and the associated energy costs. Further optimisation of processing parameters is needed to better preserve heatsensitive bioactives and to assess the functional impact of these components after treatment.

OC 17

THE MEMORY MILK GIFT: RE FRAMING BEREAVEMENT AS A LEGACY IN HUMAN MILK BANKING

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Human milk banking stands at the intersection of science, compassion, and public health. In this context, the Memory Milk Gift Initiative, led by the Milk Bank at Chester in the UK, represents a transformative innovation—reshaping how bereaved mothers are supported and how their milk is honoured as a profound legacy.

While bereavement following neonatal or infant loss is a deeply traumatic experience, lactation often begins or continues, and for some women, expressing and donating this milk becomes a vital part of their grief journey. The Memory Milk Gift is a person-centred pathway that allows bereaved mothers to donate their expressed breast milk in honour of their child. This initiative is a partnership and is codesigned with parents, a multidisciplinary advisory board and the milk bank team to offer a safe, supported, and dignified process.

The initiative includes close collaboration with neonatal, palliative care, and bereavement teams, which is growing to encompass primary and community care, alongside the expertise of the Milk Bank team and memory making for families. It extends the scope of human milk banking beyond nutrition into emotional healing, legacy creation, and maternal wellbeing. Feedback collected from bereaved milk donors between 2021 and 2025 demonstrates that donation through the Memory Milk Gift contributed to maternal mental well-being with families describing the opportunity as “healing,” and “bringing comfort” and families also reported reduced feelings of helplessness and increased sense of purpose. In addition to supporting mothers, the donated milk provided vital nutritional support to vulnerable preterm infants, exemplifying the dual benefit of this model. This initiative is aligned with the emerging emphasis on equity, safety, and personalised care in milk banking, as articulated in the IMAGINE-HMB project and upcoming EU legislation on substances of human origin (SoHO).

Importantly, the Memory Milk Gift foregrounds emotional and psychosocial safety—elements not always captured in traditional milk bank frameworks.

Key innovations include:

- A dedicated bereavement milk donation programme - The Memory Milk Gift
- All UK milk banks are signed up to the initiative and supported with Memory Making - a collaborative approach to equitable access
- Integration of trauma informed support platforms - Fly Mama - available to all Memory Milk Gift donors
- Development of culturally sensitive materials
- Flexible pump loan schemes for at-home donation
- Collaborative protocols between maternity, neonatal, hospice and bereavement services

The initiative also brings attention to the need for national and EU-level policies to formally recognise bereavement donation, ensuring families across all regions have equitable access to this option. It advocates for inclusive definitions of donor milk and ethically driven consent frameworks that reflect the lived experiences of grieving families.

As human milk banking moves toward increased standardisation, the Memory Milk Gift reminds us that innovation must be both clinical and compassionate. This programme invites milk banks to see bereaved mothers not just as patients or donors, but as powerful agents of care, love, and public health.

‘There is no footprint too small to leave an imprint on the World’

OC 18

RECOGNISING THE PRECIOUS GIFTS OF MILK DONORS: WHAT MAKES MILK DONORS FEEL VALUED?

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Human milk banks rely on the generosity of voluntary donors, who are not only feeding their own infants but also expressing and storing their excess milk for others. While extensive research has explored strategies to recruit, retain, and recognise donors of other substances of human origin (SoHO), such as blood donors, comparatively little is known about the experiences and expectations of milk donors. As the use of donor milk continues to grow, understanding the experiences and needs of milk donors is essential to ensure the sustainability of donor milk services.

This study explored the experiences of milk donors to Australian Red Cross Lifeblood's national donor milk service through mixed method research: in-depth interviews with, and an online survey of, recent milk donors. Ethical approval for this study was granted by the Lifeblood Human Research Ethics Committee (#2024-18LNR).

First, we conducted semi-structured interviews with milk donors (n=16) between May and September 2024 to understand their experiences with milk donation at our service. Interviews were transcribed and analysed using inductive qualitative thematic analysis. Convenience was identified as a key facilitator of milk donation. For some donors, the convenience of having a staff member come to their home to take the required blood sample and collect their milk influenced their decision to donate to Lifeblood over other milk banks. An efficient donation process was also perceived as important to ensure that milk was not wasted. Donors expressed trust in the formal processes of a milk bank, as they felt their milk would be handled with care and prioritised for the most vulnerable recipients by the milk bank.

Results from the interviews were used to develop an online survey to understand whether donors felt valued, and their satisfaction with the donation process. Milk donors who donated between January 2024 and April 2025 (n=588) were invited to participate; 257 donors completed the survey (43.7% response rate). Most donors (n=186, 72.4%) reported feeling highly valued by the milk bank. Aspects of donation most likely to make donors feel valued included being given milk storage bags (83.7%) and conversations with milk bank staff (72.8%). Donors did not feel valued when they didn't receive expected information about how much milk they donated (10%) or where their milk donations were used (7%). Notably, 37.7% of participants had previously donated blood or plasma, suggesting that milk donors may bring expectations shaped by their experiences receiving thank-you messages or updates after other donation types.

Across both the interview and survey data, donors described that positive interactions with milk bank staff were critical to their feeling supported, appreciated, and informed throughout their donation journey.

These findings highlight the importance of engaging with milk donors in ways that are meaningful and that acknowledge their unique situation amongst SoHO donors. To build a sustainable milk donor program, milk banks must not only facilitate convenient donation but also foster a sense of connection, appreciation, and trust among donors.

OC 19

THE EFFECT OF EARLY LIFE EXPOSURE TO EMERGENT ENVIRONMENTAL POLLUTANTS ON CHILD DEVELOPMENT: A COHORT STUDY BASED ON TAIWAN SOUTHERN HUMAN MILK BANK

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Background/Study Aims: Phthalates and their substitutes, including new emergent environmental plasticizers (NEEP), are known endocrine-disrupting chemicals (EDCs) linked to adverse health outcomes, especially in pregnant women, fetuses, and infants. Despite extensive research on plasticizer impacts, the specific risks posed by NEEP to these vulnerable groups are largely uncharacterized. Human milk, crucial for infant nutrition and potentially linked to long-term health, represents a plausible, yet under-investigated, route for maternal NEEP exposure to reach infants. To address this knowledge gap, this longitudinal study tracked maternal and infant exposure to NEEP through blood, urine, and human milk samples collected from pregnancy through early childhood. We aimed to quantify NEEP exposure and evaluate its potential long-term impacts on infant health, and hormonal systems. **Methods:** This projected (NHRI-EX113-11116PI) was supported by National Health Research Institutes, Taiwan, and proved by the institute ethic review board. This 4-year prospective cohort study (2022–2025) recruited 600 pregnant participants. Maternal blood, infant urine, maternal urine, and human milk samples were collected. Maternal blood was analyzed for thyroid function tests (TFT). NEEP concentrations were quantified in urine and human milk samples at the National Health Research Institutes (NHRI). Demographic information, medical histories, physical examinations, and anthropometric measurements were collected. **Results:** Over 3.5 years, 557 maternal participants were enrolled, with 383 infants included. Biological samples analyzed included urine from 281 mothers and 341 infants, serial human milk from 314 mothers, and TFT from 363 mothers and 382 infants. Perinatal urine phthalate metabolite concentrations were analyzed (mean[median] ng/ml): MMP 20.9[15.0], MEP 83.7[18.1], MiBP 11.8[5.9], MnBP 20.4[8.4], MBzP 2.5[0.0], MEHP 13.2[5.4], MEHP 17.9[8.7], MEOHP 19.3[11.5], MECPP 17.0 [9.4], MCMHP 7.5 [4.3], and MiNP 2.8 [0.0] for mothers; MMP 29.1 [7.2], MEP 125.4[34.2], MiBP 14.0[7.9], MnBP 15.2[8.3], MBzP 18.2[2.5], MEHP 54.5[13.8], MEHP 18.5[2.9], MEOHP 27.6[3.3], MECPP 84.4 [7.9], MCMHP 14.3 [0.0], and MiNP 1.6 [0.0] for infants. Phthalate metabolites were studied in human milk from 244 mothers. Most plasticizers were detected in >90% of samples. Significant variability was observed for several plasticizers, with some samples showing exceptionally high concentrations. MiDP and MEHHP were rarely detected, while MEHP and MiNP were detected less frequently but at relatively high concentrations. In infants and mothers, none of the urine phthalate metabolites showed a statistically significant correlation with TSH at birth (all p-values > 0.05). However, in the maternal perinatal urine and serum free T4: higher concentrations of MECPP and MCMHP were associated with lower FreeT4 levels in this study population. The associations for MEHHP and MiNP were close to significance but did not reach the conventional threshold. **Conclusion:** This cohort study demonstrates comparable levels of urine phthalate metabolites between infants and mothers, with infant MEHP levels occasionally higher, suggesting potential transplacental and lactational transfer. These findings underscore the need for continued vigilance regarding phthalate exposure during pregnancy and lactation, and highlight the importance of long-term follow-up to assess potential health impacts on exposed infants.

OC 21

HUMAN MILK BANKS OF ARGENTINA. PRESENTATION OF THE 9 YEARS OF WORK OF THE "NEUQUÉN HUMAN MILK NETWORK".

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Background: The Human Milk Bank (HMB) has successfully established a Human Milk Network throughout the province, which currently has 62 nodes, with more institutions and collection centers joining each year. It is part of the Argentine Network, along with 9 other milk banks, and the Ibero-American Network of Human Milk Banks (Iber HMB). This achievement marks a turning point in our province's Primary Health Care Strategy, connecting donor mothers at home with the most vulnerable newborns admitted to neonatal care at various hospitals and clinics in Neuquén.

Objectives: To present the growth of the Neuquén Human Milk Network, nine years after its formation, analyzing and comparing the volumes of donated and processed human milk. **Development:** The 2017-2018-2019 three-year period showed a favorable start during the first years of the Network's formation, prioritizing the training of each provider (a total of 27 by the end of 2018) in order to decentralize the task of recruiting mothers to donate raw human milk, its conservation, and its transfer to the Milk Bank for subsequent pasteurization.

In 2018, we observed a 30% decrease in the receipt of Raw Human Milk. This led us to evaluate our fieldwork strategies. This reflection was very important because it allowed us to redefine the roles and identities of each agent operating in each node of the province.

2020 presented us with a fabulous challenge in the context of the COVID-19 Syndemic. The results presented here demonstrate that we were able to fulfill our mission, also surpassing all production records since the inauguration of the Milk Bank. The donor women and their families, the promoters, the operators, the Milk Bank staff, and the health workers at each hospital were attentive, proactive, and resilient.

From the perspective of the syndemic, it helps us look not only at the infectious disease but also at the social context in the community.

2021: This year, even amid the COVID-19 pandemic, we managed to donate 687 liters of raw human milk (RHM), from 42 Collection Centers distributed throughout the province. Below you can see the annual evolution of RHM, Pasteurized Human Milk (PHM), the number of donors, and the number of recipients per year.

2022: This year, we added 145 donor mothers for our entire province. They collected 160.8 liters of LHC (from January to May 2022) with a discard rate of 20.9%.

2023: 475 liters of Raw Human Milk (LHC) were collected from the 58 collection centers. 394 liters of Pasteurized Human Milk (LHP) were delivered to the 14 neonatal inpatient units in the province, as prescribed.

2024: Volume of Human Milk Collected We collected 508 liters of Raw Human Milk (LHC) from the 62 collection nodes. Volume of Pasteurized Human Milk delivered. **Conclusions** Our Milk Bank supports breastfeeding and parenting from a community perspective. It invites us to consider this practice as not only maternal; it involves us in a challenge for healthcare teams and the entire community. We need to broaden our perspectives to ensure the right to breastfeed and contribute to food sovereignty through breastfeeding, especially for patients at risk of death.

OC 23

PERINATAL PREDICTORS OF EXTRAUTERINE GROWTH RESTRICTION IN PRETERM INFANTS: THE ROLE OF HUMAN MILK FEEDING

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Introduction: Preterm birth significantly impacts on long-term growth and development. Extrauterine Growth Restriction (EUGR) is a common complication which could worsen preterm infants' long-term auxological and neurodevelopmental outcomes. While EUGR's adverse effects are widely investigated, early-life predictors of postnatal growth are not completely understood. This study aimed to identify early neonatal factors predicting growth outcomes at discharge and up to 24 months corrected age (mCA).

Methods: This retrospective study analysed 2013-2019 data from preterm infants (GA <32 weeks and/or BW <1500 g) admitted to the neonatal intensive care unit of IRCCS AOU Bologna, Italy. We collected maternal, perinatal, neonatal characteristics and comorbidity, and auxological data at birth, discharge, and at 12/24 mCA. EUGR was defined longitudinally (lgEUGR) as >1 SD loss from birth to discharge/follow-up, and cross-sectionally (csEUGR) as weight <10th percentile at discharge, <-2 SD at 12/24 mCA. Statistical analyses included t-tests, chi-square tests, Pearson correlation, and binary logistic regression.

Results: The study cohort comprised 416 preterm infants with mean (SD) birth weight of 1216 (33) g. At discharge, 78.4% received human milk (HM), either donorHM or mother's own milk. CsEUGR was present in 52.7% (n=213) and lgEUGR in 43.5% (n=181) at discharge. Extremely low birth weight, intrauterine growth restriction (IUGR), maternal hypertension, and congenital malformations increased csEUGR risk. Only congenital malformations were independently linked to lgEUGR, with IUGR showing a protective effect. Interestingly, HM feeding was more prevalent in infants without lgEUGR at discharge compared with those with EUGR (84% vs 71%, p=0.0001), but not significantly associated with csEUGR at discharge. During follow-up, csEUGR was observed in 10.3% (n=35) of 340 infants at 12 mCA and 7.6% (n=24) of 315 infants at 24 mCA. lgEUGR was present in 25% (n=79) at 12 mCA and 22.5% (n=71) at 24 mCA. HM feeding at discharge was more prevalent in infants without lgEUGR compared to those with lgEUGR at 12 mCA (82% vs 67%, p=0.03), but not at 24 mCA or for csEUGR at any timepoint.

Conclusion: This study confirms high EUGR prevalence in preterm infants. We found a potential protective association between HM feeding at discharge and reduced lgEUGR at discharge and 12 months. While perinatal factors increased EUGR risk, the promising trend with HM warrants further research to confirm its preventative role, especially in infants with comorbidities. Identifying such modifiable factors is crucial to improving long-term outcomes.

OC 24

AVAILABILITY OF DONOR HUMAN MILK IN THE NICU. IMPACT ON NUTRITION AND CLINICAL OUTCOMES

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The analysis focuses on comparing Italian NICUs that use donated human milk (DHM) with those that do not, specifically examining preterm infants up to 31 weeks of gestational age. To facilitate a more streamlined, homogeneous, and—above all—reliable data collection, the variables considered align with those of the Italian Neonatal Network (INSINN), supplemented by information obtained directly from individual centers, extracted from institutional databases, and patient records. The study investigated feeding practices during hospitalization (including type and duration), at discharge, and clinical outcomes. The results provide a compelling snapshot of the national context, revealing highly noteworthy findings. Of particular relevance is the need for broader DHM coverage in NICUs across certain regions, prompting critical reflection on the distribution and organization of human milk banks in those areas. These findings underscore the importance of targeted improvements to address disparities and promote equity in neonatal care across different geographical regions of the country.

OC 25

HOW BREAST MILK AND DONOR MILK SUPPORT PRETERM INFANTS IN VARESE'S NICU

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Our experience before and after the opening of the Human Milk Bank

Between January 1sts 2017 and January 1sts 2020, 70 ELBW newborns were admitted to our NICU (average BW 740g, average GA 26+4 weeks), with a survival rate at discharge of 70% (49/70).

Between January 1sts 2022 and January 1sts 2025, 46 ELBW newborns (average BW 800g, average GA 27 weeks) were admitted to our NICU and received donor human milk; survival rate at discharge was 86% (40/46). For both cohorts, we analyzed the time required to achieve full enteral feeding and found no significant difference: 24 days in the first group vs. 27 days in the second. Similarly, no significant difference was observed in the average length of hospital stay (approximately 95 days). However, a significant reduction in the incidence of necrotizing enterocolitis (NEC) was observed:

- In the 2017–2020 cohort, NEC occurred in 30% of cases, with 10% requiring surgical intervention.
- In the 2022–2025 cohort, following the opening of the Human Milk Bank and the routine use of DHM, NEC incidence was halved to 15%, with only 5% requiring surgery.+

These findings confirm that, in ELBW newborns, DHM—when maternal milk is unavailable—offers effective protection against NEC.

OC 26

THE INFLUENCE OF MATERNAL DIET ON HUMAN MILK COMPOSITION DURING THE FIRST 1000 DAYS

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The "first 1000 days", spanning from conception to a child's second birthday, is a critical period that lays the foundation for long-term health. Human milk (HM) is universally regarded as the optimal source of infant nutrition, with exclusive breastfeeding recommended for the first six months due to its proven short- and long-term benefits for both mother and child. HM is a dynamic fluid containing not only essential nutrients but also bioactive components that support immune development, protection against infections, and gut microbiota colonization. Several factors influence HM's composition, such as gestational age, birthweight or number of feedings per day; among these, maternal diet is an emerging modifiable factor influencing HM composition and the trajectory of infants' development.

While methodological heterogeneity persists across studies, particularly concerning macronutrients such as carbohydrates and proteins, consistent findings have emerged regarding diet's influence on HM fatty acid (FA) profiles and micronutrient concentrations such as vitamins and minerals. Maternal diet significantly modulates polyunsaturated FA (PUFA) content and, to a lesser extent, the saturated FA (SFA) and monounsaturated FA (MUFA). In particular, the results of the Italian study MEDIDIET, conducted between 2012 and 2014, indicated that the Mediterranean diet seems to be associated to lower a content of saturated FA and ω -6/ ω -3 ratio, and to a higher content of monounsaturated FA, ω -3 FA and total antioxidant capacity. Also, the total antioxidant capacity of HM as well as its concentrations of various vitamins (A, C, B-6, D, thiamine, choline), minerals (iodine, selenium) and other substances (carotenoids) have been shown to reflect the maternal intake of these components, though this data need further confirmation. Recent evidence highlights that adequately supplemented vegetarian and vegan diets do not appear to compromise HM nutritional adequacy, provided maternal micronutrient status is maintained.

Emerging research also suggests that maternal gut microbiota, influenced by diet or probiotics, may further shape HM microbiota, either through bacterial transfer via the entero-mammary pathway or modulation of short-chain FAs and human milk oligosaccharides (HMOs), thereby potentially affecting infant gut colonization and metabolic function. Additionally, maternal body composition also plays a role: undernutrition can lead to deficiencies (e.g., vitamin B12, D, DHA) in HM, while maternal overweight and obesity may alter HM composition, increasing fat, protein, pro-inflammatory markers, and hormones linked to infant adiposity. However, dietary interventions can help mitigate these effects.

Finally, new data are emerging regarding contaminants in human milk such as heavy metals or bisphenol in association with maternal fish intake or canned drinks consumption, however with an overall content below toxicity levels. Nonetheless, due to the important negative effects on health of these substances, further studies should address this concern.

This review explores current evidence on how maternal diet influences HM's composition, emphasizing the potential for dietary strategies during lactation to optimize infant health trajectories.



POSTERS

P01

USE OF PASTEURIZED HUMAN MILK IN PREMATURE INFANTS <2000 G: ANALYSIS OF ITS IMPACT ON ENTERAL FEEDING, BIRTH WEIGHT RECOVERY, AND NUTRITION AT DISCHARGE. PRODUCTION: NUTRITION IS A FUNDAMENTAL ASPECT OF THE INITIAL CARE OF PREMATURE PATIENTS; FEEDING WITH

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Introduction: Nutrition is a fundamental aspect of the initial care of premature patients; feeding with the mother's own milk should always be prioritized. However, when this is not possible, pasteurized human milk (PHM) is an important option for these patients, as it provides essential nutrients for their growth, especially for premature patients born under 2000 g.

Objectives: To analyze the impact of HPM on enteral feeding, birth weight recovery, and nutrition at discharge in PT infants <2000 g.

Development: A retrospective descriptive study analyzing the use of human milk supplements (HPS) in PT infants <2000 g, admitted to the Neonatal Intensive Care Unit of Clínica Pasteur, Neuquén, Argentina, during 2024. Data on feeding and the use of human milk supplements were collected from the clinical histories and medical records of a total of 46 PT infants <2000 g. Study variables included gestational age, birth weight, type of feeding, duration of human milk supplementation, birth weight regain, and nutrition at discharge. The human milk supplements used were obtained from the Human Milk Bank of the Province of Neuquén, which operates under national regulations (Law 26.873), which regulates the operation of milk banks in Argentina and establishes the requirements and procedures for the collection, processing, and distribution of donated human milk. The Neuquén BLH implements a rigorous traceability system that allows each batch of LHP to be identified and tracked from donation to administration to the patient. The mean of 13.5 suggests that, on average, premature infants regain their weight in approximately 13–14 days. The standard deviation indicates moderate variability in weight regain among premature infants. Some may regain weight faster or slower than average; this could be due in some patients to complications during their neonatal stay or be directly related to their gestational age or birth weight. **Conclusions:** The study shows that Pasteurized Human Milk (PHM) is an important and safe nutritional option for PT infants <2000 g. During the year of the study, only 2 cases of Necrotizing Enterocolitis (NEC) were recorded, associated with comorbidities associated with prematurity, both cases with favorable clinical outcomes. The GA of PT infants <2000 g predominates between 30 and 32 weeks. In many cases, due to the severity of the maternal pathology, these patients do not have their own mother's milk to initiate trophic enteral feeding. Although we cannot establish a direct causal relationship, the data obtained indicate that breastfeeding during the first week of life may have a positive impact on the recovery of birth weight between 13 and 14 days of age, although further studies are needed to confirm these results. Furthermore, the use of breastfeeding has a positive feedback effect by promoting early initiation of breastfeeding and exclusive breastfeeding upon discharge. Institutions that administer breastfeeding to their patients have an unwavering commitment to promoting breastfeeding. The study's limitations may relate to the sample size and long-term follow-up. Based on the results obtained, we raise the possibility of conducting future research with a larger sample, with greater statistical value, which would allow us to confirm and deepen the data obtained, as well as to evaluate the long-term maintenance of breastfeeding and its nutritional impact.

P02

BREASTFEEDING IN LESSONS THAT THE LEFT US: EXTREME SITUATIONS. SARS-COV-2 SYNDROME

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Patricia:

Patient who was admitted to the Institution, first and foremost pregnant at 33 weeks of gestation, previously healthy, with no history of relevance. At the time of admission, she was suffering from Acute Respiratory Failure caused by SARS-CoV-2, with the threat of premature labor aggravated by the maternal clinical situation that forced the pregnancy to end. A male baby was born by cesarean section, premature at 33 weeks EG, PN 2250 grams. The patient died clinically, requiring mechanical ventilation (MRA). The mother was admitted to the ICU and her baby to the NICU.

Neythan:

RNPT, 33 weeks EG, Apgar 8/9, PN 2250 grs, who was born by cesarean section due to maternal pathology. He presented with RDS and mild pulmonary hypertension requiring CPAP for 4 days, with a favorable evolution. Respiratory isolation 10 days. Serology for SARS-CoV-2: negative. Complies with ATB for sepsis to SCNM. Enteral feeding begins within the first 24 hours of life with pasteurized human milk (LHP). She complies with total enteral intake initially with formula, until she achieves reconnection with her mother in joint hospitalization after 3 weeks.

What are we facing as a health team?

1) Patient-Mother

Severe in MRA with isolation due to Covid 19 pneumonia

Recent puerperium

Maternal desire to breastfeed

2) Infectious Aspect

Respiratory and contact isolation

Multi-resistant germs

3) Family- Environment

Asymptomatic father but with isolation due to close contact

Rupture of the mother-child father trinomial

Objectives:

1. Maintaining the Mother-Child-Father Relationship

2. Continuous communication between the health team and the family.

3. Respect the mother's decision to breastfeed and the right of the newborn to receive milk from his or her own mother.

"Interdisciplinary approach".

Conclusions:

The SARS-CoV-2 Syndemic put us to the test not only as a health team, but also as people caring for patients who suffered in the face of the unknown. With the moral duty, which the profession entails and the ambiguity between doing what "one should" vs. "what one feels". But prioritizing the undeniable right of the newborn to receive breast milk and of his mother to breastfeed.

P03

THE EFFECT OF STORAGE CONDITIONS ON THE STABILITY OF NUTRIENTS IN PASTEURIZED DONATED HUMAN MILK**J. Novoselac¹, V. Rimac¹, B. Kalenic¹, I. Bojanic¹**¹UHC Zagreb, Clinical Dep. of Transfusion Medicine and Transplantation Biology, Croatian Tissue and Cell Bank, Human Milk Bank

Introduction: Donated human milk (DHM) is a vital source of nutrition for preterm and critically ill infants when the mother's own milk is unavailable. DHM is routinely pasteurized and stored frozen in monitored freezers to ensure safety. The impact of storage duration and temperature on the stability of its nutritional components remains a critical concern.

Objective: This study aimed to evaluate the stability of key macronutrients (proteins, fats, carbohydrates) and energy content in pasteurized DHM stored at -30°C and -80°C over 12 months.

Materials and methods: Pasteurized DHM samples from 10 single-donor pools were divided into aliquots and stored at -30°C and -80°C. Nutritional value analyses were performed at baseline (pre-pasteurization) and predetermined intervals (once a month during one year) using standardized technique on Miris Human Milk Analyzer (Miris AB, Uppsala, Sweden). Macronutrient stability was assessed by comparing changes in macronutrient concentrations and energy content over time and between storage temperatures. Data were analyzed using the statistical program MedCalc (version 14.12.0, MedCalc, Ostend, Belgium), and a value $P < 0.05$ was considered statistically significant.

Results: Macronutrient values remained stable in the observed time period. There were no statistically significant differences, regardless of the storage temperature of DHM (-30°C: fat $P = 0.071$, carbohydrate $P = 0.087$, protein $P = 0.108$, energy content $P = 0.198$; -80°C: fat $P = 0.143$, carbohydrate $P = 0.059$, energy content $P = 0.577$). A statistically significant difference was observed only for protein concentration in milk samples stored at -80°C ($P = 0.039$). Due to the low protein values (the median at all measurement points was 1.0 or 1.1 g/100mL), this difference is not considered clinically significant and has no impact on the quality of the milk. No statistically significant difference was found when we compared the concentrations of the observed macronutrients and energy content in samples stored at different temperatures over the same time period.

Conclusion: Both -30°C and -80°C storage conditions maintain the acceptable nutritional quality of macronutrients in pasteurized DHM for up to 12 months.

P04

INTERCULTURAL ATTITUDES AND KNOWLEDGE OF PARENTS TOWARDS DONOR HUMAN MILK: A QUALITATIVE SYSTEMATIC REVIEW AND METAAGGREGATION

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Background and Objectives: The World Health Organization recommends breastfeeding infants exclusively for the first six months of life (World Health Organization, 2023). Donated breast milk has similar advantages to breast milk in case breast milk is not available (Bührer et al., 2020). However, religion and culture are crucial determinants for breast milk donation (Akpınar et al., 2022). Specifically, Muslim women would show more interest if religious values were considered (Karadag et al., 2015). This systematic review aims to investigate the attitudes and knowledge levels of parents with different cultural and religious backgrounds towards donor human milk focusing on clinical as well as non-clinical settings.

Design and Methods: The methodology follows the JBI Manual for Evidence Synthesis. Accordingly, the databases PubMed, CINAHL via EBSCOhost and Embase via Ovid as well as Medline via Ovid were searched. The search strategy was added by hand searches, free web searches, citation tracking and contacting authors. The entire literature search was completed in June 2024. The included qualitative and mixed-methods studies were assessed using the JBI Critical Appraisal Checklist for qualitative research. According to the metaaggregation, categories and synthesized findings were identified inductively. To rate the confidence in synthesized qualitative research ConQual was applied (Aromataris et al., 2024).

Results: Twenty-two primary studies were included. From 136 findings, 16 categories and four synthesized findings were generated. Firstly, various cultural traditions were identified. Wet nursing plays a special role here. Secondly, in view of the different world religions, a large number of religious values were identified. An important influence on the attitude towards breast milk donation is milk kinship. Thirdly, it was determined which religious and cultural requirements apply to the selection of donors or recipients. The requirements vary worldwide in terms of origin or relationships. Fourthly, it was possible to record who influences families in terms of these cultural or religious values. Relatives, especially husbands, are mainly involved.

Conclusions: Various cultural traditions and religious beliefs that determine the acceptance of breast milk donation worldwide were identified. Due to a multicultural patient population and further different waves of refugees, it is necessary to investigate whether these needs are compatible with the domestic guidelines. By taking cultural and religious needs into account, more donors of heterogeneous origin or denomination may be recruited and more infants can be given access to tested breast milk.

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P05

INFLUENCE OF GESTATIONAL AND POSTPARTUM AGE ON CALCIUM, INORGANIC PHOSPHORUS, AND ZINC CONTENT OF DONOR HUMAN MILK IN JAPAN

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Background: Calcium (Ca), inorganic phosphorus (IP), and zinc (Zn) in human milk are essential nutrients for infant growth and health. Preterm infants are at increased risk of mineral deficiencies due to higher requirements and limited endogenous stores. The mineral content of human milk is influenced by various factors, including postpartum week; however, data on the mineral composition of donor human milk (DHM) in Japan are lacking.

Objective: This study aimed to determine the concentrations of Ca, IP, and Zn in DHM in Japan and to investigate the effects of gestational and postpartum age on mineral content.

Methods: From April 2022 to December 2024, a total of 466 DHM samples were collected from 337 mothers of preterm and term infants.

Ca, IP, and Zn concentrations in preterm DHM (n = 106) and term DHM (n = 360) were analyzed using a colorimetric method.

Results: The median postpartum week of mothers of preterm and term infants was 10 weeks and 19 weeks, respectively ($p < 0.001$). Zn levels were significantly higher in preterm DHM than in term DHM (141 $\mu\text{g}/\text{dL}$ and 113 $\mu\text{g}/\text{dL}$, respectively, $p < 0.001$). Postpartum week was negatively correlated with Ca, IP, and Zn concentrations. Multivariable analysis revealed no significant association between gestational age and mineral levels, whereas longer postpartum period was associated with lower concentrations of Ca, IP, and Zn.

Conclusions: Ca, IP, and Zn concentrations in DHM decrease as the number of postpartum weeks increase and are independent of gestational age. These findings highlight the importance of nutritional analysis for the appropriate use of DHM in the care of preterm infants.

P06

EQUITABLE ACCESS TO DONOR HUMAN MILK IN A DIVERSE URBAN POPULATION: THE SINGAPORE EXPERIENCE

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Background: Human milk is the optimal source of nutrition for all infants. When mother's own milk (MOM) is unavailable or insufficient, pasteurized donor human milk (PDHM) is the recommended alternative. In 2017, Singapore established its first and only human milk bank, in KK

Women's and Children's Hospital, to provide safe PDHM to vulnerable infants nationwide. Addressing Singapore's racial, cultural, and socioeconomic diversity is vital to ensure equitable access to donor milk.

Objective: To describe our strategies to ensure equitable access to PDHM across all populations in Singapore.

Methods: A multi-pronged approach focussing on public and professional education, cultural and religious engagement, policy development for financial access, service expansion, and a framework to ensure continuous availability were adopted to promote acceptance and accessibility of PDHM.

Key Strategies and Outcomes:

1. Education and Awareness: Targeted efforts were made to educate healthcare professionals and the public about the benefits of breastfeeding, the role of PDHM as a bridge to an exclusive human milk diet and the importance of lactation support. Emphasis was placed on the risks of informal milk sharing, the voluntary and non-profit nature of the program and the adherence to international safety standards.

2. Cultural and Religious Sensitivities: With Muslims comprising approximately 13% of the population, concerns around milk kinship were addressed in collaboration with the Islamic Religious Council of Singapore. A Fatwa supporting the use of donor milk from the milk bank, without establishing kinship, was issued and widely publicized to raise awareness amongst the Muslim population.

3. Financial Accessibility: PDHM was initially offered at no cost with philanthropic funding. With convincing data of improved clinical outcomes, the Ministry of Health now funds the milk bank and provides subsidies to ensure families are not denied the use of PDHM due to cost concerns.

4. Geographic Expansion: Within one year, milk bank expanded its capacity to provide PDHM to all public and private maternity hospitals in Singapore to support all medically eligible infants in the country.

5. Improving Accessibility: The criteria for use of PDHM was expanded to include babies with medical needs post-discharge and infants unable to receive MOM due to maternal illness or medication use. A contactless milk depot was implemented to improve convenience for donors and recipients to donate and collect donor milk respectively.

6. Equity and Prioritization: The use of PDHM is prioritized to benefit the most vulnerable infants, particularly those born preterm or with serious health conditions.

7. Emergency Preparedness: The milk bank maintains a 60-day reserve to ensure continuity of supply during crises. These strategies led to widespread acceptance of PDHM across all groups in Singapore.

Conclusion: Our experience demonstrates that equitable access to PDHM is achievable in a diverse urban setting. Through coordinated efforts addressing cultural, religious, financial, and logistical barriers, the milk bank has ensured that no infant is deprived of the benefits of human milk due to circumstance. These strategies may be adopted in other multi-ethnic, urban populations aiming to implement or expand their donor human milk programs.

P07

THE IMPACT OF TIMING FOR INITIATING FORMULA FEEDING ON THE SHORT-TERM PROGNOSIS OF VERY LOW BIRTH WEIGHT INFANTS

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Background: For very low birth weight (VLBW) infants, breast milk, particularly mothers' own milk (MOM), is the optimal nutrition. Donor human milk (DHM) is recommended when MOM is insufficient. However, the optimal timing for transitioning from DHM to formula remains unclear. This study examines the impact of formula initiation timing on complications in VLBW infants.

Methods: We analyzed data from 744 VLBW infants (<1500 g) who initiated enteral feeding with DHM within 24 hours of birth using a human milk bank database (2018–2024). Postmenstrual age (PMA) at formula initiation was assessed for associations with bronchopulmonary dysplasia (BPD), home oxygen therapy (HOT), retinopathy of prematurity (ROP), and necrotizing enterocolitis (NEC).

Results: The median PMA at formula initiation was 34.6 weeks. Delayed formula initiation reduced the risk of BPD, HOT, and NEC.

Compared to formula initiation before 32 weeks, odds ratios for BPD ranged from 0.186 (34–36 weeks) to 0.239 (no formula). Formula initiation at 32–34 weeks significantly lowered ROP requiring treatment (OR 0.305). Logistic regression analysis indicated a trend toward reduced NEC risk when formula initiation occurred after 34 weeks ($p = 0.0504$).

Conclusion: Delaying formula initiation until after 34 weeks PMA reduces complications in VLBW infants. Early enteral nutrition with MOM or DHM within 24 hours of birth is crucial, and later formula introduction may provide better outcomes. Further studies are needed to refine feeding guidelines

P08

CALIBRATION AND ANALYTICAL PERFORMANCE OF THE MILKOSCAN FT-3 FOR MACRONUTRIENT QUANTIFICATION IN HUMAN MILK**P. Isabelle¹, G. Mélissa^{1,2}**¹Héma-Quebec, Medical Affairs and Innovation, Quebec City, QC, Canada²Université Laval, Faculty of Medicine, Microbiology-Infectiology and Immunology department, Quebec City, QC, Canada

Background: Human milk, whether maternal or donor-derived, plays a crucial role in the nutrition of preterm infants due to its rich composition in bioactive and immunological factors. However, it does not fully meet the elevated nutritional requirements of these infants.

For this reason, all milk administered in neonatal intensive care units (NICUs) must be fortified—typically with a bovine milk-based fortifier—to increase caloric and nutrient density. In Quebec, Héma-Québec's Public Mothers' Milk Bank required a reliable tool to assess the macronutrient content of each milk batch in order to guide accurate fortification. The Milkoscan FT-3, an infrared milk analyzer, is used in the dairy industry and some human milk banks for rapid nutrient profiling. The objective of this study was to calibrate the Milkoscan FT-3 for use with human milk and to assess its accuracy and precision in measuring protein, fat, and lactose content in both raw and pasteurized samples.

Methods: To calibrate the Milkoscan FT-3, raw human milk samples (n=30) and pooled pasteurized milk samples (n=20) were analyzed using the device and compared to results obtained from reference methods: the Kjeldahl method for proteins, the Röse-Gottlieb method for fat, and HPLC for lactose. Based on these data, the software generates a predictive model with advanced algorithms to calculate corrected values for the analyzed milk, aligning them with those from the reference methods. Post-calibration, accuracy was assessed by comparing values from the Milkoscan with those obtained via reference methods for the same set of 50 samples, using mean coefficients of variation (CVs). Repeatability was assessed by performing ten consecutive measurements on the same sample. Intermediate precision was evaluated by analyzing the same samples on two different days.

Results: Calibration of the Milkoscan FT-3 demonstrated strong linear correlations with reference methods for all macronutrients, with R^2 values of 0.87, 0.97, and 0.99 for protein, fat, and lactose, respectively, in raw milk, and 0.97, 0.81, and 0.99 in pasteurized milk.

The average CVs for accuracy were 1.60 % for protein, 6.22 % for fat, and 2.65 % for lactose in raw milk, and 2.99 %, 4.48 %, 1.62% respectively in pasteurized milk. Repeatability testing, based on ten sequential replicates showed CVs of 0.52 %, 0.69 %, and 0.11 % for proteins, fat, and lactose, respectively, in raw milk and 0.60 %, 3.12 %, and 0.17% for pasteurized milk. Intermediate precision testing showed consistent results across days, with CVs ≤ 1.36 % and ≤ 1.79 % for raw and pasteurized milk, respectively.

Conclusions: The Milkoscan FT-3 demonstrates strong analytical performance in quantifying protein, fat, and lactose concentrations in human milk, both raw and pasteurized. Its rapid analysis capabilities make it a valuable tool for human milk banks aiming to support individualized fortification strategies in NICUs. However, proper sample handling—including pre-warming and homogenization—is essential to maintain result accuracy and reproducibility. This calibration supports the implementation of real-time macronutrient analysis as a quality assurance measure in human milk banking and clinical nutrition practices.

P09

MICROBIOLOGICAL QUALITY OF DONOR HUMAN MILK: A 12-YEAR REVIEW FROM THE TAIPEI CITY HOSPITAL MILK BANK IN TAIWAN**F. Chang¹**¹Taipei City Hospital

Background: A well-organized donor milk processing system has made the bank milk a valuable alternative source of nutrition for premature or ill infants when their own mother's milk is unavailable. Microbiological screening of donor milk is essential, and pasteurization is a mandatory step to eliminate pathogenic microorganisms. This study presents the pre- and post-pasteurization bacterial profiles of donor milk collected from the Taipei City Hospital Milk Bank (TCHMB), Taiwan's first human milk bank since 2005.

Methods: The data included 57,669 batches donated to TCHMB from 2013 to 2024. For each batch, 20mL samples were taken before and after pasteurization for microbiological testing, including bacterial load with colony-forming unit (CFU) and identification of bacterial species. Pre-pasteurization samples with a total viable count (TVC) $<10^5$ CFU/mL of coagulase-negative staphylococci (CoNS), *S. epidermidis*, and *Streptococcus viridans* were accepted. Samples containing any number of Gram-negative rods, Gram-positive rods, *S. aureus*, or *Bacillus*, or with a TVC $\geq 10^5$ CFU/mL were discarded. Post-pasteurization samples had to meet the standard of <5 CFU/mL.

Results: Over a 12-year period, 4604 donors contributed a total of 54726 liters of human milk. Pre-pasteurization microbiological analysis of 57669 donor human milk (DHM) samples revealed that 1.3% exceeded the threshold of 10^5 CFU/mL; 5.6% between $10^4 \sim 10^5$ CFU/mL; 16.9% between $10^3 \sim 10^4$ CFU/mL; and the majority (76.2%) exhibited a TVC below 10^3 CFU/mL. A total of 86.0% of DHM samples passed the pre-pasteurization screening. Among the 8,065 samples that failed, 7.4% exhibited a TVC exceeding 10^5 CFU/mL; 58% contained a single pathogenic organism, including Gram negative rods (39.6%), *S. aureus* (5.0%), *Enterococcus* species (2.4%), and other pathogens (11.0%). 34.6% of disqualified samples revealed polymicrobial results. Post-pasteurization testing was conducted on 49,571 samples, of which 43 samples (0.09%) had detectable bacterial growth. The most frequently isolated organisms were *Bacillus* species (52.4%) and CoNS (23.8%). DHM samples from donors with gravidity of ≥ 3 had a lower pass rate than those with gravidity 1 or 2, though not statistically significant (G1:76.3%, G2:76.1%, $\geq$ G3:74.2%; $p > 0.05$). 243 donors participated in milk donation more than twice pregnancy, showing a non-significantly higher pass rate than first-time donors (78.9% vs. 75.9%; $p > 0.05$). No significant seasonal trends in the pass rate were observed (spring:84.3%, summer:85.9%, fall:87.7%, winter:84.8%). Samples collected in summer had a lower proportion of discards due to Gram-negative rods compared to those collected in winter (66.2% vs. 72.9%, $p = 0.048$).

Conclusions: The majority of DHM samples at TCHMB met the microbiological screening criteria. The proportions of samples with TVC $\geq 10^5$ CFU/mL and within the range of $10^4 \sim 10^5$ CFU/mL were notably lower than those reported in other published studies. 14.0% of DHM samples failed to meet microbiological standards, with 72.1% of these failures attributed to the presence of Gram-negative rods.

P10

EVALUATING MYCOTOXIN EXPOSURE IN BREASTFEEDING MOTHERS: THE CASE OF OCHRATOXIN A K. Ropejko, M. Twarušek

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Mycotoxins are secondary metabolites of molds. Ochratoxin A (OTA) is one of the most prevalent mycotoxins in the Polish climate, produced primarily by *Aspergillus* and *Penicillium* species as a result of improper food storage. It is commonly found in many products, which are consumed by both humans and animals: cereals, wheat gluten, coffee, dried fruit, wine, grape juice, spices, beer and products based on them. OTA is known as a nephrotoxic, hepatotoxic, potentially carcinogenic and teratogenic. OTA mainly passes to the organisms by oral intake. The aim of the study was to detect the presence of OTA in milk, urine and serum of women who are lactating.

A survey was also conducted regarding the daily diet of women. The research group consisted of 32 lactating women, including 11 donors from the Milk Bank in Toruń, and 21 participants recruited independently. OTA was detected only in 3 milk samples (9.38%). The minimum level was 0.01 ng/ml, while maximum 0.018 ng/ml and mean 0.0013 ng/ml. 26 urine samples (81.25%) was OTA positive, with minimum level 0.013 ng/ml, maximum level 0.117 ng/ml and mean 0.0192 ng/ml. Also, all 32 serum samples (100%) were contaminated by OTA, with minimum level 0.099 ng/ml, maximum level 2.38 ng/ml and mean 0.4649 ng/ml. In the case of 3 women, OTA was present in all tested body fluids. Based on the results, the following conclusions can be drawn: the breast-milk of women in the study group is slightly contaminated with ochratoxin A. The 10 samples of urine contained ochratoxin A above the average content of it in tested samples. Moreover, the serum of 8 women contains ochratoxin A at a level above the average content of this mycotoxin in tested samples.

The average ochratoxin A level in serum in the presented studies was 0.4649 ng/ml and is much lower than the average serum ochratoxin A level established in several countries in the world which is 0.7 ng/ml.

P11

"BREASTFEEDING AS A RIGHT OF THE MOTHER AND CHILD" – ASSESSMENT OF PERINATAL CARE IN POLAND

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Background

The Small Mammal Association, which supports breastfeeding in Poland, conducted monitoring of lactation care in Poland from 2018 to 2022 as part of the project "Breastfeeding as a Right of the Mother and Child."

Objectives

The project aimed to assess the state of publicly funded perinatal care in Poland, with a particular focus on lactation care, based on conducted monitoring.

Methods

Data were collected using questionnaires prepared for the study (from women who gave birth in the years 2018-2022 and who breastfed or wanted to breastfeed, medical staff involved in lactation care), in-depth interviews as well as official data obtained from public institutions.

The collected data was analyzed, taking into account prenatal care, perinatal care in the hospital, community care, and specialized care for the child.

Results

Finally obtained 2,504 anonymous surveys and 57 in-depth interviews were conducted. Multiple needs were identified: the need to increase the education of future medics in the field of lactation, increase the availability of lactation consultants in maternity wards, ensuring skin-to-skin contact, developing support groups for breastfeeding women, ensure reliable care by a community midwife after delivery, limiting the feeding of children with formula.

Conclusions

The report showed that at every stage, from pregnancy to birth and further care of the child, women face obstacles resulting from the shortcomings of the health care system.

The project took action to improve lactation care, which culminated in the submission of a petition and raised public awareness of the issue.

This work was supported by a grant from the Active Citizens – National Fund program, financed by Iceland, Liechtenstein, and Norway under the EEA Grants (2022-2023).

The data that support the findings of this study are available upon reasonable request and with permission of the Smallmammal Association.

P12

BIOELECTRICAL IMPEDANCE VECTOR ANALYSIS IN THE FOLLOW-UP OF PRETERM INFANTS WITH BIRTH WEIGHT LESS THAN 1000G

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Introduction: Nutrition of preterm infants with birth weight less than 1000 g (Extremely low birth weight or ELBW) is a fundamental aspect of post-discharge care, with an impact on the risk of non-communicable diseases in adulthood. However, body composition changes in this population are not fully understood.

Objectives: Describe bioelectrical data for extremely low birth weight (ELBW) infants at 2 years of corrected age (CA) using bioelectrical impedance vector analysis (BIVA). **Methods:** A prospective observational descriptive study was conducted that included patients from a cohort of newborns with birth weight less than 1000 g who underwent a complete nutritional assessment at the time of their scheduled follow up visit at 2 years of EC. Gestational age, sex, history of intrauterine growth restriction (IUGR) and anthropometry at 2 years of corrected age were recorded. Qualitative variables were described as absolute and relative frequencies. BIVA (BIA 101 BIVA PRO AKERN srl, Florence) was used to perform a semi-quantitative analysis of body composition. The components of the impedance vector —resistance (R) and reactance (Xc)—were normalised by height (H). Three measurements were taken for each subject, and the mean ($\pm$ standard deviation) was taken as the result after checking for normal distribution. The Student's t-test was used to make comparisons. Informed consent and approval from the Ethics Committee were requested.

Results: Twenty-six patients (5 males, 21 females) with a mean EC of 25.56 months ($SD \pm 1.158$) were included. Of these, 13 of 26 patients (50%) had a history of IUGR and another 13 of 26 patients (50%) were small for gestational age (SGA), with both circumstances being identified in 11 of 26 patients (43%). At the time of assessment, the mean BMI was 13.07 ($SD \pm 0.81$). The mean impedance vector values for the entire sample were obtained: R/H 777.44 ohm/m ($SD \pm 126.37$) and Xc/H 65.14 ohm/m ($SD \pm 7.23$). The mean phase angle value was 5.67 ($SD \pm 1.08$). No statistically significant differences were found for these values between patients with IUGR and SGA.

Conclusions: Bioelectrical parameters in the follow-up of ELBW infants are consistent with those described in healthy patients of the same age. The lack of difference at 2 years CA makes it advisable to extend the follow-up of our cohort to identify the highest risk period for fat rebound in this population.

P13

SUPPLEMENT USE BY POTENTIAL MILK DONORS TO A NOT-FOR-PROFIT MILK BANK IN AUSTRALIA THAN 1000G**V.C. Clifford^{1,2,3,4}, M. Booth¹, C. Newman¹, F. Roberts¹, L. Klein¹**¹Australian Red Cross Lifeblood, West Melbourne, Victoria, Australia²University of Melbourne, Parkville, Victoria, Australia³Royal Children's Hospital, Parkville, Victoria, Australia⁴Murdoch Children's Research Institute, Parkville, Victoria, Australia

During lactation many parents take nutritional supplements to support their own health and the health of their baby. These include vitamin and mineral supplements, as well as herbal and traditional remedies. While standard dose multivitamins are generally safe during breastfeeding, less is known about the potential adverse effects of excess dosages of vitamins, minerals and other supplements. There is considerable variation globally between milk banks regarding deferral of donors taking supplements and medication. Australian Red Cross Lifeblood, the national provider of pasteurised donor human milk in Australia, maintains a formal set of donor selection guidelines that are reviewed and updated annually. These guidelines include medication deferrals, and those related to the use of nutritional supplements; for example, donors taking mega dose vitamin supplements (>20 times the recommended daily intake) are deferred for seven days from the last dose. Deferrals for vitamin or supplement use are one of the most common reasons for Lifeblood milk donors to be deferred. To ensure a consistent supply of donor milk, it is essential that donors are only deferred for important safety risks. Unfortunately, for many nutritional supplements, studies need to be done to confirm their safety in milk donation. To prioritise research questions, it is important to know which supplements and medications are most commonly taken by lactating women. However, there is a lack of up-to-date data about nutritional supplement and medication use amongst lactating women in Australia. At Lifeblood, all potential milk donors are screened by a donor coordinator by telephone before a home visit takes place (at which point a formal donor questionnaire is administered and a declaration signed by the donor). During the telephone call, donor coordinators ask about and record all nutritional supplements and medications taken by the potential donor. This represents a valuable source of information about supplement use amongst lactating women in Australia.

This study aimed to describe supplement usage among potential donors to our donor human milk service in Australia. We reviewed our records over a 3-year period (2022-2024) for all donor telephone interviews and recorded all nutritional supplement and medication use reported by potential donors over this period. We also determined the proportion of potential donors who proceeded to formal donor eligibility assessment after the telephone interviews. Most potential donors were taking at least one nutritional supplement; most commonly this was a standard-dose multivitamin, but several were taking very high doses of individual micronutrients. Other commonly reported supplements included iron, calcium, Vitamin D and probiotics. Information about nutritional supplement use in potential donors will be used to inform the priority of research questions around donor milk safety and to improve our donor selection processes.

P14

VIABLE SPORE-FORMING ANAEROBES NOT DETECTED IN A PILOT STUDY OF PASTEURISED DONOR HUMAN MILK**V. Clifford^{1,2,3,4}, T. Wu¹, S. Markham¹, C. Sulfaro¹, L. Klein¹**¹Australian Red Cross Lifeblood, West Melbourne, VIC 3003, Australia²University of Melbourne, Parkville, VIC 3050, Australia³Royal Children's Hospital, Parkville, VIC 3052, Australia⁴Murdoch Children's Research Institute, Parkville, VIC 3052, Australia

Background: When access to mother's own milk is limited, donor human milk (DHM) is the best alternative source of nutrition for highrisk preterm infants. To ensure the microbial safety of DHM, milk banks typically process it using Holder pasteurisation ($\geq 62.5^{\circ}\text{C}$ for ≥ 30 minutes). Bacterial screening of post-pasteurisation DHM is essential to ensure its safety, as spore-forming bacteria may survive pasteurisation. Standard screening will detect spore-forming bacteria that grow aerobically, such as *Bacillus cereus*, but may miss obligate anaerobes, such as *Clostridium* species. Recently a milk bank in China reported that *Clostridium perfringens* was detected in donor human milk after pasteurisation, using anaerobic blood culture media. Although milk banking guidelines globally recommend microbial screening of milk batches, they do not specifically recommend anaerobic testing. To determine whether additional anaerobic testing of PDHM is indicated, this study aimed to determine the proportion of PDHM batches at an Australian milk bank that contained viable anaerobic bacteria after Holder pasteurisation.

Methods: Over a 5-month period (August–December 2024), 150 batches of donated milk from unique donors were sampled at Australian Red Cross Lifeblood processing centres in Sydney ($n = 81$) and Brisbane ($n = 69$). For each batch, a pre- and post-pasteurisation sample were selected for microbial screening at an accredited food safety laboratory. Samples were transported at 4°C to the testing laboratory. The laboratory did routine microbial screening under aerobic conditions, as per standard practice, and additionally performed specialised testing for anaerobes based on Standard AS5013.14, using an in-house validated method, based on a reference method from the Compendium of Methods for the Microbiological Examination of Foods, with a detection limit of 1 CFU/mL. In brief, 1mL of milk (in two replicates: 1mL neat and 1mL diluted 1:10 with 0.1% peptone salt solution) was poured into petri dishes with an overlay of Reinforced Clostridial Agar (RCA). Inverted RCA plates were incubated at $30\pm 1^{\circ}\text{C}$ for 3 days under anaerobic conditions, followed by colony counting. Positive and negative controls were included with each test run.

Results: No bacteria were recovered from any of the 150 post-pasteurisation samples tested under anaerobic culture conditions. Using standard aerobic culture, 4.7% (7/150) of samples failed pre-pasteurisation microbial screening according to local acceptance guidelines, due to a total colony count $\geq 10(5)$ CFU/mL ($n = 6$) and/or the presence of Enterobacterales $\geq 10(4)$ CFU/mL ($n = 3$) and none failed post-pasteurisation testing.

Conclusions: This study confirmed that obligate anaerobic bacteria are rarely viable after Holder pasteurisation of donor milk. Based on these findings, our milk bank decided not to implement additional process control through routine testing for anaerobic bacteria. We took into account the management of PDHM after pasteurisation, and particularly the requirement that it be stored frozen ($<18^{\circ}\text{C}$) until ready for use. Clinicians should nevertheless remain vigilant about potential recipient adverse events (for example, unexplained gastrointestinal symptoms including colitis) and promptly report these back to the source milk bank.

P15

ACCESSIBILITY OF DONOR HUMAN MILK FOR RECIPIENTS: A 20-YEAR EXPERIENCE FROM THE TAIPEI CITY HOSPITAL MILK BANK IN TAIWAN**Y. Lin¹, T. Wu¹, L. Fang¹, F. Chang¹**¹Taipei City Hospital**Background:**

The benefits of donor human milk (DHM) for premature infants are well established; however, not all preterm or ill infants who lack available own mother milk have access to this alternative source of nutrition. The insufficient knowledge and limited accessibility of DHM reduced interest among both parents and healthcare professionals in initiating this valuable option. The Taipei City Hospital Milk Bank (TCHMB) established in 2005 as Taiwan's first nonprofit human milk bank. This study analyzes the demographics and clinical profiles of its recipients.

Methods:

TCHMB has adopted standards of practice laid down by the Human Milk Banking Association of North America (HMBANA) and United Kingdom Association for Milk Banking (UKAMB). DHM has been provided to various infant populations, with priority given to hospitalized preterm infants, followed by those with malabsorption, major surgeries, or feeding intolerance. The clinical characteristics of the recipients were reviewed retrospectively.

Results:

Between 2005 and 2024, a total of 7076 infants received pasteurized donor milk from TCHMB, with the most common indications being prematurity (91.1%), feeding intolerance (3.3%), malabsorption (3.1%), and post-surgical support (2.0%). The mean birth weight of recipients was 1677.8 g (range: 294–7200 g), and 32.6% were from multiple pregnancies (twins 30.5%, triplets 2.1%). The mean gestational age of recipients was 32.1 weeks (range: 22.3–42.6 weeks).

The TCHMB was established in Taipei, located in northern Taiwan. From 2005 to 2009, the majority of recipients were from northern Taiwan (84.6%), with 7.0% and 7.3% from central and southern Taiwan, respectively (average of 71 recipients per year). Regional distribution shifted following the establishment of a satellite collection and deposit site in Taichung, central Taiwan, in 2010. Between 2010 and 2013, the proportion of recipients from northern Taiwan decreased to 78.0%, while central and southern Taiwan accounted for 12.4% and 7.9%, respectively (average of 228 recipients per year). In 2014, two additional distribution sites were established in NICUs at medical centers—one in central and one in southern Taiwan.

This led to a further increase in numbers of recipients, averaging 443 per year between 2014 and 2017, with a marked shifting regional distribution: 47.6% from the north, 27.9% from the center, and 22.9% from the south. Between 2018 and 2020, three more distribution sites were set up in NICUs of medical centers in northern and central Taiwan. Subsequent data revealed a steady rise in recipient numbers, from 458 in 2018, 598 in 2021, to 766 in 2024. Since 2018, regional distribution has become more balanced, with 48.1% of recipients from northern Taiwan and 50.6% from central and southern Taiwan combined. Over the entire study period, a total of 15,273 donor milk applications were recorded, with 49.6% of recipients referred through distribution sites.

Conclusions: The early introduction of DHM has a great impact for recipients. The establishment of distribution sites within medical centers improves accessibility and supports the timely initiation of this valuable nutritional resource for preterm and medically fragile infants.

P16

NUTRITIONAL DIFFERENCES BETWEEN TERM AND PRETERM DONOR BREAST MILK FROM THE MURCIA REGION MILK BANK

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The WHO recommends that the best feeding option for preterm babies is their mother's own milk. It is also believed that the milk adjusts to the special needs of the baby. Analyzing the nutritional components throughout the donation process from lactating mothers will help identify which type of donated breast milk is most suitable at each moment.

Objective: The aim of this analysis is to observe whether there are differences between the breast milk from donors whose babies have reached full term and that from donors whose babies were born prematurely.

Material: Proteins, fats, and lactose were analyzed using near-infrared spectroscopy (NIRS) across 4,165 batches processed at the Murcia Region Milk Bank. Of these, 3,021 were donated term breast milk (LMD) and 1,144 were donated preterm breast milk (LMDP).

The batches were categorized into Colostrum (0-1 week), Intermediate (1-2 weeks), Mature (2 weeks to 12 months), and Mature over one year, to observe if there are significant differences between the two groups as the breast milk matures.

Results: Significant differences were observed between LMD and LMDP in colostrum (proteins, fats, and lactose); in intermediate milk (proteins and fats); in mature milk (proteins, fats, and lactose); and in mature milk over one year (fats).

Conclusions: There are nutritional variations in the percentages of proteins, fats, and lactose between the two types of breast milk, LMD and LMDP, across different stages of their production. It would be important to consider choosing LMDP over LMD for feeding preterm infants. Further studies are needed to confirm the composition inside the different nutrients.

P17

MEDICATION ASSESSMENT FOR MILK DONOR SELECTION, IN QUÉBEC, CANADA

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Background: Rigorous donor selection for public human milk bank is fundamental to preserve recipient's safety. Since its inauguration in 2014, Héma-Québec's public mother's milk bank assesses every prospective donor and excludes donors using incompatible medications with milk donation. Temporary or permanent deferrals depends on the medication's potential to cause harm, its half-life, and if the use is intended to be on a temporary basis or for a long-term treatment.

Aims: As science evolves and new data on medication safety arises, Héma-Québec aims to review the unacceptable medication list, including the length of deferrals, for breast milk donors.

Methods: Donors are asked if they have taken prescription or over-the-counter medications since their childbirth during the initial questionnaire and since their last questionnaire when subsequent participation. Medication and their reason for use are registered in the donor's chart, within the electronic database. Retrospective data from our institution's database were analyzed. Between December 1st, 2022 and September 12th, 2024, temporary and permanent deferrals related to unacceptable medications declared by voluntary milk donors were identified.

Results: On a period of 22 months, a total of 639 declarations including unacceptable medication were identified. 76 deferrals were permanent. Of these, only 3 used a medication that automatically led to a permanent deferral and 73 were due to the use of unacceptable medication on a daily and long-term basis, such as antidepressants, psychostimulants or antihypertensive medications. The most frequent deferred medication classes are the antimicrobials (N=320), the nonsteroidal anti-inflammatories (N=76) and antidepressants (N=52).

Conclusion: Most deferrals related to unacceptable medications are temporary deferrals. Some medication classes are overrepresented and may lead to permanent deferrals, which may not always be based on current evidence. Deferrals not justified by strong evidence can impact the participation rate and the organization's credibility. These observations support the need to review the unacceptable medications and their deferral periods for milk donor selection.

P18

STATE OF THE ART REGARDING NEW INDICATIONS FOR PASTEURIZED DONOR HUMAN MILK: A RATIONALE FOR ADDRESSING INCREASING DEMANDS**A. Gausсен¹, C. Thibeault¹, A. Lewin¹, C. Renaud¹**¹Héma-Québec, Medical Affairs and Innovation, Québec, Canada

Background: Pasteurized donor human milk (PDHM) is the best option for very preterm infants who cannot be breastfed or fed mother own milk (MOM), protecting from clinical complications. The public mother's milk bank of Québec, Héma-Québec, provides PDHM to babies up to 32 weeks of age who require medical care in neonatal units and whose mothers are unable to breastfeed. A grid is used to determine the PDHM allocation priority based on baby's gestational age (GA), weight, medical condition, and milk supply capacity. In the context of growing demand from hospitals and exception requests for PDHM outside our allocation guidelines we aim to reassess the indications for PDHM to adapt to the current needs, considering the indications recognized in the literature.

Objectives : To review the recommendations for the indications of PDHM at the international level, the emerging or supporting literature, and the maternal and psychological benefits of PDHM.

Methods: Review questions were formulated to focus on the indications of PDHM for babies born beyond 32 weeks GA and the benefits for the infants and the mothers, especially during the bridge between hospital and home. A comprehensive search has been performed from September 17 to September 30, 2024 to identify the scientific literature from MEDLINE via PubMed, using selected terms and vocabulary, without limits of publication period. Citing and cited references were also explored. Grey literature search was also executed to collect guidelines and recommendations from non-governmental agencies and scientific and/or medical societies.

Results: From the grey literature and the 72 references selected for full analysis, we identified published international, national and local recommendations for PDHM indication for infants over 32 weeks GA in specified and various circumstances, or not (Sweden), when a mother's own milk is unavailable, limited, or contraindicated. National and local recommendations were also identified for individuals with HIV and in case the mother is suspected for HIV infection. Published surveys from the last five years in the UK and the USA illustrated indications of PDHM as a bridge until breastfeeding establishment. Some retrospective studies in late preterms observed a positive association of PDHM with MOM feeding at discharge or breastfeeding, unlike receiving formula. Other retrospective studies found benefits of PDHM over formula for infants >35 weeks GA at high risk neonatal hypoglycemia.

Conclusions: Our review of indications of PDHM shows that clinical practice in some countries has already extended the common limits of GA and weight, in specified conditions, supported by several guidelines issued by national authorities, international nongovernmental agencies and academies or societies. Results from retrospective studies on the impact of PDHM on maternal feeding (MOM or breastfeeding) are encouraging. However, the existing scientific literature lacks results from prospective clinical trials.

P19

DETERMINANTS OF THE BACTERIOLOGICAL PROFILE OF DONOR HUMAN MILK: A SINGLE- CENTER STUDY FROM A HUMAN MILK BANK IN GREECE**A. Georgiadou¹, M. Lithoxopoulou¹, A. Karagiozi², E. Drogouti¹, C. Tsakalidis¹**¹Human Milk Bank, 2nd Dep Of Neonatology and NICU, Aristotle University, Papageorgiou Hospital, Thessaloniki Greece²1st Dep of Obstetrics and Gynecology, Aristotle University, Papageorgiou Hospital, Thessaloniki, Greece

Background: Human breast milk is widely recognized as the optimal nutrition for infants, offering immunological and developmental benefits. Human donor milk (HDM) is an alternative to mother's own milk, particularly for preterm or medically vulnerable neonates.

Human milk banks worldwide play a critical role in collecting, processing, and distributing HDM under stringent safety protocols. Rigorous microbiological screening of donated milk is essential to ensure its safety and to minimize the risk of transmitting infectious agents to recipient infants. Aim: To investigate the bacteria that colonize human donor milk (HDM), to determine potential differences in the microbiological profiles between milk donated by mothers of preterm versus term infants, and to assess the impact of neonatal hospitalization on both the bacterial load and species diversity. Methods: Samples of HDM were microbiologically analyzed using the standard culture-based methods technique. Median values of total bacterial load were calculated across donor milk batches. Mann Whitney test was used to determine the effect of gestational age and hospitalization in the count of bacteria and Fisher's Exact Test was used to explore the effect of the same parameters in bacteria species. Shapiro-Wilk test was applied to evaluate the normality of the data distributions. Statistical analyses were performed using Jamovi Software (v2.6.44) with a significance level set at $p < 0.05$. Results: A total of 313 samples from human milk donors were analyzed. Donors were healthy women with a mean age of 33.6 years (± 5.02 , min 19, max 48). The median total bacterial load per batch was 10000 CFU (IQR: 100000). A statistically significant difference in the count of isolated bacteria was found between mothers of preterm and term neonates ($p < 0.001$). *Staphylococcus epidermidis* was the most frequently detected species, isolated in 56.5% of the samples and appearing significantly more often in samples from mothers of preterm infants ($p < 0.0001$). Absence of microbial growth was significantly more frequent in samples from mothers of term infants ($p < 0.0001$). Dualspecies colonization was identified both in samples from preterm and term mothers, with the absence of statistical significance ($p = 0.5$). A strong association was identified between neonatal intensive care unit (NICU) admission and the presence of *S. epidermidis* in donor milk. The bacterium was more commonly recovered from samples provided by mothers of NICU-admitted infants ($p < 0.0001$), whereas sterile cultures were more prevalent among those whose infants did not require NICU care ($p < 0.0001$).

Conclusion: Microbiological composition of human milk presents a diverse range of bacterial species and appears to be influenced by both maternal and infant-related factors.

Increased exposure to hospital-associated microbiota and variations in milk expression practices among mothers may contribute to higher prevalence of certain bacterial species. Targeted education and empowerment of potential human milk donors—particularly in the areas of hygienic expression, proper storage, and safe transportation of breast milk—may enhance both the microbiological quality and overall availability of HDM. Such improvements are essential to ensure the safety and efficacy of donor milk, particularly for vulnerable neonatal recipients.

P20

HUMAN MILK OLIGOSACCHARIDES PROFILE OF BREAST MILK IN JAPAN

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Background: Human milk oligosaccharides (HMOs) are major components of breast milk that play a crucial role in the development of the infant immune system. In particular, 2'-fucosyllactose (2'-FL), disialyllacto-N-tetraose (DSLNT), and 6'-sialyllactose (6'-SL) are considered important for the prevention of necrotizing enterocolitis (NEC). In Japan, donor human milk (DHM) is primarily provided to prevent NEC in very preterm infants, and we believe that HMOs concentration monitoring will become increasingly important for future DHM quality control. The HMOs profile in breast milk is known to vary depending on the mother's secretor status and environmental factors. However, data on HMOs profiles among Japanese mothers remain lacking.

Objective: This study aimed to characterize the HMOs profiles of breast milk in Japan, with a particular focus on secretor status, in order to provide reference data for the future quality control of DHM.

Methods: Between November 2023 and August 2024, breast milk samples were collected from 23 mothers of both preterm and term infants, at 2 to 18 weeks postpartum. Maternal and infant data (maternal age, gestational age, pre-pregnancy BMI, and birth weight) were obtained via questionnaire, with informed consent for research use. Concentrations of 11 HMOs (2'-FL, 3-FL, LNDFH-I, LNFP-I, LDFT, LNT, 6'-SL, 3'-SL, LSTb, LSTc, DSLNT) were analyzed using high-performance anion-exchange chromatography with pulsed amperometric detection (HPAEC-PAD). Secretor status was determined based on 2'-FL concentration; samples with nearly undetectable levels of 2'-FL were classified as non-secretors. This study was approved by the Showa Medical University Ethics Committee.

Results: The ratio of secretors to non-secretors was approximately 8:2. Among secretors, the concentrations of HMOs synthesized via FUT2 (2'-FL, LNFP-I, LNDFH-I, LDFT) were significantly higher than those in the non-secretor. Conversely, LNT concentrations were significantly higher in the non-secretor group. There were few significant associations between HMO concentrations and maternal characteristics.

Conclusions: The observed differences in HMOs concentrations between secretor and non-secretor groups were generally consistent with previous findings from other regions. Additionally, few significant associations were found between maternal characteristics and HMOs composition.

These findings suggest that classifying DHM based on 2'-FL concentration may be useful for DHM quality control. Further studies with larger sample sizes are needed to confirm these results.

P21

CAN HUMAN MILK BE USED FOR NON-INVASIVE LEWIS PHENOTYPING? A STEP-BY-STEP ELISA PROTOCOL**M. Konieczna¹, G. Oledzka¹, A. Koryszewska-Baginska¹**¹Department of Medical Biology, Medical University of Warsaw

Introduction: Lewis antigens (Lea and Leb) are fucosylated glycans synthesized by the enzymatic activity of α 1,3/4-fucosyltransferase (FUT3) and α 1,2-fucosyltransferase (FUT2). These antigens determine Lewis and Secretor phenotypes, which in turn influence the composition of human milk oligosaccharides (HMOs). Given their role in modulating the infant microbiome, immune function, and protection against pathogens, accurate profiling of Lewis antigens in human milk is of growing interest. Current phenotyping methods rely on blood or saliva analysis using serological or molecular techniques. However, direct detection in milk remains challenging due to its complex composition, high lipid content, and the absence of standardized assays.

Objective: The study aimed to develop and optimize an enzyme-linked immunosorbent assay (ELISA) protocol for direct detection of Lea and Leb antigens directly in human milk. We focused on identifying assay conditions that maximize sensitivity and specificity while minimizing matrix-related background interference.

Methods: We developed an indirect ELISA protocol using murine monoclonal IgM anti-Lea and anti-Leb antibodies, followed by HRPconjugated goat anti-mouse IgG (H+L) detection. Multiple assay parameters were systematically optimized, including: Blocking agents (1% BSA, 1% casein, 5% non-fat dry milk in PBS), plate selection (e.g., Thermo Scientific™ MaxiSorp™ high-binding plates), wash buffers (PBS vs. PBS-Tween 0.05%), antibody dilutions in PBS and PBS-Tween, and milk sample pre-treatment (centrifugation to remove fat, serial dilution). Validation was performed using positive controls from blood-based agglutination tube tests performed on capillary blood from matched donors.

Results: Preliminary optimization revealed key differences in assay performance depending on the blocking buffer, antibody dilution, and sample preparation. Dilutions of milk samples showed that 1:1 and 1:10 yielded comparable signal strength, with noticeable signal reduction beginning at 1:1000. Blocking buffer composition also influenced background and signal clarity: non-fat dried milk and casein produced slightly different results compared to BSA, particularly in detecting the Lea antigen. In some samples, casein and BSA appeared to reveal weak positive signals where non-fat dried milk did not, suggesting potential borderline expression of Lea. For the Leb antigen, signal profiles remained consistent across all tested blocking conditions.

Conclusion: This study establishes a reliable and reproducible ELISA-based method for detecting Lewis antigens in human milk. Beyond its nutritional applications, this non-invasive approach enables direct assessment of maternal phenotypic traits directly from milk samples.

The optimized protocol presented here provides new opportunities to study how milk oligosaccharides contribute to gut microbiome development, immune system modulation, and overall health.

Funding: This project was supported by the Young Researcher Grant no. NZ1/2/Z/MB/N/23 from the Medical University of Warsaw..

P22

VALIDATION OF DONOR HUMAN MILK PRESERVATION TIME IN DOMESTIC FREEZERS DURING POWER OUTAGES**R. Palau¹, V. Pleguezuelos¹, E. Alonso¹, M. Coderch¹, S. Marquez¹**¹*Banc de Sang i Teixits (Barcelona)***Background**

In April 2025, a nationwide power outage in south of Europe raised concerns about the preservation of donor human milk (DHM) stored in domestic freezers. Since most donors store milk in household freezers, it is essential to determine the maximum duration these appliances can maintain DHM at safe temperatures ($< -18^{\circ}\text{C}$), according to the EDQM Guide (5th Edition, 2022). This study aimed to evaluate how long donor milk can remain safely frozen in different freezer load conditions during a power cut.

Methods

Three different conditions were conducted using a typical household refrigerator-freezer combination unit. The freezing unit used was a low-end household refrigerator-freezer combination with limited insulation and basic electronic control. Temperature data were recorded continuously using a probe inserted into a milk bottle containing 100 mL of DHM, which was placed in: an empty freezer with a single milk bottle (the one containing the probe) a half-loaded freezer containing different DHM volumes (20–150#mL) a fully loaded freezer containing different DHM volumes (20–150#mL). The experiment under each condition begins once stability is reached at a temperature below -25°C , by manually switching off the power, and ends when the probe detects temperatures below -18°C . The freezer remained closed throughout the entire experiment. The duration from power failure to when milk temperature rose above -18°C was calculated in each scenario. Room temperature remained constant at 19°C with air circulation. Results In the empty freezer, the temperature rose above -18°C after 2 hours and 40 minutes. In the half-loaded freezer, the safe temperature was maintained for 4 hours and 50 minutes, while in the fully loaded freezer, the temperature remained below -18°C for 7 hours. In all scenarios, milk was considered unsafe when the probe registered a temperature above -18°C . The cooling inertia increased with the quantity of frozen product, delaying temperature rise.

Conclusions

The study demonstrates that freezer load significantly influences the preservation of DHM during power outages. A fully loaded freezer offers nearly three times the preservation time compared to an empty one. For milk stored in domestic conditions, if a power cut exceeds the following durations, the milk should be discarded (Empty freezer: $>2\text{ h }45\text{ min}$; Half-full freezer: $>4\text{ h }50\text{ min}$; Full freezer: $>7\text{ h}$). These data provide guidance on the preservation time of DHM in household freezers during incidents in which appropriate storage conditions are not maintained, and reinforce the importance of advising donors to keep their freezers as full as possible. The findings validate current collection practices as acceptable, provided that the established time and temperature limits are not exceeded.

P23

WOMEN'S KNOWLEDGE AND ATTITUDES ON DONOR HUMAN MILK AND MILK DONATION: A NATIONAL CROSS-SECTIONAL SURVEY IN CROATIA

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Background: Donor human milk is recommended as the first alternative when mothers' milk is not available. In Croatia, one human milk bank has been established. To promote human milk donation, it is important to know women's awareness of donor human milk and milk donation, however this has not been explored in our population.

Aim: The aim of the study was to explore women's knowledge and attitudes on donor human milk use and milk donation.

Methods: A national, cross-sectional, online survey was conducted in Croatia from February to March 2023. Women with child below 1 year of age and pregnant women were recruited online via social media. An online questionnaire was used to obtain sociodemographic data and to determine participant's knowledge and attitudes. Women attitudes were explored using a 5-point Likert-type response scale with 21 items. Data analysis was performed using descriptive statistics.

Results: A total of 1034 women participated in the survey of whom 8.2% (n=85) were pregnant women. 73.4% (n=759) of participants had heard about human milk bank before the survey and 15.7% (n=162) reported having sufficient information about milk donation, 21% (n=217) had some information and 63.3% (n=655) had little or no information. 6.8% (n=70) of participants were milk donors, while 72.8% (n=753) stated that they were willing to donate their milk if they had more than their child needed. The knowledge about milk donation requirements was good, but only 29% of participants correctly answered the question that donor human milk should be pasteurized.

The majority of women had positive attitudes on donor human milk use and milk donation. 70% (n=724) of participants agreed with the statement "I would always choose donated human milk from a milk bank over formula for my newborn if I could not breastfeed". However, more than 1/3 of participants agreed or had neutral responses to the statements "My family would not support my decision to donate milk", "If I donated milk, I would worry about whether there would be enough for my child" and "I have no confidence in the health, habits and hygiene of milk donors".

Conclusion: Findings indicate a certain lack of knowledge about human milk donation. Some attitudes suggest uncertainty regarding donor human milk use and milk donation, which may limit the process of milk donation by a potential donor or the use of donor milk. It is important to enhance public awareness about human milk banks and improve women's information about donor human milk.

P24

BARRIERS AND FACILITATORS TO BREASTMILK DONATION IN QUÉBEC, CANADA: A QUANTITATIVE AND QUALITATIVE SURVEY**A. Tessier¹, C. St-Pierre¹, S. Rochette¹, D. Fournier¹, I. Martin², M. Rivard², G. Myhal¹**¹Héma-Québec²L'Observateur

Background: Donor milk is essential to reducing the risk of necrotizing enterocolitis in preterm babies. Yet the supply of this precious resource is far from guaranteed as it hinges on the generosity of breastmilk donors, who may face barriers in their donation journey.

Therefore, our milk bank aimed to better understand the barriers and facilitators to breastmilk donation.

Methods: This study comprised two parts: (1) an online quantitative survey sent out by email to 1518 mothers who registered to the donor milk program between June 28, 2023 and July 9, 2023, and (2) qualitative interviews conducted among 30 Part 1 respondents who agreed to be contacted by phone. These 30 donors were selected to reflect a variety of donor views and experiences and were classified into five groups.

Results: In Part 1, 358 (23.6%) mothers responded to the survey. The respondents became aware of the donor milk program mostly through publications on social media platforms (n=132 [36.9%]), their relatives (n=48 [13.4%]), or prenatal visits (n=37 [10.3%]). Their primary motivation was empathy towards preterm babies (n=132 [36.9%]) or their mothers (n=71 [19.8%]). Overall, 36 (10.0%) found the donor selection process too rigid, to the point that it deterred them from donating more. Among the 278 eligible mothers, the main barriers to donating more included the donation preparation process (97 [35.0%]), finding the right time to express milk (103 [37.0%]), and delays between the time of registration and the first donation (93 [33.5%]). In Part 2, Group 1 interviewees (N=5) reported that post-registration delays prevented them from donating in the first month after birth, during which their milk production was particularly abundant. Group 2 interviewees (N=7) reported difficulties integrating breastmilk donation in their routine, especially due to the burden of sterilizing breast pumps. Group 3 interviewees (N=6) were little or not inclined to continue donating after their first donation, often because their production had decreased or because their baby routine was no longer compatible with donation. Group 4 interviewees (N=6) found the donation process smooth and intuitive, in large part because they were able to integrate milk donation in their daily routine. Group 5 interviewees (N=6) used the "Haaka" breast pump, and all found the donation and sterilization processes very convenient.

Conclusion: The donation of breastmilk could be further encouraged by better informing donors and recruiting them earlier, by minimizing delays between donor registration and the first donation, and helping mothers integrate breastmilk donation in their daily routine.

P25

HUMAN MILK BANK EXPERIENCE IN THE HOSPITAL OF LITHUANIAN UNIVERSITY OF HEALTH SCIENCES KAUNAS CLINICS DURING 2016-2025**V. Ivanauskiene^{1,2}, V. Liukaitiene¹, R. Tameliene¹, R. Vazgiene^{1,2}, S. Siudikiene^{1,2}, I. Aldauskiene¹, N. Skorobogatova¹**¹Department of Neonatology, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania²Donor Human Milk Bank, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania**Introduction**

Human milk (breastmilk) is the normal, optimal and most desirable food for human infants [1]. EMBA together with HMBANA and their member milk banks are committed to improving the health of populations through promoting breastfeeding and human milk as the first food for all babies [2]. Donated milk is used primarily for preterm infants during their first days, until mother's own milk production has started. Human donor milk could be life enhancing and often life saving for low birth weight and premature babies or infants recovering from serious gut complications and surgery [3].

Results and conclusions

The first human milk bank in Lithuania was established on December 1, 2016, at the Lithuanian University of Health Sciences, Kaunas Clinics. The primary objective of the human milk bank is to collect, process, and distribute donor human milk to meet the nutritional needs of vulnerable and preterm neonates. To ensure optimal quality and safety, the milk bank adheres to established international guidelines, including those from the National Institute for Health and Care Excellence (NICE) [4] and Swedish protocols on human milk processing and handling [5]. Between 2016 and 2025, a total of 428 women donated human milk. Of the total donor milk collected, 83% originated from mothers of preterm infants. The number of active human milk donors remained relatively stable throughout the study period. The volume of pasteurised breast milk throughout the years was varying between 485 and 789 litres. The use of donor human milk in neonatal care has steadily increased over the past years, reflecting evolving clinical guidelines and practices.

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P25 bis

BARRIERS AND FACILITATORS TO BREASTMILK DONATION IN QUÉBEC, CANADA: A QUANTITATIVE AND QUALITATIVE SURVEY**K. Lubiech¹, M. Twaruzek¹, E. Sinkiewicz-Darol^{1,2}, D. Martysiak-Zurowska³, B. Kusznierevicz³**¹Milk Bank, Ludwik Rydygier' Provincial Polyclinical Hospital in Torun, Torun, Poland²Human Milk Bank, Ludwik Rydygier' Provincial Polyclinical Hospital in Torun, Torun, Poland³Dep. of Chemistry, Technology and Biotechnology of Food, Chemical Faculty, Gdansk University of Technology, Gdansk, Poland

Breast milk is the optimal food for children in the early stages of life which is characterized by nutritional properties adapted to the needs of the developing organism. It provides basic nutrients and factors with biological activity that support the child's health in many ways. These factors include the breast milk microbiota, prebiotic factors, which include breast milk oligosaccharides and many other components.

Among the bacteria inhabiting the environment of breast milk, strains with potential probiotic effects can be identified. These include, among others: bacteria from the Lactobacilaceae family, the presence of which in mother's milk depends on many variable factors. These include maternal, perinatal and environmental factors. The microbiological composition also changes qualitatively and quantitatively.

The aim of the study was to determine the frequency of occurrence of microorganisms belonging to the Lactobacilaceae family and to examine the content of oligosaccharides in the breast milk of Polish breastfeeding women. The study included 63 samples of breast milk from breastfeeding women at various stages of lactation who expressed their willingness to participate in the study, confirmed by written consent. All participants of the study were informed about the scope and course of the scientific research, which was approved by the Bioethics Committee.

The methodology of the conducted study included microbiological analyses, performed based on culture methods with subsequent identification of microorganisms using MALDI-TOF/MS mass spectrometry. The studies focused on the content of oligosaccharides in breast milk, were conducted using ultra-high-performance liquid chromatography (UHPLC) combined with high-resolution mass spectrometry (HRMS).

The obtained results confirmed the presence of bacteria belonging to the Lactobacilaceae family in 22.2% of the analyzed samples of breast milk. A statistically insignificant relationship was observed between the occurrence of Lactobacilaceae bacteria and the content of HMOs in human milk. Human milk is a rich source of oligosaccharides with prebiotic activity, and can also be a source of microorganisms with a potential probiotic character.

P26

INFLUENCE OF LACTATION STAGE ON CONTENT OF NEUROTROPHIC FACTORS, LEPTIN, AND INSULIN IN HUMAN MILK

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Background

Human milk (HM) contains components that support a child's growth and development, including bioactive substances that influence nutritional programming.

Objectives

This study aimed to analyze the levels of nerve growth factor (NGF), ciliary neurotrophic factor (CNTF), neurotrophin-3 (NT-3), leptin, insulin, and macronutrient content in human milk samples from breastfeeding women during early and long-term lactation.

Materials & Methods

HM samples were collected from healthy women in two groups: early lactation (EL, 1–3 months) and long-term lactation (LTL, >6 to 12 months). Concentrations of leptin, insulin, NGF, NT-3, and CNTF were measured using ELISA kits, while macronutrients were analyzed with a MIRIS HMA human milk analyzer.

Results

Leptin levels were higher in the early lactation group, while NGF and insulin levels did not differ significantly between the groups. A significant difference in carbohydrate levels was found, with the LTL group showing a strong correlation between leptin, insulin, fat content, and energy value. Higher insulin levels were linked to lower protein content, while NGF levels were associated with increased carbohydrate content and energy value in the EL group. NT-3 and CNTF were not detected in any of the analyzed samples.

Conclusions

HM beyond six months of lactation remains a source of bioactive components important for nutritional programming. Among macronutrients, variability was primarily observed in carbohydrate content and energy value, reflecting the child's increased energy requirements during the second half of the first year of life.

This research was funded by National Science Centre, Poland, within MINIATURA 6 project grant number 2022/06/X/NZ9/01595.

P26 bis

THE REGIONAL LAKE HOUSE OF ILE DE FRANCE AND THE CENTRAL FEEDING CENTER OF THE NECKER HOSPITAL RECYCLE FOR EVERYONE'S HEALTH

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The reduction of plastic waste from the baby milk industry and the lake house will have a strong ecological, economic, and social impact by reducing their carbon footprint, leverage 27 of the "30 levers for action" of the APHP. Implementing specific environmental protection measures at service level can (i) give staff members inter-professional cohesion and contribute to the retention of professionals. ii) participate in the sustainable economy

About 5 tons of single-use plastic are thrown away per year after being used for i) collection, the qualification, the distribution of women's milk to the regional Lactarium of IDF ii) the preparation of diets by the central Necker feeding plant for sick children iii) meet the obligations of environmental cleaning. Our two units are the largest structures in their field within the APHP (12000 liters of women's milk covered and 291 400 syringes and bottles prepared annually).

The steps of such a recycling process were: 1) identification of types of recyclable plastics (polypropylene (UU baby bottles, UU nipples) and polyethylene (caps, mostly artificial milk bottle, hygiene products container) and the volume produced 3) search for a presiter to valorize 2) proposal for a detailed protocol in compliance with the requirements of the EPRI

3) active communication on the subject to raise awareness among the other units of the Necker Hospital for Sick Children.

In total, we have reduced our environmental footprint by 5.6 tonnes of CO2 equivalent in 12 months by recycling 1.7 tonnes of PE and 2.8 tonnes of PP. Our project also allows for the revaluation of the pallets and delivery boxes of these DMDI and is being extended to other devices (zipped bag, personal protective equipment. The implementation of DMDI recycling in baby houses and at the Lactarium participates in the sustainable economy, engages the teams in a unifying project, allowing a valorization of DMDI to improve the environment of children in hospitals, protect the planet and preserve the future of our children.

P27

THE IMPACT OF THYROID DISORDERS ON THE HORMONAL PROFILE OF HUMAN MILK IN A POPULATION OF EXCLUSIVELY BREASTFEEDING WOMEN**E. Sinkiewicz-Darol^{1,2}, K. Lubiech¹, I. Adamczyk¹, E. Zastempowska¹, M. Tomczak¹, K. Szalkowski¹, I. Drazkowska³, M. Twaruzek¹**¹Kazimierz Wielki University, Faculty of Biological Sciences, Department of Physiology and Toxicology; J.K. Chodkiewiczza 30 St., 85-064 Bydgoszcz, Poland²Ludwik Rydygier' Provincial Polyclinical Hospital in Torun, Human Milk Bank; St. Jozef 53 59 St., 87 100 Torun, Poland³University Clinical Centre, Medical University of Gdansk, Division of Neonatology, Debinki 7, 80-952 Gdansk, Poland**Background**

Hormones present in human milk, including thyroxine (fT4), triiodothyronine (fT3), and thyroid-stimulating hormone (TSH), can influence the child's physiology, supporting developmental processes. The aim of this study was to evaluate macronutrient content and thyroid hormone concentrations (TSH, fT3, fT4) in the breast milk of lactating women in Poland, with consideration given to the impact of maternal thyroid status and pasteurization on their levels.

Materials and Methods

This study included 81 women between 3 and 5 weeks postpartum, comprising 39 healthy participants and 32 diagnosed with hypothyroidism. Concentrations of fT4, fT3, and TSH were determined using ELISA kits, while macronutrient composition was analyzed using a MIRIS HMA human milk analyzer.

Results

Analysis of macronutrient content in milk samples revealed no statistically significant differences between the control and study groups. In the hypothyroid group, a slight 2% increase in milk fat and energy content and a 4.5% decrease in total protein content were observed; however, these differences were not statistically significant. The only significant relationship identified was a strong positive correlation between fT4 levels in milk and carbohydrate content ($p = 0.003$). Thyroid hormone concentrations did not differ significantly between groups, although TSH levels approached statistical significance ($p = 0.078$). No significant differences were observed based on maternal BMI. A strong, statistically significant negative correlation was found between infant birth weight and fT3 levels in maternal milk ($p = 0.004$). Women who delivered vaginally had higher milk fat, carbohydrate, and energy content compared to those who delivered via cesarean section; these differences were statistically significant ($r = 0.31-0.34$). Pasteurization using the holder method significantly reduced TSH and fT3 levels by 42.8% and 42.39%, respectively. A difference in fT3 levels according to delivery mode approached statistical significance ($p = 0.093$), suggesting potential variation in thyroid axis function dependent on delivery type.

Conclusions

While maternal hypothyroidism did not significantly alter breast milk macronutrient or hormone content, notable correlations emerged between milk thyroid hormones and infant or milk characteristics. Mode of delivery and pasteurization significantly influenced specific components, highlighting the importance of these factors in milk composition and potential infant outcomes.

This research was funded by the Polish Minister of Education and Science under the program "Regional Initiative of Excellence" from 2024 to 2027, grant number RID/SP/0048/2024/01.

P27 bis

STRUCTURAL CHANGES OF HUMAN MILK DURING SIMULATED INFANT GASTRIC DIGESTION: IMPACT ON NUTRIENT BIOACCESSIBILITY AND IMPLICATIONS FOR INFANT FORMULA DESIGN**I.E. Kłosowska-Chomiczewska¹, G. Burakowska¹, P. Zmuda-Trzebiatowska¹, A. Kopańska¹, N. Szczygiel¹, E. Sinkiewicz Daro^{2,3}, K. Lubiech², A. Macierzanka¹**¹Dep of Biotechnology and Microbiology, Faculty of Chemistry, Gdansk University of Technology, Gdansk, Poland;²Faculty of Biological Sciences, Kazimierz Wielki University, Bydgoszcz, Poland; ³ Human Milk Bank, Ludwik Rydygier Provincial Polyclinical Hospital, Torun, Poland

Human milk (HM) undergoes complex structural transformations during infant gastric digestion, influencing the bioaccessibility of key nutrients. These transformations can be mimicked using in vitro digestion models. The models provide a controlled, reproducible alternative to in vivo studies for investigating food and nutrients behaviour under gastrointestinal conditions. They reduce the need for animal or human testing, addressing ethical concerns and regulatory requirements. Additionally, they are cost-effective and allow for highthroughput screening, making them very useful for early-stage nutritional research and product development. Our research group has conducted a series of extensive in vitro digestion studies to investigate how HM composition—shaped by gestational age and stage of lactation—affects the physico-chemical behaviour of milk during gastric digestion. In particular, we compared colostrum and mature HM samples against cow's milk to evaluate differences in structural response and nutrient release.

Due to the limited volumes of HM available for testing—particularly colostrum—we developed a miniaturized in vitro gastric digestion setup. Simulated gastric conditions, representative of the infant digestion conditions, were applied, including progressive acidification and enzyme addition. Stomach emptying was imitated by sampling/reducing gastric contents at regular intervals. The model was coupled to multiple light scattering and laser diffraction techniques to track changes in the colloidal structure and phase separation throughout digestion.

Our findings show that digestion kinetics and nutrient bioaccessibility are closely related to the colloidal behaviour of HM. Acid/enzyme-induced flocculation of fat droplets and protein coagulation led to the formation of distinct phases—either fat creaming or protein sedimentation—governing the gastric release dynamics of macronutrients. Phase separation strongly influenced which components were emptied first from the simulated stomach and at what rate. Notably, colostrum displayed distinct digestion dynamics compared to mature HM and cow's milk, highlighting the adaptive role of early milk in neonatal nutrition. Despite the small sample volumes and complexity of simulating gastrointestinal conditions, the model allowed for simulating the fate of HM during the early digestion stages. The gathered insights are essential for understanding the behaviour of HM in the gut under physiological conditions, and for guiding the development of effective/tailored infant formulas (IFs). Our results emphasize the need for nutritional strategies that go beyond matching the chemical composition of HM in developing IFs. Future formulations should also aim to mimic the colloidal structure of HM and its digestive behaviour to more accurately support neonatal development when breastfeeding is not possible.

This research was funded by the National Science Centre, Poland, under the OPUS LAP project "Digestion of human milk with regard to premature infants" (MilkDigest), grant no. 2022/47/1/NZ9/02749

Keywords: human milk, infant digestion, in vitro model, colloidal structure, nutrient bioaccessibility

P28

POLICIES AND GUIDELINES SUPPORTING THE SUSTAINABILITY OF HUMAN MILK DONATION TO MILK BANKS IN SWITZERLAND: A SYSTEMATIC REVIEW

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Background:

Donor human milk from human milk banks (HMBs) is recommended for vulnerable infants when a mother's own milk is lacking. Despite the global increase in HMBs, demand for donor milk continues to exceed supply, leading to inequitable and inadequate access. This systematic literature review aimed to explore how global, European, and national policies and guidelines promote the sustainability of human milk donation, focusing on the Swiss context as an example.

Methods:

A systematic search of Medline (via PubMed) and CINAHL was conducted in June 2024. Eight documents were included in this document analysis: three guidelines, two position papers or consensus statements, two toolkits, and one document containing policy recommendations. The analysis followed a multi-level framework encompassing the micro (individual), meso (institutional), and macro (healthcare system and policy) levels.

Results:

International and European documents provide broad recommendations that allow for flexible, context-specific adaptations. International policies contain explicit recommendations supporting sustainability primarily at the macro and meso levels, while European documents address sustainability factors across all three levels. Swiss national guidelines mainly target the meso level, offering contextspecific guidance. When examined through the lens of the three pillars of sustainability—social, economic, and environmental— most recommendations emphasized social aspects. Economic considerations were moderately addressed, whereas the environmental dimensions (e.g., milk wastage, contamination, single-use plastics, and broader ecological impacts) were mostly absent.

Conclusions:

Current guidelines at international, European, and national levels address human milk donation sustainability inconsistently. Some documents provide detailed, multi-level (macro, meso, micro) recommendations, while others only refer implicitly to considerations related to sustainability. Future policies and research should focus on creating a more coherent and integrated framework. This framework should align efforts at the policy, organisational, and behavioural levels to support the long-term sustainability of human milk donation.

P29

IMPACT OF RECONSTITUTION METHODS ON THE COMPOSITION OF FREEZE-DRIED HUMAN MILK**M. Okubo^{2,1}, M. Tanaka¹, K. Mizuno^{1,3}**¹The Nippon Foundation Human Milk Bank, Japan²Grad. Sch. of Humanities and Sci., Ochanomizu Univ., Japan³Dep. of Pediatr., Sch. of Med., Showa Med. Univ., Japan**Background:**

Freeze-drying of human milk has gained attention for its potential to extend shelf life and improve storage efficiency. While previous studies have focused on shelf-type freeze-dryers, there is limited data on the use of flask-type freeze-dryers for human milk. Moreover, reconstitution methods following freeze-drying are not standardized. This study aims to evaluate the effects of different reconstitution methods on the composition of human milk freeze-dried using a flask-type device.

Methods:

Forty samples of donor human milk provided by a human milk bank were used. Each sample was aliquoted, frozen at -30°C after an initial 10-minute cold bath, and then freeze-dried for at least 18 hours using a flask-type freeze-dryer (EYELA FDU-1200,#####,Saitama, Japan). Reconstitution was performed under six different conditions, combining three water temperatures (20°C, 37°C, 50°C) and two mixing orders (adding powder first vs. adding water first). Water activity, weight, concentrations of lipid, protein, carbohydrate, lactoferrin, calcium, inorganic phosphate, and zinc were measured before and after drying.

Results:

Water activity after freeze-drying was ≤ 0.2 Aw for all samples, indicating sufficient dehydration. Significant reductions were observed in lipid, protein, and carbohydrate contents ($p < 0.05$), with lipid showing the greatest decrease at 14.2%. A positive correlation was found between initial lipid content and the rate of lipid loss ($r < 0.05$). Changes in reconstitution temperature and order of mixing did not significantly improve lipid retention.

Conclusion:

Flask-type freeze-drying is effective for dehydrating human milk, but significant compositional losses, particularly in lipids, remain a challenge. The tested reconstitution methods did not mitigate lipid reduction. Further investigation is needed, including the application of sonication, which has been shown to be effective in reducing lipid loss in shelf-type dryers.

P30

TIME ACCESSING TO DONOR MILK IN PRETERM INFANTS: A 6-YEAR EXPERIENCE OF A TERTIARY NICU WITH A PRE-POSITIONED BASE AFFILIATED WITH TAIWAN SOUTHERN HUMAN MILK BANK

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Background: Human milk is the optimal source of nutrition for preterm infants, providing immunological, developmental, and gastrointestinal benefits. Early feeding with human milk may accelerate the gut maturation. However, mothers of premature infants may not always be able to provide breast milk immediately after birth which leading to delay of enteral feeding. The establishment of prepositioned donor human milk (DHM) base might improve access to early human milk feeding. In 2018, the Taiwan Southern Human Milk Bank (TWSHMB) was launched at National Cheng Kung University Hospital (NCKUH), providing on-site availability of DHM to support feeding strategies for high-risk neonates. This study aimed to analyze the time access to DHM of preterm infants admitted in a tertiary NICU equipped with a pre-positioned donor human milk (DHM) base and a smart electronic recording system affiliated with TWSHMB.

Methods: This study retrieved medical records of feeding practices from 2018 to 2024 in preterm infants with birth weight <1500g, categorized into four gestational age groups: periviable (PI, GA 22–25 weeks), extremely preterm (EPI, GA 26–27 weeks), very preterm (VPI, GA 28–31 weeks), and moderate to late preterm (MLPI, GA 32–36 weeks). We evaluated the timing of physician-prescribed feeding initiation, the age of first access to DHM, and the time gap between prescription and actual usage.

Results: The mean age at which physicians initiated feeding orders was similar across all groups, indicating consistent feeding strategies. The interval between physician order and first DHM administration was remarkably short, reflecting real-time access: PI 1.9 ± 11.8 days (n=94), EPI 0.6 ± 2.6 days (n=66), VPI 0.2 ± 0.8 days (n=235), and MLPI 0.4 ± 1.6 days (n=92). The age of first DHM access was: PI 4.4 ± 12.6 days, EPI 3.5 ± 4.2 days, VPI 2.4 ± 3.0 days, and MLPI 2.2 ± 6.2 days. While variability existed—particularly in the PI group due to clinical instability or hesitation regarding DHM use—most infants received donor milk within the first few days of life.

Conclusion: The implementation of a NICU-based donor milk bank enables timely initiation of human milk feeding across all gestational age groups. The minimal delay between physician prescription and DHM administration demonstrates the operational efficiency and clinical integration of the milk bank. This model enhances the quality of nutritional care for preterm infants, particularly in the critical early postnatal period.

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DECENTRALIZED DONOR HUMAN MILK ALLOCATION TO REDUCE INEQUALITIES AND PROMOTE SUSTAINABLE NEONATAL FEEDING**P. Jao¹, Y. Lin^{1,2,4}, L. Kang³, Y. Chen^{1,2,4}**¹Taiwan Southern Human Milk Bank, Dep. of Pediatrics, National Cheng Kung University Hospital, College of Medicine, National Cheng-Kung University, Taiwan²Dep. of Pediatrics, National Cheng Kung University Hospital, Taiwan³Dep. of Obstetrics and Gynecology, National Cheng Kung University Hospital, Taiwan⁴Dep. of Pediatrics, College of Medicine, National Cheng Kung University, Taiwan

Background: Donor human milk (DHM) serves as the optimal alternative to mother's own milk, particularly for vulnerable neonates. However, significant disparities in DHM access persist globally, often linked to geographical location and healthcare infrastructure. In Taiwan, these inequities have historically delayed crucial DHM feeding for preterm infants and other high-risk populations. Addressing this challenge, and aligning with the United Nations Sustainable Development Goals (SDG 3: Good Health and Well-Being, SDG 10: Reduced Inequalities, SDG 12: Responsible Consumption and Production), the Taiwan Southern Human Milk Bank (TWSHMB) established a Pre-Positioned Donor Milk Program in 2019. This initiative aimed to decentralize DHM distribution, enhance accessibility, and promote health equity. The program involves pre-allocating pasteurized DHM to participating hospitals across central, southern, and eastern Taiwan, enabling timely access independent of immediate clinical demand. By 2024, the program encompassed 15 hospitals, including diverse facility types (medical centers, regional hospitals, district hospitals), all operating under standardized protocols for temperature monitoring, cold chain management, and allocation (one bottle per infant). This study aimed to evaluate the utilization patterns of DHM distributed through this innovative program. **Methods:** We conducted a retrospective analysis of DHM recipients served through the Pre-Positioned Donor Milk Program between October 2023 and September 2024. Data collected included the source hospital, gestational age (GA) at birth, primary reason for DHM utilization, and the total volume of DHM consumed. This analysis focused on characterizing recipient demographics and DHM consumption patterns across different GA groups. **Results:** During the study period, the Pre-Positioned Donor Milk Program successfully delivered 1,142,562 mL of DHM to 812 infants across the 15 participating hospitals. This volume represents approximately 50% of the total DHM annually processed by the TWSHMB, demonstrating the program's significant contribution to DHM distribution. While 76% of recipients were full-term infants (GA $\geq$ 37 weeks), the program effectively prioritized preterm infants, who consumed 72% of the total distributed volume. Stratification by GA revealed the following distribution: 618 (76%) term infants, 90 (11%) late preterm infants (34–36 weeks), 31 (3.8%) moderate preterm infants (32–33 weeks), 52 (6.4%) very preterm infants, and 32 (3.8%) extremely preterm infants. Analysis of average personal utilization volume by GA group highlighted the critical role of DHM for preterm infants: 715 mL for term infants, 1503 mL for late preterm infants, 3701 mL for moderate preterm infants, 3230 mL for very preterm infants, and 4428 mL for extremely preterm infants.

Conclusion: The TWSHMB's Pre-Positioned Donor Milk Program provides a robust and scalable model for enhancing neonatal feeding equity and promoting sustainable infant nutrition practices. By decentralizing DHM distribution and ensuring timely access across diverse healthcare settings, the program effectively supports vulnerable populations, particularly preterm infants, who demonstrate the highest utilization volumes. This initiative not only addresses critical disparities in DHM access but also contributes significantly to achieving broader health and development goals, aligning with the principles of sustainable consumption and responsible production within the neonatal care landscape. The success of this program underscores the potential for innovative logistical strategies to improve health equity in resource-limited settings.

P32

IMPACT OF A NICU-AFFILIATED HUMAN MILK BANK ON EARLY FEEDING AND GROWTH OUTCOMES IN PRETERM INFANTS**Y. Chen^{1,2,5}, L. Kang³, W. Hsu⁴, Y. Lin^{1,2,5}**¹Taiwan Southern Human Milk Bank, Dep. of Pediatrics, National Cheng Kung University Hospital, College of Medicine, National Cheng-Kung University, Taiwan²Dep. of Pediatrics, National Cheng Kung University Hospital, Taiwan³Dep. of Obstetrics and Gynecology, National Cheng Kung University Hospital, Taiwan⁴Department of Nutrition, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Taiwan⁵Dep. of Pediatrics, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Taiwan

Background: Human milk is the preferred nutrition for preterm infants, offering numerous benefits including reduced risk of necrotizing enterocolitis. However, biological mothers often face challenges providing adequate milk promptly. Donor human milk (DHM) serves as a crucial alternative, particularly for very low birth weight (VLBW, <1500g) infants. This study investigates the impact of evolving DHM accessibility at National Cheng Kung University Hospital (NCKUH) – transitioning from no support (Epoch I: 2011–2013), to a prepositioned distribution point (Epoch II: 2014–2017), and finally to an independently operated NICU-affiliated milk bank (Taiwan Southern Human Milk Bank, TSHMB, Epoch III: 2018–2024) – on both early feeding initiation and growth trajectories in preterm infants.

Methods: We retrospectively analyzed data for preterm infants admitted to the NCKUH NICU between 2011 and 2024 with birth weight <1500g. Infants who died within one week or had major congenital anomalies were excluded. Subjects were stratified by gestational age: periviable (PI, 22–25 weeks), extremely preterm (EPI, 26–27 weeks), and very preterm (VPI, 28–31 weeks). The primary outcomes assessed were the time to first enteral feeding (days) and anthropometric status at term equivalent age (TEA), specifically the z-score of body weight (TEA zBW) calculated using the Fenton growth chart. Statistical analyses, including ANOVA and multivariable linear regression (SPSS v29), were employed to compare outcomes across the three Epochs and identify associated factors.

Results: A total of 906 infants (PI: n=194; EPI: n=199; VPI: n=513) were analyzed for feeding outcomes, while survived 851 infants (PI: n=152; EPI: n=193; VPI: n=506) were included in the growth analysis. A significant decline in the age of first feeding was observed across Epochs I to III, particularly among infants <32 weeks gestation (PI: 5.6 ± 11.8 to 2.7 ± 1.6 days; EPI: 3.98 to 2.92 days; VPI: 3.11 to 2.27 days). Similarly, improving trends in TEA zBW were noted across the Epochs, especially in the PI (-1.735, -1.929, -1.320, $p=0.022$) and VPI (-0.719, -0.631, -0.352, $p=0.024$) groups. Multivariable analysis confirmed a positive association between Epoch (representing increasing DHM accessibility) and TEA zBW (coefficient 0.216 ± 0.051 , $p = 0.001$), after adjusting for gestational age group, sex, small for gestational age status, and necrotizing enterocolitis.

Conclusion: The establishment and operation of a NICU-affiliated human milk bank significantly improved both the timeliness of early enteral feeding and growth outcomes (measured by TEA zBW) among very low birth weight preterm infants. These findings underscore the clinical value of localized donor milk availability in supporting optimal nutritional strategies for vulnerable neonatal populations.

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IMPACT OF GESTATIONAL DIABETES MELLITUS ON THE COMPOSITION AND ANTIOXIDANT POTENTIAL OF COLOSTRUM**P. Gawel¹, K. Karcz¹, B. Królak-Olejnik¹**¹*Department and Clinic of Neonatology, Wrocław Medical University, Poland*

Introduction: Breastfeeding provides essential nutritional and immunological benefits for both mother and infant and is particularly important for women with gestational diabetes mellitus (GDM). Colostrum, the earliest form of human milk, may play a crucial role in mitigating the effects of GDM through its unique composition. Additionally, human milk exhibits potent antioxidant activity, which is particularly relevant in the context of GDM where both mothers and their infants are exposed to significantly elevated oxidative stress.

Objective: This study aimed to evaluate the antioxidant capacity and basic composition of colostrum in women with GDM compared to healthy controls, with a focus on specific enzymatic antioxidants such as superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx).

Materials and Methods: A total of 77 lactating mothers participated in the study, including 56 diagnosed with GDM. Among them, 15 women managed their condition through diet and exercise (GDM G1), while 41 required insulin therapy (GDM G2). The control group consisted of 21 women with no history of glucose intolerance before or during pregnancy. Colostrum samples were collected between postpartum days 3 and 5 and analyzed for macronutrient content using mid-infrared transmission spectroscopy (MIRIS Human Milk Analyzer, Uppsala, Sweden), and for antioxidant enzyme activity using commercial assay kits. Statistical analysis was performed with a significance level set at $\alpha = 0.05$; p-values below 0.05 were considered statistically significant.

Results: Maternal age was comparable across groups (32.5–34.1 years). Cesarean section was the predominant delivery mode (54.5%). Median gestational age at birth was 39 weeks in the overall population. Gender distribution and mean birth weight (3.3–3.4 kg) were comparable across study groups. Exclusive breastfeeding was observed in 58.4% of cases, while 41.6% of newborns received mixed feeding. The assessment of antioxidant parameters in colostrum demonstrated significant differences in total antioxidant capacity (TAC) among the study groups ($p = 0.001$). The lowest median TAC was observed in the insulin-treated GDM group (3.7 [2.4] nmol/ μ l), while higher values were noted in the diet-controlled GDM group (4.6 [6.8] nmol/ μ l), and the highest in the control group (5.2 [1.4] nmol/ μ l). In contrast, no significant differences were observed for enzymatic antioxidants, including catalase ($p = 0.349$), superoxide dismutase ($p = 0.052$), and glutathione peroxidase activity ($p = 0.213$). Analysis of macronutrient composition revealed significant group differences in energy content ($p = 0.048$) and dry matter levels ($p = 0.015$), with the control group showing the highest values. However, there were no significant differences among the groups in terms of total protein ($p = 0.153$), true protein ($p = 0.141$), fat ($p = 0.673$), or carbohydrate concentrations ($p = 0.650$).

Conclusion: Colostrum from women with gestational diabetes, particularly those requiring insulin therapy, exhibited reduced total antioxidant capacity compared to healthy controls. While no significant differences were observed in enzymatic antioxidant activity, the findings suggest a potential impairment in the non-enzymatic antioxidant defense in this group. Additionally, the lower energy and dry matter content in colostrum from women with GDM may have nutritional implications for the newborn. These results highlight the need for further research into the impact of GDM on colostrum quality and its potential consequences for neonatal health.

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INFLUENCE OF FREEZING AND THAWING CONDITIONS ON MACRONUTRIENT COMPOSITION AND IGA LEVELS IN HUMAN MILK

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Background. In human milk banking, donated human milk (HM) undergoes a series of processing steps, including freezing, storage, thawing and pasteurization, to ensure microbiological safety and extend preservation duration. Mother's own milk is often subjected to similar handling in neonatal care, excluding pasteurization. However, these procedures may affect the nutritional composition and bioactive components of HM.

Aims. To assess the impact of different freezing/storage conditions (-30°C vs -80°C) and thawing methods (4°C overnight, 37°C water bath and defroster) on the macronutrient composition and immunoglobulin A (IgA) content of HM.

Methods. Several HM samples were pooled, half of the pool remained raw and the second half was subjected to Holder pasteurization (62.5°C, 30 minutes). Aliquots of 30 mL of raw and pasteurized HM were frozen at either -30 or -80 degrees. After one week, samples were thawed using different techniques: overnight at 4°C, 15 minutes in a 37°C water bath, or using pulsed air at 15°C for 2 hours in a defroster. For each combination of freezing and thawing conditions, three samples of raw and pasteurized milk were analyzed. Macronutrient content was measured using Miris Human Milk Analyzer, and IgA concentrations were determined by ELISA.

Results. Regarding macronutrients, freezing temperature had some variable effects on raw and pasteurized HM depending on the thawing condition. In contrast, thawing methods seemed to influence macronutrient content more uniformly, particularly in raw HM. For both freezing temperatures, lipid and protein concentrations were lowest after thawing overnight in refrigerator compared to the water bath and defroster. Protein concentrations were highest after water bath thawing for samples frozen at -30°C, and after thawing in defroster for samples frozen at -80°C. Differences in carbohydrates concentrations were smaller and the lowest ones were observed after overnight thawing in refrigerator for samples frozen at -30°C and after water bath for samples frozen at -80°C. In pasteurized HM, less significant differences were observed: only samples frozen at -80°C showed lower concentrations of lipids, proteins and carbohydrates after water bath thawing compared to the other thawing methods. On the contrary, IgA concentrations were more affected by freezing temperature than by thawing methods. Significantly higher IgA levels were found in both raw and pasteurized HM frozen at -30°C across all thawing conditions, compared to those frozen at -80°C. The second IgA quantification replicate confirmed the first results, though with smaller differences. High sample variability suggests these results should be interpreted with caution.

Conclusions Our results suggest that thawing methods influence macronutrient levels in HM, with higher concentrations after thawing in water bath or defroster compared to overnight thawing in refrigerator. In contrast, IgA concentrations appeared more sensitive to freezing temperature, with higher concentrations observed in samples frozen and stored at -30 than at -80 degrees. Further studies are needed to confirm these trends, evaluate their clinical significance and investigate

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MILKING THE DATA: EVALUATING THE EFFICIENCY OF HUMAN MILK EXTRACELLULAR VESICLE ISOLATION TECHNIQUES**K. Tiszbein¹, I. Koss-Mikolajczyk¹, I. Sieminska², R. Szatanek², N. Maciejewska³, I. Drazkowska⁴, M. Baj-Krzyworzecka², D. Martysiak-Zurowska¹**¹Dep. of Chemistry, Technology and Biotechnology of Food, Faculty of Chemistry, Gdansk University of Technology, Gdansk, Poland²Dep. of Clinical Immunology, Faculty of Medicine, Institute of Pediatrics, Jagiellonian University Medical College, Cracow, Poland³Dep. of Pharmaceutical Technology and Biochemistry, Faculty of Chemistry, Gdansk University of Technology, Gdansk, Poland⁴Div. of Neonatology, Medical University of Gdansk, Gdansk, Poland

Human milk-derived extracellular vesicles (HMEVs) are increasingly studied to better understand their biological functions and their potential impact on early childhood development, particularly in immune modulation and gut maturation [1]. However, isolating pure, structurally intact EVs from the complex matrix that is human milk, remains challenging. This study aimed to compare the efficiency of commonly used HMEV isolation techniques: PEG-based precipitation, differential ultracentrifugation (70,000 × g, 100,000 × g, and 100,000 × g repeated three times), and membrane filtration (0.45 µm), to identify methods that optimize yield while preserving vesicle integrity and purity.

Prior to isolation, milk samples underwent a standardized pre-purification step to remove fat, proteins and cells present in HM (includes leukocytes, epithelial cells, stem cells, and bacteria) that could interfere with EV characterization. Isolated vesicles were evaluated in accordance with MISEV2023 guidelines using a multi-method approach [2]. Nanoparticle Tracking Analysis (NTA) was used to assess size distribution and concentration, while flow cytometry and confocal microscopy were applied to evaluate membrane integrity. Additionally, Western blotting was performed to confirm the presence of extracellular vesicles by detecting EV-associated protein markers (CD9, TSG101, HSP70) and the negative control marker Calnexin, in order to verify the purity of EV isolates and the absence of cellular contamination.

Among the tested protocols, PEG-based precipitation yielded the highest particle concentration ($>1 \times 10^{12}$ particles/mL), though some compromise in membrane integrity was observed. Ultracentrifugation methods, especially at 100,000 × g, produced lower particle yields but preserved vesicle morphology and demonstrated strong marker expression. In contrast, filtration generated high particle counts but showed poor selectivity, with irregular vesicle shapes and weak protein marker signals. The findings identify PEG precipitation and ultracentrifugation as the most effective strategies for isolating HMEVs. Moreover, the results underscore the critical role of pre-purification in improving sample quality. These insights support the development of optimized workflows for the reliable isolation of functional milk-derived EVs for nutritional and biomedical applications.

Funding: This work was supported by the National Science Centre (Poland) in a programme OPUS 24 + LAP/Weave (application no. 2022/47/1/NZ9/02749).

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HMO COMPOSITION ACROSS LACTATION STAGES IN POLISH MOTHERS: INSIGHTS FROM HPLC-MS PROFILING**P. Krawczyk¹, D. Martysiak-Zurowska¹**¹Gdansk University of Technology, Faculty of Chemistry, Dep. of Chemistry, Technology and Biotechnology of Food

Human milk oligosaccharides (HMOs) are the third most abundant solid component of human milk after lactose and lipids, playing a crucial role in shaping the infant gut microbiota, supporting immune development, and protecting against pathogens [1]. The composition and concentration of HMOs are known to vary across lactation stages, with colostrum typically containing higher total HMO content than mature milk [2,3]. However, data on HMO profiles in specific populations, such as Polish lactating women, remain limited.

The presented study aimed to characterize and compare the HMO profiles in milk samples collected from healthy donors at two defined stages of lactation: colostrum (up to 5 days postpartum) and mature milk (30 days postpartum). HMO analysis was performed using high-performance liquid chromatography coupled with mass spectrometry (HPLC-MS), a sensitive and selective technique that enables structural differentiation and semi-quantification of individual oligosaccharides without derivatization [4]. The analysis focused on key neutral and acidic HMOs, including 2'-fucosyllactose (2'-FL), 3-fucosyllactose (3-FL), 3'-sialyllactose (3'-SL), and 6'-sialyllactose (6'-SL).

The presented results concerning detailed HMO profiles, including quantitative data of selected oligosaccharides, illustrate inter-individual variability among Polish mothers. The data were compared with HMO profiles of mothers from other populations.

These findings contribute to a better understanding of the lactational dynamics of HMOs in a Central European population and may inform the design of region-specific infant nutrition strategies.

This work was supported by National Science Centre (Poland) in a programme OPUS 24 + LAP/Weave (application no. 2022/47/1/ NZ9/02749).

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ROLE OF PLANNING STRUCTURE IN MILK BANKING

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Background

A planning structure is essential for the efficient organization of services. It enables us to formalize decision-making processes, forecast the necessary human and material resources, anticipate unforeseen events, and monitor the results of action plans, with the goal of ensuring product availability for our partners.

Methods

Héma-Québec is a centralised public milk bank for province of Quebec, Canada, producing and distributing human milk for a population of 9 million people. Our organization has adopted a three-tiered structure comprising strategic, tactical, and operational levels. Each level corresponds to a different time horizon and set of objectives, enabling the organisation's activities to be managed progressively and coherently. Strategic planning establishes the organisation's key objectives for several years (three or five years), identifying longterm opportunities, risks and uncertainties, and their impact on demand forecasts. Tactical planning, with a timeframe of one to three years, translates the strategy into concrete objectives and forecasts. It considers trends and evaluates the risks and opportunities for the upcoming year. Operational planning focuses on the short term (up to one year). It implements the concrete actions arising from tactical plans and manages day-to-day contingencies while identifying immediate risks and opportunities. Each level is based on teamwork and reliable availability of data. In this context, the various committees monitor several performance and quality indicators, including the the natality rate in Québec, the number of donor registrations, qualification rate, time between registration and qualification, quantity of milk supplied per donor, rejection rate, pre- and post-pasteurisation inventories, distribution to hospital centres and compliance deviations among others.

Results

In 2022, Héma-Québec observed a decline in demand for milk bottles. After analysing the data, we found that this drop was correlated with the decline in births in Quebec in 2022 and 2023. Consequently, we were able to adjust our hospital partners' forecasts, reducing the number of monthly donors required from 110 to 85. Without these adjustments, donations would have exceeded demand, resulting in expired stock and storage issues. During 2024, we observed an increase in the average monthly donation volume per donor, which gradually rose from 2.3 litres to 3 litres. This resulted in a reduction in the monthly target from 80 donors to 40. A great deal of effort and collaboration was undertaken at all three levels to achieve this objective, enabling the creation of an agile registration control solution. Graphics representing our various indicators will be presented.

Conclusion

Setting up a planning structure helps to ensure consistency between strategic objectives and operational actions, to analyse trends, to facilitate decision-making and to guarantee that resources are used wisely. By providing a collaborative framework, it strengthens the visibility, coordination and alignment of teams around defined priorities. What's more, the quality of all planning depends on the quality of the data available and the constant need to obtain new data.

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COMPARISON OF THE PASTEURIZATION WITH THE LYOPHILIZATION PROCESS REGARDING THE PRESERVATION OF MACRONUTRIENTS OF HUMAN MILK - A PILOT STUDY FROM A GREEK HUMAN MILK BANK

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Introduction: Human milk (HM) is the optimal source of nutrition for infants, providing essential macronutrients and bioactive compounds. In clinical and milk banking settings, processing method such as pasteurization is employed to ensure microbiological safety. Lyophilization is an alternative process of dehydration based on the sublimation of ice that is contained in a frozen sample of HM turning it into a powder. However, these methods may affect the nutritional quality of milk.

Aim: This study aims to compare the impact of pasteurization process with the lyophilization (freeze-drying) process on the macronutrient content of HM (carbohydrates, proteins, fats).

Materials and Methods: Study Design and Participants. The study involved six healthy Greek mothers who had delivered full-term infants. The mean maternal age was 29.3 years (± 3.88 ; range: 22–33 years). Informed consent was obtained from all participants. Milk Collection and Processing. Mature HM was collected and aliquoted into three portions: F: Fresh, unprocessed; P: Pasteurized using Holder method (62.5°C for 30 minutes); L: Lyophilized using laboratory freeze-dryer. Nutritional Analysis. Each sample was analyzed using mid-infrared spectroscopy (MIRIS® HM Analyzer) to quantify the following parameters: Crude and True protein, Fat, Carbohydrates, Energy (kcal/dL), Total solids. Statistical Analysis. A repeated-measures design was used. Normality was tested using Shapiro–Wilk test. Repeated measures ANOVA was conducted to evaluate differences among three treatments (F, P, L), with Bonferroni correction applied to post hoc comparisons. Analyses were conducted using R (v4.1) and Jamovi (v2.3). Results: Fat content was significantly higher in fresh milk compared to freeze-dried samples ($p = 0.003$). Although fat levels in pasteurized milk were higher than in freeze-dried milk, the difference was not statistically significant ($p = 0.061$). Crude protein levels varied significantly ($p = 0.028$), with freeze-dried milk containing significantly lower amounts than pasteurized milk ($p = 0.038$). Energy content was significantly reduced in freeze-dried milk when compared to fresh ($p = 0.002$) and pasteurized ($p = 0.029$) samples. Total solids were also significantly decreased in freeze-dried samples compared to fresh ($p = 0.002$) and pasteurized milk ($p = 0.027$). Carbohydrate content was significantly lower in freeze-dried milk than in fresh milk ($p = 0.023$), with non-significant difference compared to pasteurized milk ($p = 0.151$).

Discussion: This study demonstrates that lyophilization, although beneficial for storage and logistics, leads to measurable reductions in essential macronutrients in HM. Fat, protein, energy, and total solids were significantly affected. In contrast, pasteurization, while known to affect some bioactive components, preserved macronutrient levels more effectively than freeze-drying. Lyophilization provides ease of storage, but it may compromise nutritional integrity of HM, necessitating further refinement of the technique.

Conclusions: Freeze-drying results in significant reduction of macronutrients in HM compared to fresh and pasteurized states. These findings emphasize the importance of evaluating processing methods not only for microbiological safety but also for nutritional outcomes. Further studies with larger sample sizes and refined freeze-drying protocols are essential to improve retention of HM's nutritional value.

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COMPARATIVE EVALUATION OF THE PHYSICOCHEMICAL PROPERTIES AND DIGESTIBILITY OF DONOR HUMAN MILK TREATED BY HOLDER PASTEURIZATION OR ULTRA-HIGH PRESSURE HOMOGENIZATION (UHPH)

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Background. Donor human milk (DHM) should retain its nutritional and functional value after processing to ensure both safety and quality. Holder pasteurisation (HoP), the conventional thermal method used in human milk banks, may compromise key characteristics such as stability, viscosity, and digestibility. In contrast, ultra-high pressure homogenisation (UHPH) is an emerging technology that may offer potential advantages in preserving these properties. Moreover, previous studies have demonstrated that UHPH provides significant microbiological advantages over HoP, further supporting its potential as an alternative processing method. This study aimed to compare the effects of HoP and UHPH treatments on the physicochemical characteristics and digestibility of DHM.

Methods. Pooled DHM samples were processed either by HoP (62.5 °C, 30 min) or by UHPH at 200 and 250 MPa, using an inlet temperature of 13–20 ± 2 °C and instantaneous valve temperatures of 90 °C and 95 °C, respectively (exposure < 0.5 s). Parameters assessed included pH, colour (L*, a*, b*), viscosity (measured via rheometry), particle size, and physical stability, as determined by the Turbiscan Stability Index (TSI). Digestibility was determined using the standardised INFOGEST in vitro digestion model, which quantified proteolysis and lipolysis as total free amino acids (FAAs) and free fatty acids (FFAs), respectively.

Results. UHPH treatment significantly reduced the particle size and viscosity of DHM samples while increasing lightness, as indicated by higher L* values, compared to HoP. Additionally, UHPH-treated samples—particularly those processed at 250 MPa—maintained a higher pH, exhibited lower aggregation, and demonstrated greater physical stability during storage, with destabilisation occurring after 39 days at 23#°C, in contrast to only one day for HoP-treated samples. Regarding digestibility, UHPH enhanced the release of both free amino acids (FAAs) and free fatty acids (FFAs) during in vitro intestinal digestion, suggesting improved protein and lipid bioavailability.

Conclusion. UHPH improves the physicochemical stability, reduces viscosity, and enhances the digestibility of DHM compared to conventional HoP. By promoting the release of bioavailable nutrients during digestion, UHPH supports improved nutritional preservation and functional quality. These findings highlight its potential as an advanced processing alternative for human milk banks, with the potential to improve nutritional outcomes for vulnerable infants.

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EVALUATION OF THE MACRONUTRIENT COMPOSITION OF INDIAN MOTHERS AND HIGHLIGHTING THE NEED OF FORTIFICATION IN INDIAN MOTHERS**S. Mane¹, S. Taneja¹**¹Dr. D.Y Patil Medical College, Hospital & Research Centre, Pune

This study evaluates the macronutrient and energy composition of human breast milk from mothers delivering preterm and term infants during early lactation (days 1–10), with a focus on Indian mothers. Human milk is recognized as the optimal source of nutrition for neonates, providing essential proteins, fats, carbohydrates, and bioactive components that support growth, immunity, and neurodevelopment— functions that are especially critical for preterm infants. The study highlights that preterm milk differs from term milk, typically having higher protein and lower lactose concentrations in the first month postpartum, which may influence fortification strategies for neonatal nutrition. As many Indian mothers follow vegetarian diets that are often low in protein, this dietary pattern can affect the quality of breast milk. In turn, suboptimal breast milk composition may contribute to increased neonatal morbidity and mortality, particularly in premature, low birth weight, and critically ill infants. Given India's high neonatal mortality rate—largely attributable to prematurity, low birth weight, and infections—understanding the nutritional composition of breast milk is essential to improving infant health outcomes. The study further correlates breast milk macronutrient content with maternal factors (such as age, nutritional status, mode of delivery, and comorbidities) and neonatal parameters (including gestational age, gender, and health status). This comprehensive analysis addresses the current gap in data on temporal changes and inter-individual variability in breast milk composition among Indian mothers. The findings underscore the need for individualized fortification of mothers' milk based on nutritional content, particularly in high-risk neonates.

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SYSTEMIC INNOVATION IN HUMAN MILK BANKING: A DECADE OF TECHNOLOGICAL AND PROCESS OPTIMIZATION IN INDIA

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Over the past twelve years, we have undertaken a structured, research-driven initiative to establish and optimize Human Milk Banks (HMBs) across India. Our approach integrates contextual adaptation, technological innovation, and systemic process enhancement. The key components of our model are outlined below:

1. Geographic Reach and Institutional Collaboration

- o Established 43 Human Milk Banks across varied healthcare settings (public and private sector hospitals) in India.
- o Customization of implementation protocols based on the regional socio-cultural and infrastructural landscape.

2. Technological Innovation

- o Deployment of state-of-the-art pasteurization systems ensuring microbial safety and nutrient preservation.
- o Deploying a proprietary software platform for comprehensive HMB process management, including inventory control, donor-recipient mapping, and compliance reporting.

3. Incremental Process Innovation

- o Applied a Quality by Design (QbD) approach in developing standardized yet adaptable training modules, workflow protocols, standard operating procedures (SOPs), patient education materials and functional layout of Human Milk Banks.
- o Identification and monitoring of critical control points (CCPs) in the milk banking workflow, from collection and storage to pasteurization and distribution.
- o Integration of quality assurance protocols to ensure traceability from donor to recipient and minimize contamination risks.

4. Human Resource Capacity Building

- o Implementation of structured and periodic training programs for HMB personnel to reinforce standard operating procedures, hygiene practices, and emergency response mechanisms.
- o Documentation of increased operational efficiency and reduced process variability through skill reinforcement.

5. Family-Centric Lactation Counselling Model

- o Shift from mother-only to family-inclusive counselling, aimed at improving acceptance and participation in human milk donation and breastfeeding practices.
- o Observed improvements in breastfeeding rates and donor retention linked to structured, repeated engagement of caregivers and extended family.

6. Sustainability and Scalability

- o A hybrid model combining infrastructure, human resource training, software-driven management, and behavioural change communication.

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FIFTEEN YEARS OF THE HUMAN MILK BANK OF MATERNIDADE ALFREDO DA COSTA, LISBON, PORTUGAL

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The Human Milk Bank of Maternidade Alfredo da Costa (HMB-MAC), the first in Portugal, has been in operation since 2009. HMB-MAC is part of the HMB Network of the Portuguese Speaking Countries Community. It is a specialized, non-profit center, that works with Neonatology Units in the Greater Lisbon area. By 2025, HMB-MAC had recruited 700 donors, processed approximately 350 liters/year and provided milk to 240 premature babies/year. HMB-MAC operates with a network of Centers for Donor Recruitment and Milk Collection, close to the population, related to Maternities and General Practice consultations. It provides pasteurized human milk to neonatal units in the Greater Lisbon area. Target fortification, individualized according to measured macronutrient content of human milk, has contributed to better growth and improved body composition (less adiposity) of the very preterm infants. The benefits achieved over 15 years are estimated in earlier achievement of exclusive enteral nutrition, reduction of infections related to central venous lines, avoiding about 30 cases of necrotizing enterocolitis, slightly shorter hospital stays and increased breastfeeding at hospital discharge. HMB-MAC contributed to the education and development of new HMBs, and it is a privileged investigation and innovation centre, focused on newborn's nutrition.

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IMPACT OF MATERNAL CO-MORBIDITIES AND PROCESSING ON DONOR HUMAN MILK COMPOSITION**S. Nangia¹, J. Jalthuria², I. Thapar², K. Schjøberg³**¹Department of Neonatology, Lady Hardinge Medical College & Associated Hospitals, New Delhi, India²National Comprehensive Lactation Management Centre, Lady Hardinge Medical College & Associated Hospitals, New Delhi, India³Department of Global Health, Oslo University Hospital, Oslo, Norway

Background: Human milk is the preferred source of nutrition for neonates, particularly those born extreme preterm. However, its macronutrient composition can be influenced by both maternal health conditions and milk handling practices such as deep freezing & pasteurization. Understanding these influences is critical to ensure optimal nutritional planning in neonatal intensive care settings, especially when donor milk is used.

Method: This study analyzed 600 human milk samples using a mid-infrared milk analyzer to determine fat, carbohydrate, protein, and energy content. Two hundred (200) fresh milk samples were collected from mothers with comorbidities such as gestational diabetes mellitus (GDM), hypertension, anemia, Rh isoimmunization, hypothyroidism, intrahepatic cholestasis, and others. Remaining 400 samples (200 each) were categorized into pooled samples of pre-pasteurized donor human milk (Pre-PDHM), and pasteurized donor human milk (PDHM) to assess the impact of processing. Statistical analysis was performed using ANOVA and t-tests to compare macronutrient content across groups. **Results:** Milk from mothers with comorbidities and from the control group showed broadly similar macronutrient profiles. Rh-isoimmunized mothers had the lowest protein content (1.244 ± 0.477 g/dL) and energy levels (63.60 ± 14.28 kcal/dL), while slightly higher fat and energy values were noted in samples from mothers with intrahepatic cholestasis, however, these differences were not statistically significant. In contrast, deep freezing and pasteurization had a clear and significant impact on macronutrient levels.

Mean Fat levels decreased from 3.391 ± 1.386 g/dL in fresh milk to 2.901 ± 1.206 g/dL in PDHM ($p = 0.00093$), carbohydrates from 7.208 ± 0.797 to 6.115 ± 1.8 g/dL ($p = 1.74 \times 10^{-13}$), protein from 1.464 ± 0.409 to 1.096 ± 0.387 g/dL ($p = 2.50 \times 10^{-##}$), and energy content from 67.554 ± 14.64 to 58.16 ± 12.713 kcal/dL ($p = 2.14 \times 10^{-1#}$). **Conclusion:** Maternal comorbidities had a limited impact on the macronutrient composition of human milk, with only modest, non-significant variation across conditions. However, milk processing, particularly pasteurization, significantly reduced the content of all key macronutrients. These findings highlight the importance of investing efforts to procure Mother's own milk for preterm infant feeding. Additionally, routine nutrient analysis of donor milk intended for preterm or critically ill neonates should be done and individualized fortification strategies should be attempted for optimum results.

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ASSOCIATION BETWEEN PASTEURIZED DONOR HUMAN MILK (PDHM) EXPOSURE AND NEONATAL OUTCOMES IN A COHORT OF EXTREME PRETERM INFANTS**S. Nangia¹, J. Jalthuria², I. Thapar², P. Anand¹, A. John¹, K. Schjøberg³**¹Department of Neonatology, Lady Hardinge Medical College & Associated Hospitals, New Delhi, India²National Comprehensive Lactation Management Centre, Lady Hardinge Medical College & Associated Hospitals, New Delhi, India³Department of Global Health, Oslo University Hospital, Oslo, Norway

Background: Pasteurized Donor Human Milk (PDHM) is widely used when mother's own milk is unavailable, but its impact on neonatal outcomes remains under-evaluated in real-world settings. This study aimed to assess the association between PDHM exposure and clinical outcomes in preterm infants.

Methods: Data was analysed from 200 neonates receiving varying durations and proportions of PDHM. Outcomes included days to regain birth weight, weekly weight gain, duration of hospital stay, sepsis, NEC, and mortality. Comparisons were made across PDHM exposure durations (<4 days, 4–7 days, >7 days) and proportion of PDHM in total enteral feeds (≤50% vs >50%).

Results: 196 (98%) neonates regained their birth weight with a mean time of 12.7 ± 4.2 days, with overall median duration of hospital stay was 25 days (IQR: 18–35 days). There were no significant differences in weight gain or time to regain birth weight across PDHM duration or proportion groups ($p > 0.05$). Importantly, no cases of necrotizing enterocolitis (NEC) occurred in any group. Median hospital stay was significantly longer in those receiving >7 days PDHM (34 vs 25 days; $p = 0.04$), potentially reflecting greater illness severity rather than milk exposure effect. Further, PDHM proportion (>50%) was not associated with adverse outcomes or prolonged stay ($p > 0.05$).

Conclusion: PDHM use is safe and nutritionally adequate, with no observed increase in NEC, sepsis, or impaired growth. Adverse outcomes in short-duration users may reflect underlying severity rather than PDHM effects. These findings support continued integration of PDHM into neonatal nutrition protocols when mother's milk is insufficient.

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FROM NUTRITIONAL SUPPORT FOR PRETERM INFANTS TO SOHO APPLICATIONS FOR BROADER PATIENT GROUP. PRESENT AND FUTURE USE OF DONOR MILK IN POLAND

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Background: Donor human milk (DHM) is defined as milk expressed by a lactating woman and collected, processed, and distributed by a human milk bank (HMB) for use by infants other than their own mother's child. In Poland, the development of the network of milk banks has been significantly shaped by the activities of the Human Milk Bank Foundation (HMBF) established in 2009, registered with the Patient Ombudsman, representing the interests and needs of children and their caregivers in terms of equal access to human milk. The principles of financing nutritional therapy in Poland as part of guaranteed healthcare services and officially representing the EMBA in Poland.

Aim: This study aims to assess and summarise the distribution of previous donor milk practices and the projected use of DHM in hospitals, using data collected by HMBF from all Polish milk banks. It focuses on donor number, volume of milk, cooperation of HMB with hospitals, and the role of milk banks in ensuring equitable access to DHM for newborns who require it.

Methods: The analysis is based on secondary statistical data systematically collected by the HMBF from all operational HMBs in Poland between 2018 and 2024, supplemented by a 2023 and 2024 survey on recipient prioritisation practices.

Results: The first Human Milk Bank in Poland was opened in 2012 in cooperation with the HMBF. Ensuring the safety of donor milk has been based on the principles of good hygienic and laboratory practice, and the Human Milk Bank Foundation has recommended the use of the HACCP system, which, however, was not a legal requirement for human milk bank facilities. Under the patronage of HMBF, there are currently 16 human milk banks operating within hospitals in Poland. A dynamic increase in their number has occurred since 2018, when state budget financing was launched to support the establishment and operation of milk banks, as well as reimbursement for enteral nutrition for preterm infants up to 4 weeks corrected age and for ill, low birth weight infants up to 4 weeks of age. Within the last 7 years, in total, 2,753 donors contributed 35,909 litres of DHM. Between 2018 and 2023, 28,867 neonatal patients received donor milk in Polish hospitals. HMBF continuously undertakes actions to ensure that all newborns in particularly challenging life circumstances – including children of mothers with cancer or living with HIV – have access to donor milk. From 2023, a survey was conducted regarding the rule of recipients' priority of DHM from milk banks that received milk while hospitalised.

Conclusion: This study describes seven years of human milk banking in Poland, during which new milk banks were established, received government funding, and donor milk began to be covered by health insurance—despite the absence of official regulations or regular inspections. Presented data will undoubtedly serve as a starting point for adaptation and the harmonisation of standards, the improvement of access mechanisms, and long-term strategic planning to meet the needs for DHM following its reclassification as a Substance of Human Origin.

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A COLLABORATIVE AND MULTIFACETED APPROACH TO MANAGING MEDICINE COMPATIBILITY FOR DONOR MILK RECRUITMENT**L. Kearney¹, G. Holder², G. Weaver³**¹UK Drugs In Lactation Advisory Service, University Hospitals of Leicester NHS Trust, Leicester, UK²Birmingham Women's and Children's NHS Foundation Trust, Birmingham, UK³Human Milk Foundation, Gossoms End Health Centre, Hertfordshire, UK

Demand for donor human milk (DHM) continues to grow in the UK and globally. There is also an increasing clinical complexity of patients wanting to donate milk whilst on medication, including new patient cohorts, for example those diagnosed with ADHD.

We previously reported on the development of an open access medication database by the Human Milk Foundation to support donor recruitment for human milk banks. This was launched in the UK in 2021. Whilst this has undoubtedly supported donor recruitment, the complex nature of such scenarios has required a multi-faceted and collaborative approach to support the UK milk banks.

The UK Drugs in Lactation Advisory Service (UKDILAS), a pharmacist-led NHS service, has been advising milk bank personnel on medication compatibility for donor milk since 2022, receiving over 250 milk donation enquiries. This work is not funded and represents around 9% of their total enquiry workload. Despite the medication database publication, the service has seen a 60% increase in donor milk enquiries from 2022–2024. Reasons for contact include: reassurance regarding the information in the database; reassurance about a particular combination of medicines or dose; the medicine not listed in the database, and advice regarding wash out periods. In 2023, for example, 50% of enquiries received were not included in the database, however this does help to identify priority medicines to update.

There is also variation regarding contact to the UKDILAS service, with only 50% of milk banks in the UK seeking their advice. Further investigation is required to understand this.

In addition to the medication database and the enquiry answering service, there has also been a requirement to provide more in-depth and innovative approaches to secure creation of new policies and change embedded practice. This has been in scenarios where historical advice has been questioned by key stakeholders for example the heparins and raising the vitamin D dose threshold. These in-depth reviews have led to widespread increased access to donor milk, and a reduction in enquiries about these topics, for example 40% reduction of enquiries regarding vitamin D.

There is still widespread variation in the UK regarding managing medicine compatibility for donor milk recruitment. Through experience, we have recognised that a 'one size fits all' approach is not appropriate due to the complexity of the milk donation scenarios, e.g. for more mature and home based infants, and maternal medications. Therefore, a combined and collaborative approach is required; however there is still further work to be done. This should include a 'model' online screening questionnaire with pharmaceutical input to standardise milk bank acceptance criteria, and reduce donor self-assessment of what is defined as a medicine, leading to more robust and safer milk donation outcomes. Overall, there is now a much more collaborative approach with key stakeholders to ensure a governed and consistent process for managing medicines compatibility in milk donation. This improves the quality assurance and standard of care for vulnerable babies receiving donated milk.

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THE GERMAN REGIONAL HUMAN MILK BANK NETWORK BADEN-WÜRTTEMBERG: FIRST RESULTS AND FUTURE PERSPECTIVES

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Background: The German Regional Human Milk Bank Network (FMBW) represents a collaborative approach to ensuring donor human milk supply for premature infants in the federal state of Baden-Württemberg. This network model addresses the critical need for human milk feeding in neonatal intensive care units while optimizing resource allocation and distribution.

Methods: The network consists of two hub clinics (Freiburg and Winnenden) and 8 depot clinics, operating under standardized protocols for milk collection, processing, and distribution. Data were collected from all participating network clinics for the 2024 calendar year, including metrics on milk donation volumes, infant feeding outcomes, and operational efficiency.

Results: In 2024, the network successfully provided donor human milk to 573 premature and newborn infants (383 in hub clinics, 190 in depot clinics). A total of 1,997 liters of human milk were donated and processed within the network (hub clinics: 1,482 liters; depot clinics: 515 liters), with 337 liters distributed as donor milk throughout the network. The network serves approximately 30% of infants born with birth weights <1,500g in Baden-Württemberg, contributing to the overall coverage of 53% of all newborns treated in centers with human milk banks or cooperations.

Impact: The network demonstrated increased milk donation volumes across nearly all participating clinics and successful network expansion through new clinic partnerships aiming to achieve the network's primary goals NEC reduction and increased breastfeeding rates.

Future Directions: The network has established five strategic priorities for 2025: (1) network expansion to achieve comprehensive regional coverage, (2) securing state funding similar to other German states, (3) supporting the development of human milk bank networks in other states, (4) enhancing systematic data collection including breastfeeding rates, and (5) implementing digital solutions for standardized processes across all facilities.

Conclusions: The Human Milk Bank Network Baden-Württemberg demonstrates a successful model for regional collaboration in donor human milk provision. The network's structured approach to resource sharing, standardized protocols, and continuous quality improvement provides a replicable framework for other regions seeking to optimize human milk availability for vulnerable infants.

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MICROBIOLOGICAL AND FREE FATTY ACIDS CHANGES IN RAW AND PASTEURIZED CREAM FROM HUMAN MILK FOR USE AS A NUTRITIONAL SUPPLEMENT**D. Escuder Vieco¹, J.M. Rodríguez Gómez², L. Fernández³, M.V. Calvo⁴, J. Fontecha⁴, K. Keller¹, J.L. Cirián Frías⁵, C.R. Pallás Alonso⁶, N.R. García Lara⁶**¹Aladina-MGU"-Regional Human Milk Bank, 12 de Octubre University Hospital, Research Institute i+12, Madrid, Spain.²Sección Departamental de Nutrición y Ciencia de los Alimentos. Facultad de Veterinaria. Universidad Complutense de Madrid³Sección Departamental de Farmacia Galénica y Tecnología Alimentaria. Facultad de Veterinaria. Universidad Complutense de Madrid⁴Food Lipid Biomarkers and Health Group, Institute of Food Science Research (CIAL), CSIC-UAM, Madrid, Spain.⁵Department of Microbiology, 12 de Octubre University Hospital, Madrid, Spain⁶Department of Neonatology, 12 de Octubre University Hospital, Research Institute i+12, Spain.

Introduction: In neonatal units, breast milk is usually defatted for newborns with chylothorax or metabolic disorders, and the resulting cream is discarded. This cream could be reused to fortify the mother's own milk if necessary or pasteurized to be administered to another preterm infant. Therefore, the objective of this study was to determine the microbiological and free fatty acid (FFAs) changes of raw and pasteurized cream during refrigerated storage after 24 and 72 hours.

Material and methods: The mean frozen storage time of donor milk used for this study before pooling was 30 days. From a defrosted pool of donor milk (340 mL) (n=6), 100 mL of raw milk was collected and the rest was pasteurized by Holder method (HoP) (62.5°C, 30 min). The raw and pasteurized milk was centrifuged at 1932 xg for 15 min at 2°C. The raw and HoP creams obtained were kept refrigerated for 24 and 72 hours. Proper peptone water dilutions of raw and HoP cream samples were spread onto Columbia Nalidixic Acid (BioMérieux; a highly nutritious, general-purpose medium for the isolation and cultivation of Gram-positive bacteria) and MacConkey agar media (BioMérieux; a selective medium for the isolation of enterobacteria). Identification of the majority isolates was performed by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) using the Vitek-MS™ system (BioMérieux). The identification and quantification of the FFAs in the samples was performed according to the method by Fontecha et al. (2005), using a Clarus 400 GC (PerkinElmer Ltd, UK) equipped with an automatic split/splitless injector and a flame ionization detector (FID). The significance of differences between means or medians was assessed using paired Student's t-tests or Wilcoxon signed rank test.

Results: The mean total bacterial count in raw cream samples after 72 hours of refrigerated storage was slightly lower (3.42 ± 0.97 log₁₀ colony forming units (CFU)/mL) than after 24 hours (3.85 ± 1.05 log₁₀ CFU/mL) ($p=0.077$). *Staphylococcus epidermidis* and *Serratia liquefaciens* were the most frequently identified species. No bacterial growth was detected in HoP cream samples at either time point. The mean percentage of FFAs in raw cream samples were significantly higher after 72 hours [18.99% (18.41–20.6%)] compared to after 24 hours [6.26% (2.27–12.21%)] of refrigerated storage ($p=0.036$). In contrast, HoP cream samples showed no significant increase in FFA concentration over time during refrigerated storage, with values of 1.2% (0.52–4.33%) after 24 hours and 5.3% (3.85–6.63%) after 72 hours ($p=0.142$).

Conclusion: Holder pasteurization effectively maintains the microbiological quality of cream and delays lipolysis during refrigerated storage in contrast to raw cream, which exhibits increased free fatty acid formation over time under the same storage conditions. These findings corroborate the use of Holder pasteurization to improve the safety and shelf-life of cream of human milk to be used as nutritional supplement.

Reference

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HOW TO FORTIFY DONOR HUMAN MILK TO PREVENT OSTEOPENIA OF PREMATUREITY?**I. Drazkowska¹, A. Wesolowska¹, A. Bzikowska-Jura¹, A. Molas², A. Piatkowska³, J. Jassem-Bobowicz⁴, M. Krajewski⁵, K. Mansen⁶, K. Israel-Ballard⁶, M.T. Perrin⁷**¹Medical University of Warsaw, Dep. Of Medical Biology, Lab. Of Human Milk and Lactation Research²Lab. of Human Milk and Lactation Research in Warsaw Medical University at Regional Human Milk Bank in the Specialistic Holy Family

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INTRODUCTION. Osteopenia of prematurity affects bones of premature newborns after inadequate mineral intake, especially calcium and phosphorus. The condition occurs mostly in the group of extremely preterm infants, commencing 6-8 weeks postpartum and it is mainly caused by inability to absorb indispensable amount of minerals during the third trimester of pregnancy. The role of postnatal nutrition is to prevent and compensate for these deficiencies. The use of pasteurized donor human milk (DHM) in premature babies nutrition in the absence of own mother's milk, is a challenge in this respect and frequently needs to be fortified. The majority of research on DHM fortification focuses on establishing the optimal supplementation with macronutrients to meet ESPGHAN requirements. Fat, protein, carbohydrates and energy are usually analyzed by European milk banks; however, the efforts should not only emphasize on the provision of adequate macronutrients and energy, but also aim to prevent complications such as osteopenia through the provision of adequate minerals. Consequently, the primary aim of this study was to evaluate the potential effects of fortifying DHM with two fortifiers available in Poland, on calcium and phosphorus as a preventive measure against osteopenia. **MATERIAL AND METHODS.** We collected milk samples from approved milk bank donors (n=50) from Polish human milk banks (n=3) in 2023. Each sample reflected milk donations from a unique donor collected over 3 or more days as part of the larger Global Donor Human Milk Study. The milk was collected, pooled and prepared according to the guidelines, standardized in every HMB. Samples were assessed for calcium and phosphorus concentration and compared with ESPGHAN recommendations. Milk samples were obtained from two groups of donors: term (n=38) and preterm (n=12). **RESULTS.** The mean calcium concentration in term donors (X# = 42.6 mg/150 ml; SD = 7.2 mg/150 ml) did not differ significantly from that in preterm donors (X# = 43.0 mg/150 ml; SD = 5.8 mg/150 ml), as indicated by Welch's t-test (p = 0.86). According to ESPGHAN recommendations, the calcium intake in both groups covered only 35% ± 6% of the daily requirement. After the addition of the Fortifier 1, the mean calcium concentration increased to 146.7 ± 7 mg/150 ml (122% ± 6% of lower recommended range), meeting the ESPGHAN recommended daily intake without exceeding the upper range of 200 mg/150 ml. After the application of Fortifier 2, the mean calcium concentration increased to 156.1 ± 7 mg/150 ml (130% ± 6% of lower range), still remaining below the maximum range. The median phosphorus concentration in term donors (Mdn = 19.6#mg/150#ml; IQR: 2.8 mg/150ml) was significantly lower than in preterm donors (Mdn = 21.5#mg/150#ml; IQR: 3.8 mg/150ml), as confirmed by the Mann-Whitney U test (p = 0.03). Due to the non-normal distribution of phosphorus values in term donors, the median was used as a measure to compare values between this groups. The phosphorus intake covered only 29% of the daily ESPGHAN requirement in term donors and 32% in preterm donors. After the application of the Fortifier 1, the median phosphorus concentration increased to 76.5#mg/150#ml (112.3% of the ESPGHAN lower recommended range) in term donors and 78.4#mg/150#ml (115.1% of lower range) in preterm donors. After supplementation with Fortifier 2 the median phosphorus concentration increased to 85.6mg/150#ml (125.7% of lower range) in term donors and 87.5 mg/150#ml (128.5% of lower range) in preterm donors. The phosphorus concentrations after fortification were within the desired ranges, without exceeding the upper range of 115 mg/150 ml. **CONCLUSIONS.** In Poland, when using DHM, calcium and phosphorus ESPGHAN requirements are only covered with the supplementation of fortifiers in the group of premature babies and are crucial as a prevention of osteopenia of prematurity. Nevertheless, both products are based of bovine protein and may cause other health sequelae, therefore their use should always be thoroughly analyzed.)

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IMPACT OF DIET AND BODY COMPOSITION ON DONOR HUMAN MILK: A CROSS-SECTIONAL PILOT STUDY

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Introduction and Objectives: Donor human milk is recommended in Neonatal Intensive Care Units when maternal breast milk is unavailable. This study aimed to explore the association between the eating habits, body mass index, and body composition of human milk donors with the nutritional composition of their donor milk.

Methods: A cross-sectional observational study involved 65 human milk donors. Sociodemographic, lifestyle, and clinical data were collected by questionnaires administered through interviews. Height, weight, and fat mass were measured and body mass index was calculated. Eating habits were assessed using a Food Frequency Questionnaire. Donor human milk samples were analyzed before and after pasteurization using the Miris Human Milk Analyzer™.

Results: Thirty-three (50.8%) human milk donors were overweight, with a median fat mass of 33.2%. No significant associations were found between body mass index or fat mass and the nutritional composition of donated milk. However, infants' gestational age showed a positive correlation with the protein content after the donated milk had been pasteurized. The energy of donor human milk before pasteurization was positively associated with carbohydrate intake ($r = 0.272$, $p = 0.029$). The consumption of carbohydrate sources was positively correlated with the energy of donor human milk before ($r = 0.271$, $p = 0.029$) and after pasteurization ($r = 0.248$, $p = 0.046$).

Potato intake showed a positive correlation with fat content in donor human milk before ($r = 0.474$, $p < 0.001$) and after the milk had been pasteurized ($r = 0.443$, $p < 0.001$).

Discussion: These results highlight the importance of monitoring human milk donors' nutrition to optimize their nutritional status and donated milk composition.

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MICROBIOLOGICAL CONTROL OF HUMAN MILK DONATED TO THE NORTHERN HUMAN MILK BANK - PORTUGAL (2022-2025)

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Introduction: Human milk (HM) has a unique composition, ensuring the nutritional and bioactive components necessary for the proper development of the newborn. It is known that HM is not sterile, as commensal and probiotic microorganisms are part of the microbiome of healthy women.

Under certain circumstances, it can be a vehicle for pathogenic microorganisms.

Holder pasteurization is the recommended method for treating HM, although recommendations for pre (pre-P) and post-pasteurization (pos-P) testing are not consensual.

Objectives: To analyse the results of microbiological control of human milk (HM) donated to the Northern Human Milk Bank (NHMB) since its opening (september 2022 - june 2025).

Methods: Evaluation of the results of microbiological tests performed on donated human milk.

Quantitative controls were performed on pre- and post-P samples, seeded on blood agar, mannitol salt, and MacConkey media. After incubation at 37°C in a 5% CO₂ atmosphere, growth was assessed at 48 hours. Evaluation was performed in accordance with International Recommendations for HMB.

Results: 1588 samples were analysed, with 175 and 24 positive in pre-P and post-P results, respectively. Of these (pre-P) 25 were first-time donations. In 41/175 positive pre-P samples, two or more pathogens were identified. The most common pathogens were *Pseudomonas* spp (18.8%), *Acinetobacter* spp (16.7%), *Enterobacter* spp (15.6%), *Enterococcus* spp (8,1%) and *Staphylococcus aureus* (8,1%). In the positive post-P samples was isolated *Bacillus* spp.

Conclusion: The results obtained are consistent with the literature, with pre-P results depending on the ability to express aseptically and the compliance with cleaning/disinfection rules of extration equipment. Training during recruitment is essential. The presence of sporulating bacteria resistant to high temperatures explains the positive pos-P results, a recognized limitation of the pasteurization technique. Microbiological control is the main criterion for discarding HM, therefore, its knowledge and adoption of restrictive recommendations allows optimisation of the process safety. Analysing the results allows us to identify areas for improvement.

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EVOLUTION AND ACHIEVEMENTS OF THE REGIONAL HUMAN MILK BANK IN WARSAW OVER TEN YEARS

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INTRODUCTION

Poland currently has 16 human milk banks (HMBs), most of which collaborate with local hospitals. Among them, the HMB at the Holy Family Hospital in Warsaw is distinguished by its regional scope, supplying donor human milk to 14 neonatal care units in the Masovian Voivodeship (all level III and a few II).

OBJECTIVE

The study aimed to conduct a retrospective analysis of selected operational, demographic and nutritional aspects of the Warsaw HMB over its first ten years of activity.

MATERIAL AND METHODS

To achieve the objective, the following data were used: quantitative operational data, recruitment questionnaire responses, human milk composition data from distributed batches.

RESULTS

Since its establishment, the Warsaw HMB has expanded from serving 6 hospitals in its first year (2015) to 14 hospitals in 2024. Over ten years, 245 donors contributed a total of 4017 972 mL of human milk. Most donors (n=187, 76.7%) had term deliveries, 23.3% delivered prematurely. Donors were on average 31 years old (range: 20-43). In terms of diet, 90.6% (n=222) reported a regular diet, while 3.7% of donors were vegetarian, one was vegan (0.4%), and the rest (n=13, 5.3%) were on different elimination diets (eg, lactose- or gluten-free).

Most donors were healthy (n=217, 88.6%), 10.6% (n=26) reported comorbidities, and 8.2% (n=20) used medications (thyroid hormones n=15, anti-allergic medications n=5, insulin n=1, and contraception pills n=1). Donation volume per donor ranged from 630 mL to 295,500 mL, with an average of 16,882 mL. While 45 women were recruited in the first year, this number dropped to 31 in 2024. However, individual donation volumes increased significantly. In 2015, 57.8% of donors gave <5,000 mL; by 2024, only 3 donors (1%) remained below this threshold, and over 32% donated >20,000 mL. In the first year, a total of 295.88 L of milk was collected, with 21.59 L (7.2%) disposed of. There were 179 milk pools established, and 99 pasteurization processes carried out using a device with a 36-bottle capacity. In 2024, 536.35 L of milk were pasteurized, with 20.2 L (3.8%) disposed of. During this year, 158 milk pools were formed, and 120 pasteurization processes were executed using a 72-bottle and 36-bottle capacity device. The average composition of the milk distributed by the HMB since 2015 was as follows: fat 3.5 g/dL, protein 0.8 g/dL, carbohydrates 8.0 g/dL, energy 68.6 kcal/dL. For comparison, the composition of milk in the first year was: fat 3.1 g/dL, proteins 0.8 g/dL, lactose 7.4 g/dL, energy 61.7 kcal/dL, and in 2024: fat 3.9 g/dL, proteins 0.9 g/dL, lactose 8.6 g/dL, energy 72.4 kcal/dL.

CONCLUSIONS

Over its first decade, Warsaw HMB significantly expanded its operational reach. Despite a reduction in the number of donors in the last year, the increased efficiency and volume of individual donations ensured a stable supply of donor milk to neonatal units. The HMB at Warsaw serves as a model for regional milk banking through its integrated logistics, consistent milk quality, and data-driven approach to donor recruitment and retention.

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ASSESSING PHARMACOTHERAPY IN HUMAN MILK DONATION: A PILOT SURVEY OF PRACTICES IN POLISH MILK BANKS**K. Kalita-Kurzyńska¹, G. Weaver², N. Shenker³, N.R. García Lara⁴, M. Gormaz Moreno⁵, A. Wesołowska^{1,6}**¹Lab of Human Milk and Lactation Research, Regional HMB at Holy Family Specialist Hospital, Dep of Medical Biology, Medical University of Warsaw, Warsaw, Poland²Human Milk Foundation and Hearts Milk Bank, Berkhamsted, UK³Imperial College London, London, UK⁴Madrid Regional Milk Bank, Neonatology Department, 12 Octubre University Hospital, Madrid, Spain⁵Neonatal Unit and Human milk Bank. University and Polytechnic Hospital La Fe, Valencia Spain⁶Human Milk Bank Foundation, Warsaw, Poland

Background: Human milk from milk donors is widely considered essential for newborns whose mothers are unable to breastfeed, especially vulnerable infants requiring medical care. Its safety is crucial, which is a challenge especially when donor mothers have medical conditions that require medication. However, donor eligibility criteria for pharmacotherapy vary across Europe. In Poland, donors taking any medication usually are not accepted, resulting in less donor milk available. The purpose of the study was to learn about the practice of Polish human milk banks (HMBs) when assessing the safety of medication during lactation for milk donations. **Methods:** We conducted a pilot study in 2025 among staff from HMBs in Poland by using a designed questionnaire that focused on donor eligibility criteria. The questionnaire was distributed by the Human Milk Bank Foundation among 16 milk banks via e-mail with a link to LimeSurvey Platform. We asked about commonly used medications which were categorized into therapeutic classes (antidepressants, hypertension and thyroid medications, antihistamines, antibiotics, anticoagulants, anal varices treatment and contraceptives), vaccines, herbal medications, vitamins and supplements. Finally, we asked about the sources of information used to decide whether medications were acceptable or not for donation. **Results:** We collected eleven completed questionnaires from staff of sixteen Polish HMBs. All persons that responded evaluated paracetamol and ibuprofen and considered them as acceptable for donation. Regarding other common medications, levothyroxine was evaluated in 8 HMBs, and cetirizine and heparine in 6 HMBs but not all of them considered these medications as acceptable for donation. The candidates to be milk donors reported having received the following vaccinations: COVID-19 (n=9), influenza (n=8), diphtheria, tetanus and pertussis (n=7), meningitis (n=4) and BCG (n=3). All the above vaccinations were accepted while donating milk. Regarding Hepatitis A vaccine, it was considered acceptable according to 2 respondents and unacceptable by one person. Vaccination against yellow fever was considered unanimously an exclusion criterion. Eight respondents declared that donors were asked about use of vitamins and supplements. Ten of all the surveyed persons mentioned the need to consult other specialists to assess the compatibility of medications. The main sources of information concerning pharmacotherapy in donation are assumptions in the Human Milk Bank Donor Screening Form (in Polish: Honorary Human Milk Donor's Card) (n=9), www.e-lactancia.org website (n=9) and Hale's Lactation Risk Categories (n=8). **Conclusions:** The use of medication during breastfeeding does not necessarily imply exclusion from milk donation. The survey results revealed significant variation in approaches to accepting mothers to become donors while requiring treatment during lactation. A high level of uncertainty on this topic among milk bank staff was also observed, often leading to the need to consult other specialists. With the upcoming SoHO regulation focusing on the safety of both recipients and donors, there is a clear need to develop consistent, EU-wide guidelines for assessing the risk-benefit ratio of using milk from mothers requiring pharmacotherapy. The next step will be to expand the survey to include other countries, such as Spain and the UK, which have their own experience in this area.

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THE HUMAN MILK FOUNDATION'S NORFOLK PROJECT

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Background:An estimated 800,000 infants receive donor human milk (DHM) annually in 70+ countries across the world. The usual indication for its use is as a supplement to maternal colostrum and later milk when the mothers of preterm and low birthweight infants have not yet established a sufficient milk supply. Globally, when DHM is available in sufficient quantities, it is also used as a supplement or as the sole enteral feed for babies and young children with a wide range of conditions.

Funded by Norfolk County Council in the East of England, via national government's Start for Life funding, the HMF embarked in 2024 on a project in which mothers previously diagnosed with Type 1 or Type 11 Diabetes or with Gestational Diabetes were offered the chance to enrol in a programme whereby they were able to access additional lactation and breastfeeding support together with DHM if their infant's maternal milk intake was insufficient and the newborn was considered to clinically require additional enteral feeds.

Method:Information about the project was provided to all pregnant women with diabetes at 28 weeks of pregnancy, or when diagnosed, if later. Specialist lactation support and access to DHM was available to all those who consented. The DHM was available prior to and after discharge home from hospital as required and up to 4 weeks post date of birth.

Results:In the first 12 months, lactation information and support were provided to 434 families at the Norfolk and Norwich University Hospital. DHM was supplied to 40 families all of whom reached their stated breastfeeding goals at midwifery discharge. Interviews with the participants at 6-8 weeks indicated that breastfeeding rates were considerably higher in the Norfolk Project families and that together these interventions support the wider availability of DHM for the infants of diabetic mothers.

Conclusion:The results from the first year of the HMF Norfolk project show that a combination of lactation and breastfeeding support and access to DHM when clinically indicated can lead to improved breastfeeding rates at midwifery discharge and at 6-8 weeks and enable more families to achieve their initial feeding goals. Funding for a second year has now been provided. All of the collated data and up to date results will be presented.

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ARE HUMAN MILK BANKS PREPARED FOR THE POLYCRISIS? NOURISHING HOPE FOR VULNERABLE CHILDREN, WOMEN, AND FAMILIES IN EMERGENCY CONTEXTS**M. Farinha¹, A. Oliveira¹**¹*Faculty of Human Sciences, Catholic University of Portugal*

Background and purpose: "Who counts as human? Whose lives count as lives? And, finally, what makes for a grievable life?" asked Butler (Butler, 2004, p. 20). The author further elaborated: "One way of posing the question of who 'we' are in these times of war is by asking whose lives are considered valuable, whose lives are mourned, and whose lives are considered ungrievable (...) An ungrievable life is one that cannot be mourned because it has never been lived, that is, it has never counted as life at all" (Butler, 2009, p. 38). Amid intersecting global shocks – socio-political upheaval, economic instability, supply-chain disruption, public health emergencies, natural disasters, and armed conflicts – Butler's (2004, 2009) concept of "grievable lives" exposes the moral imperative to protect children, women, and families rendered "ungrievable" by systemic neglect, particularly when access to safe nutrition collapses. Aligned with the 2025 World Human Milk Donation Day theme "Human Milk Donation: A Humanitarian Gesture that Nourishes Hope", this literature review synthesises evidence on the lifesaving role of breastfeeding in emergencies and examines the use of formal donor human milk (DMH) during crises for non-breastfed infants, consistent with the Operational Guidance for Emergency Relief Staff and Programme Managers (IFE Core Group, 2017). It assesses human milk banks' (HMB) preparedness to respond in a context of polycrisis, an option often overlooked within national emergency preparedness and response plans. Methods: A comprehensive literature review was conducted through searches across three databases (Scopus, Web of Science, and PubMed), complemented by an investigation into seven grey literature sources (WHO Library Initiatives, UN-Nutrition Knowledge Library, UNICEF Knowledge Library, ReliefWeb, Save the Children Resource Centre, ENN – Field Exchange, and the IFE Core Group IYCF-E Literature Repository). The search included literature published in English, Portuguese, and Spanish, without temporal constraints. Exclusion criteria applied to studies lacking documentation on HMB operationalization in crises or lessons learned. Findings: From an initial corpus of 262 publications, a total of 18 met the predefined inclusion criteria for detailed analysis. The findings were categorized into four distinct crisis typologies: (i) armed conflict; (ii) natural disasters; (iii) the COVID-19 pandemic; and (iv) nationwide infant formula shortages. The analysis revealed that infant and young child nutrition was often compromised, particularly among marginalized groups, during periods of unregulated distribution of commercial milk formula. Inadequate and/or insufficient national regulatory frameworks for HMB in emergencies impeded the implementation of global recommendations. Conclusions and implications: The scarcity of literature documenting the operation of human milk banking during or after crises may stem from the uneven global distribution of HMB. Global inequities in HMB distribution and weak preparedness systems impair HMB's emergency response. Nonetheless, the reviewed cases offer valuable insights into the operational strengths and limitations encountered across varied settings and underscore HMB's life-saving potential in emergencies. There is an urgent need to bolster policy initiatives and cross-sectoral collaboration to ensure that access to breastmilk is universally available for all infants, in every context.

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NORTHERN HUMAN MILK BANK (NHMB) – 34 MONTHS OF EXPERIENCE

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Human milk is the ideal food for any newborn. In premature newborns, an exclusive human diet provides protection against several diseases associated with prematurity and ensures numerous immunological advantages with short- and long-term impact.

The NHMB was created on 26/09/2022 with the purpose of safely providing the best food for the most fragile babies admitted to Neonatal Units across the north of Portugal.

The NHMB is certified by the ISO 9001/2015 Standard and its activity is guided by the most rigorous safety and quality standards. During its first 34 months of operation, the NHMB recruited 203 donors. Donors had a median age of 33 (20-48) years old, 80,3% had a superior education level and 5,4% were currently unemployed.

From these donors, 660 liters of human milk were collected and processed, with a rejection rate of 26%. Thanks to the activities carried out by the NHMB, it was possible to provide a diet of pasteurized donor human milk (PDHM) to 264 newborns admitted to 7/8 NICUs in the North of the country. These babies were mostly preterm (mean gestational age of 29,7 (24-36) weeks and low birth weight (1240,8 (440-2240) g), born after multiple pregnancy in 36,4% of the cases. PDHM was administered during 12 (1-81) days. For 107 babies PDHM was administered for less than 72 hours as a bridge to their own mother's milk. In keeping with its purpose, the NHMB will continue its objective of reaching all at-risk newborns who benefit from this milk, with full coverage in the region's hospitals, functioning as a reference network for the portuguese national health system.

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VALUE IN EVERY DROP. ACTIVITIES OF THE BREAST MILK BANK OF THE LVIV PERINATAL CENTER IN WARTIME**M. Malachynska¹, O. Shlemkevych¹, N. Veresnyuk¹**¹Lviv Regional Clinical Perinatal Center

The second modern high-tech Human Milk Bank in Ukraine was opened at the Lviv Regional Clinical Perinatal Center in December 2022, during a time when the country was at war. The informational and technical components of the project, as well as staff training, were made possible with the support of the Polish Association of Human Milk Banks. Over the past three years, the Lviv Perinatal Center has observed a trend of increasing birth rates: the growth in births in 2024 compared to 2022 amounted to +5.7%. In 2024, 4,876 babies were born at the facility, of which 387 were premature, accounting for 7.93%. These infants are prioritized for receiving donor milk. Donor milk is also provided to babies who, for certain reasons, are temporarily unable to be fed with their mother's milk. Most often, donor milk is used for babies in the post-intensive care department for premature and sick full-term newborns. Overall, approximately one-quarter of the babies born at the perinatal center each year, starting from December 2022, have received donor milk. Among all the babies born during 2022, when the war began, over 1,000 were born to internally displaced women. To this day, women who have come from other regions of Ukraine where active hostilities are taking place continue to give birth at the Lviv Perinatal Center. Their babies have access to donor milk when needed. This underscores the importance and value of the Human Milk Bank's work during wartime. The Human Milk Bank is one of the high-tech initiatives of the perinatal center. The bank is equipped with all the necessary equipment that meets the highest modern global standards. In the 2.5 years since the Human Milk Bank began operating in December 2022, 1,654 liters of donor breast milk have been collected from 157 donor women. Interesting facts about the work of the donors at the Human Milk Bank: The longest period of donation lasted 11 months. Total number of donors: 157. The longest donation period by a single woman: 11 months, resulting in 50 liters of milk. The largest amount of milk collected from a single donor: 79 liters over 5 months. The highest amount of milk donated by one woman in a single month: 55 liters. Most of the donors at the Human Milk Bank are women who gave birth at the Lviv Perinatal Center.

Last time mothers who gave birth at other maternity hospitals have also begun to express interest in becoming donors. With increasing reserves, the donor milk from the Human Milk Bank will be used to meet the needs of newborns in other medical facilities in Lviv and the surrounding region. Promoting the creation of a network of Human Milk Banks in Ukraine at the national level could make a significant contribution to ensuring the healthy development of newborns and infants in the country. This has become particularly relevant during wartime and amid the deep demographic crisis in Ukraine.

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THE GLOBAL COMMERCIALIZATION OF HUMAN MILK FOR INFANT CONSUMPTION: A SCOPING REVIEW**H.C. Rusi^{1,2}, M. Brockway^{1,3,2}, J. Dion^{1,4}, S. Rodrigues¹**¹Faculty of Nursing, University of Calgary²Alberta Children's Hospital Research Institute³Community Health Sciences, Cumming School of Medicine, University of Calgary⁴Children's Hospital of Eastern Ontario Research Institute (CHEO RI)

Introduction: Over the last 25 years, for-profit human milk companies have been in operation, selling CHM products for infant consumption, primarily in neonatal intensive care settings, with products now entering communities. While there is a need for increased access to human milk for infants, concerns have been raised related to the commercialization of human milk. Evidence and governance for commercialized human milk is inconsistent globally, which has raised concerns of discrepancies in evidence-based practice, inequitable distribution, unethical practices, safety and quality of products, and inappropriate promotion of products.

Aim: The objective of this scoping review is to (1) identify the global landscape (including strengths, weaknesses, opportunities, and threats) of the commercialization of human milk for infant consumption on a global scale; (2a) identify the evidence that exists around the governance of for-profit human milk for infant consumption; and (2b) identify the evidence that exists related to the safety, efficacy, equity, ethics, and marketing of for-profit human milk for infant consumption.

Methods: The scoping review is being conducted in accordance with the JBI methodology for scoping reviews. The PCC (Participants, Concept, Context) framework was used to develop the inclusion and exclusion criteria. Inclusion criteria included: 1) Participants – for-profit human milk companies, healthcare agencies and practitioners, policy makers, and milk banking agencies; 2) Concept – for-profit commercialization of human milk; 3) Context – human milk for infant consumption; 4) Articles from the year 2000 onwards since commercialized human milk products for infant consumption began at this time; 5) All languages. Study selection was conducted by two independent reviewers and verified by a third reviewer. Data was extracted from included papers by two or more independent reviewers. Primary and secondary outcomes were deductively coded while other themes resulting from the scoping review were inductively coded.

Results: A total of 5,897 articles were reviewed for title and abstract. The full text of 101 articles was reviewed, and 72 articles were excluded as they did not meet the inclusion criteria. A total of 29 articles met the inclusion criteria. The final sample size was 29 articles. **Conclusion:** The resulting evidence will be used to identify gaps in knowledge and research to help knowledge users and policy makers understand the evidence available and make evidence-based decisions for product use.

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SANITIZATION OF INDOOR AIR BY BIPOLAR NEEDLE IONIZATION COLD PLASMA TECHNOLOGY

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Cold plasma (CP) has quickly established itself as a technology for microbial decontamination and, experimentally, for wound healing and cancer treatment. Its action is carried out by means of the chemical and bioactive radicals generated, known collectively as reactive oxygen and nitrogen species. It is a suitable technology to address the problem of microbial contamination in air treatments, a problem particularly felt in contexts such as hospitals, retirement homes and, more generally, in all highly frequented places.

The Italian "Istituto Superiore di Sanità (Rapporto ISS COVID n.12/2021)" recognises the validity of the Needle Point Bipolar Ionization technology, which has an advantage over other cold plasma technologies because it produces insignificant amounts of ozone for human health (less than 10 µg/m³) and can therefore be used in the presence of people without any risk.

Our innovative system is distinguished by its ability to act on chemical and biological pollutants present on surfaces and in indoor air (bacteria, viruses, moulds, PM 10, PM 2.5, VOCs) through ionization. This effectiveness is widely supported by the international scientific literature, laboratory tests conducted in Italy and abroad and field trials in real situations.

These innovative devices implement the technology by performing continuous action through the diffusion of ions in the environment through ventilation, do not require periodic replacement or spare parts and do not require maintenance, thanks to a patented self-cleaning system.

The technology has been tested and verified in different contexts and environments (schools, pharmacies, hospitals, retirement homes, public transport...) constantly demonstrating its effectiveness in improving the general and microbiological quality of the air.

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LONG-TERM ADVANTAGES EVALUATION OF PROTEIN-FORTIFIED HUMAN MILK IN VERY LOW BIRTH WEIGHT NEONATES

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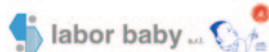
Preterm infants are often at-risk for extrauterine growth restriction and downward percentile-crossing between birth and discharge. Increased energy and protein intake through fortification of human milk during the first weeks of life has been associated with improved short-term growth and better developmental outcomes. The aim of this study was to evaluate whether these benefits persist up to children school age. During hospitalization, 22 very low birth weight preterm infants were fed with increasing protein fortification of human milk (protein supplemented group, PSG). As a control group (CG), 11 preterm infants were fed with standard nutrition regimen. At children school age (9–11 years), we assessed anthropometric data (weight, height, BMI), global health (renal function), and specific psychological outcomes (Child Behavior Checklist 6–18). A global homogeneity between CG and PSG groups emerged: we found no significant differences in weight, height, and BMI, nor in internalizing symptom outcomes (all p s > 0.05). Therefore, neonatal enteral protein supplementation in very low birth weight preterm infants leads to no positive nor adverse consequences in long-term assessment, suggesting that benefits are restricted to the neonatal term and first years of age.

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