



Event

“NFPs/NCPs National and European networks: challenges for the creation of synergies on health among European programmes”

Rome 21-22 November 2023

Life MILCH

Mother and Infant dyads: Lowering the impact of endocrine disrupting Chemicals in milk for a Healthy Life

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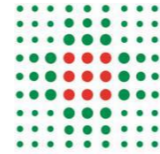
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partners:



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UNIFI PeptLab-MoD&LS



Call: LIFE 2018 - LIFE ACTION GRANTS
Programme: LIFE Environment and Resource Efficiency - Environment and Health

Start: 01/09/2019 -
End: 30/08/2024....30/08/2026

The Life MILCH project aims to reduce exposure of mother-infant pairs to environmental Endocrine Disrupting Chemicals (EDCs):

1. Assessing exposure levels to **EDCs** in **mother-child pairs** and their impact on **infant development** in the 1^o year of life – with **breast milk** as a biomarker of exposure (First Screening)
2. Developing **specific intervention actions** to reduce maternal exposure => awareness & educational campaign and **monitoring** its impact (Second Screening).

Environmental Endocrine Disrupting Chemicals:

An **endocrine disruptor** is an exogenous chemical, or mixture of chemicals, that **interferes with any aspect of hormone action** (Zoeller et al., *Endocrinology*, 2012)

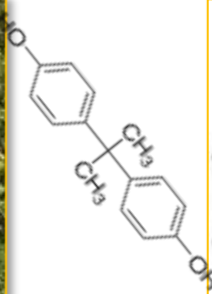
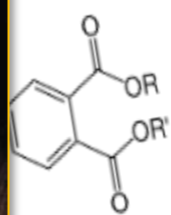
A chemical designed for specific purpose but with side effect...mimic or antagonize hormone action. ~1000 chemicals released in the environment are EDCs

Consistent epidemiological and animal experimental evidence of **Disease Risk Increased by Developmental Exposures to EDCs** (Reproductive, Neurobehavioral, Metabolic disorders)

>100,000 chemicals in commerce

Some % are toxic, via
Alterations of DNA
Mutagens
or general Toxicity

Some % interfere with
some aspect of the
endocrine system
Endocrine Disruptors



Why Breast Milk?

- ✓ Best source of nutrition, many benefits
- ✓ Critical period for brain development
- ✓ Not well studied
- ✓ Concentrate lipophilic substances
- ✓ Biomarker of environmental exposure

(and formula milk)

Breast milk benefits

SOURCE OF STEM CELLS
Australian molecular biologist Mark Cregan found in breast milk a pool of stem cells. Besides the benefits for infants, Cregan believes that diseases such as diabetes, Parkinson's, cancer and spinal cord injuries could be treated with them, thereby avoiding passing the ethical dilemma posed by the use of embryonic stem cells.

SCHOOL
Maman children perform better in class, say experts at the universities of Oxford and Essex after analyzing the results in Language, Science and Mathematics students from five, seven, eleven and fourteen who took test.

MENTAL HEALTH DRINKS
Human milk is an antidote to aggression, depression, anxiety and criminal behavior, according to the Australian nutritionist Wendy Oddy. Take it for sixteen weeks reduces by 30% the risk of socialization problems from age five.

INSURANCE AGAINST FAT
Take the treat at birth prevents obesity. Children who have received this form of nutrition know elucidate more easily when they feel full and satisfied, enabling them to eat healthier and balanced once they reach adulthood.

A SHIELD AGAINST CANCERS
A daily drink in the early months of life reduces the risk of leukemia, Hodgkin's disease, neuroblastoma and other aggressive childhood tumors. The anticancer effect is due to the presence in the breast milk of a substance called TRAIL.

SUGAR FOR BOWEL
Breast milk is full of polymers formed by simple- oligosaccharide sugars that function as fiber, then they reach the intestine intact.

HEALTHIER HEART
When we eat vegetables and fruit, bacteria in the mouth and stomach become their relatives into ribitites, which produce nitric oxide necessary to maintain blood pressure, fight infection, protect the nervous system and prevent heart attacks.

STOP TO HIV
Over 15% of new annual infections of the AIDS (HIV) virus affecting children. Without treatment, only 65% of infected infants survive the first birthday, but the kids who have been breastfed this statistic is not met.

TENANTS IN THE VARIETY IS THE KEY
In a comparative study of children three months of age with and without breast milk, scientists at the University of Texas A & M in EE, UI, Found that the microbiome - Community of organisms and their genomes living with us - it was much more varied in the first group, that is, babies who suckled.

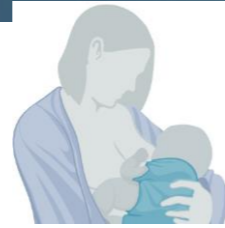
GOOD FOR WOMEN
Mothers also benefit from breastfeeding their children. Eleanor Schwarz, University of Pittsburgh, has proved that the practice reduces by 10% the risk of heart disease, hypertension, heart attacks and stroke. Milk production mobilizes female body fat and reduces the Michelin 8 cm waist, and eliminate the visceral fat that accumulates around vital organs like the heart.

15%

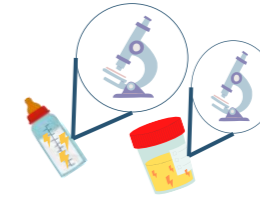
30%

10%

First screening



Collection of breast milk, mother urine



Collection of breast milk, mother



Collection of mother urine and serum and EDCs level evaluation

Collection of infant urine and EDCs level evaluation

Collection of infant urine

Collection of breast milk, mother urine and EDCs level evaluation

Collection of infant urine and EDCs level evaluation

Collection of infant urine

Collection of infant urine and EDCs level evaluation

36th week of pregnancy

delivery

1-month

3 months

6 months

12 months

Woman lifestyle and nutritional habits questionnaires

Evaluation of newborn growth parameter

Evaluation of infant development

Mother and infant lifestyle and nutritional habits questionnaires

Evaluation of infant development

Mother and infant lifestyle and nutritional habits questionnaires

Evaluation of infant development

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Evaluation of infant development

Mother and infant lifestyle and nutritional habits questionnaires

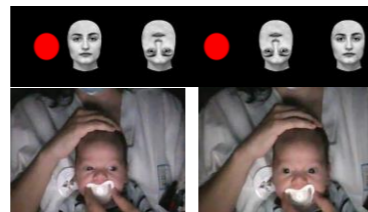
Clinical data collection

Evaluation of infant neurobehavioral development

Evaluation of infant neurobehavioral development

Evaluation of infant neurobehavioral development

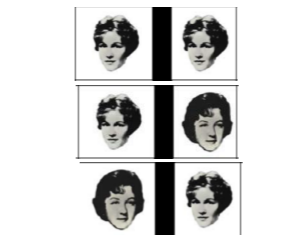
Evaluation of infant neurobehavioral development



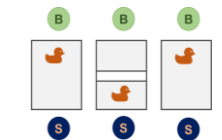
Visual preference paradigm



Face-to-Face-Still-Face



Fagan test



Barrier task

	Numero
Parma	255
Reggio Emilia	283
Cagliari	151
TOTALE	689



Bayley-III

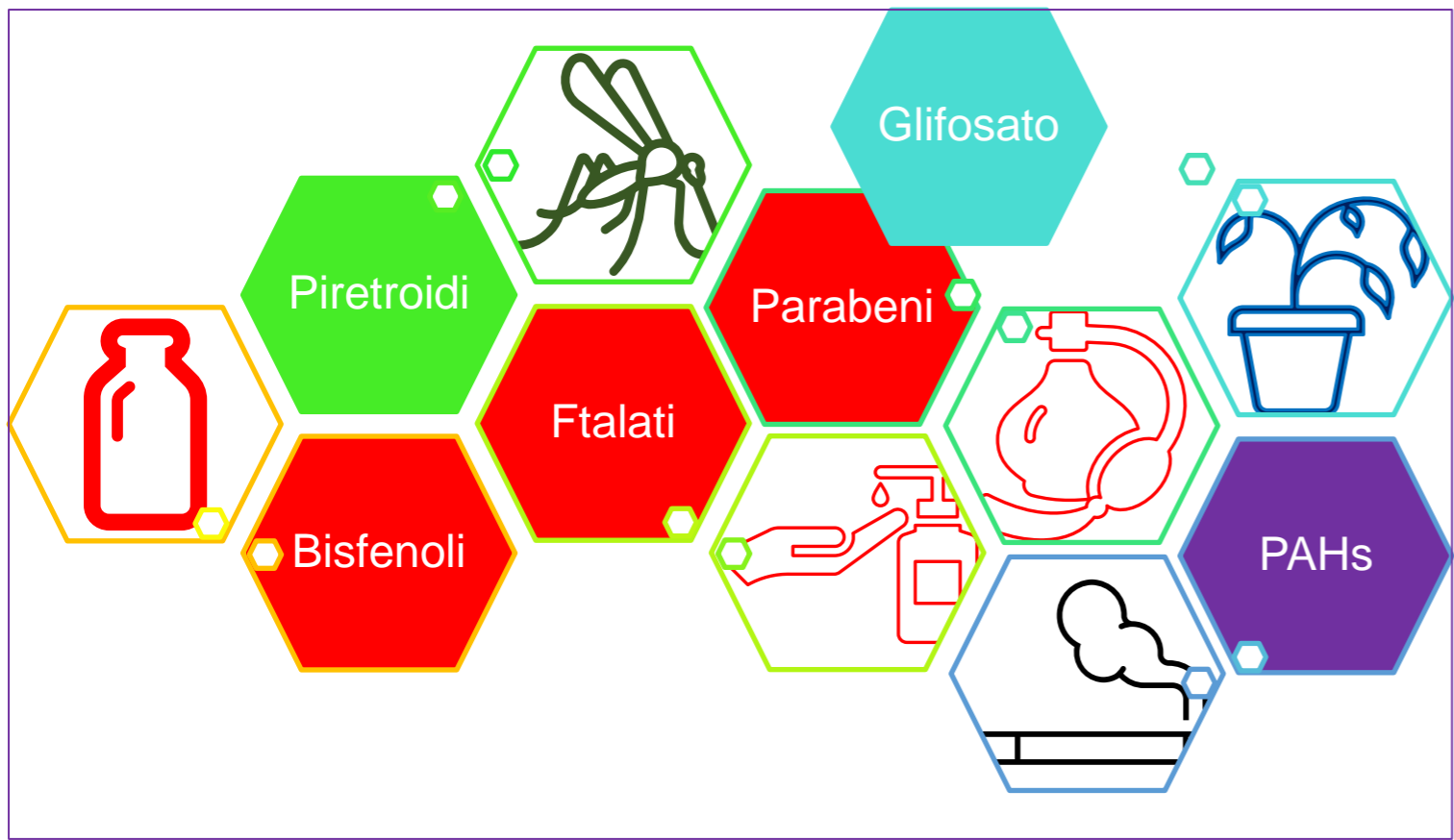


Bayley-III



List of Endocrine Disruptors Chemicals (EDCs)

Simultaneous analyses of the groups of EDC analytes were set up

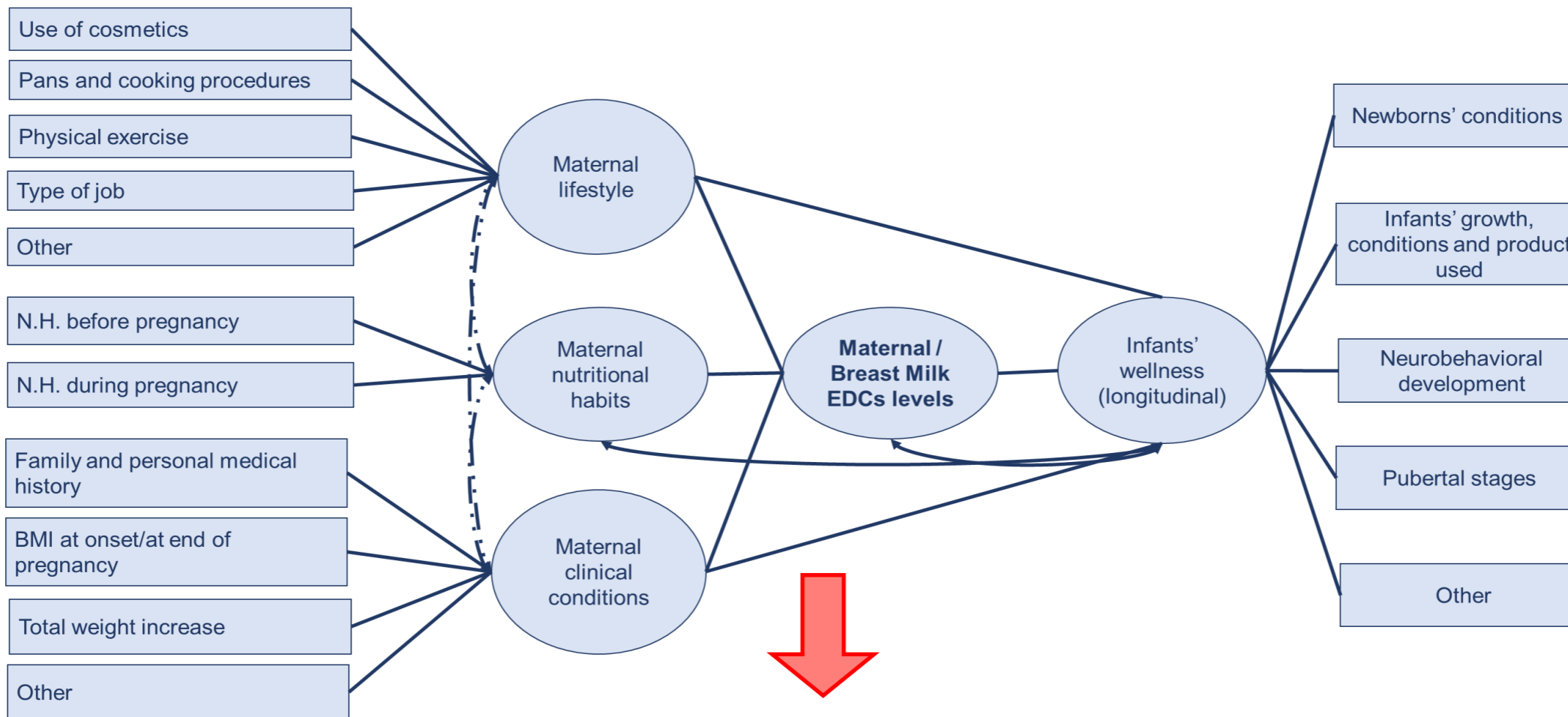


- **Group A: (4 analytes)** = Bisphenols A, S, F and Bisphenol F 1,1'-[Methylenebis(4,1-phenyleneoxy)]bis[3-chloro-2-propanol].
- **Group B: (7 analytes)** = **Parabens** methyl, ethyl, propyl, isopropyl, butyl, isobutyl and benzyl esters of parahydroxybenzoic acid.
- **Group C: (11 analytes)** = **polycyclic aromatic hydrocarbons (PAHs)** anthracene, pyrene, phenanthrene, chrysene, benz(a)anthracene, Benzofluoroanthracene + benzo(a)pyrene + benzo(k)fluoranthene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene.
- **Group D: (4 analytes)** = **Pesticides** Chlorpyrifos, Glyphosate and its major metabolites glufosinate and aminomethylphosphonic acid (AMPA).
- **Group E: (14 analytes)** = **Phthalates** Dimethyl phthalate, Diethyl phthalate, Dibutyl phthalate, Benzyl butyl phthalate, Di-n-octyl phthalate, Di-(2-ethylhexyl)phthalate, Mono-methyl phthalate, Mono-ethyl phthalate, Mono-n-butyl phthalate, Mono-benzyl phthalate, Mono-n-octyl phthalate, Mono(2-ethylhexyl)-phthalate, Mono(2-ethyl-5-hydroxyhexyl)-phthalate, Mono(2-ethyl-5-oxohexyl)- phthalate.
- **Group F: (2 analytes)** = **Insecticide Pyrethroid**; cypermethrin and cyfluthrin.

- **Group G: (16 analytes) Metals** (Al, As, Ba, Bi, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, Ti, Tl, V, Zn).

Risk assessment model

Maternal lifestyle and nutritional habit pre- and post-pregnancy will be correlated to EDCs levels in breast milk and infant growth parameters and neurodevelopmental outcomes

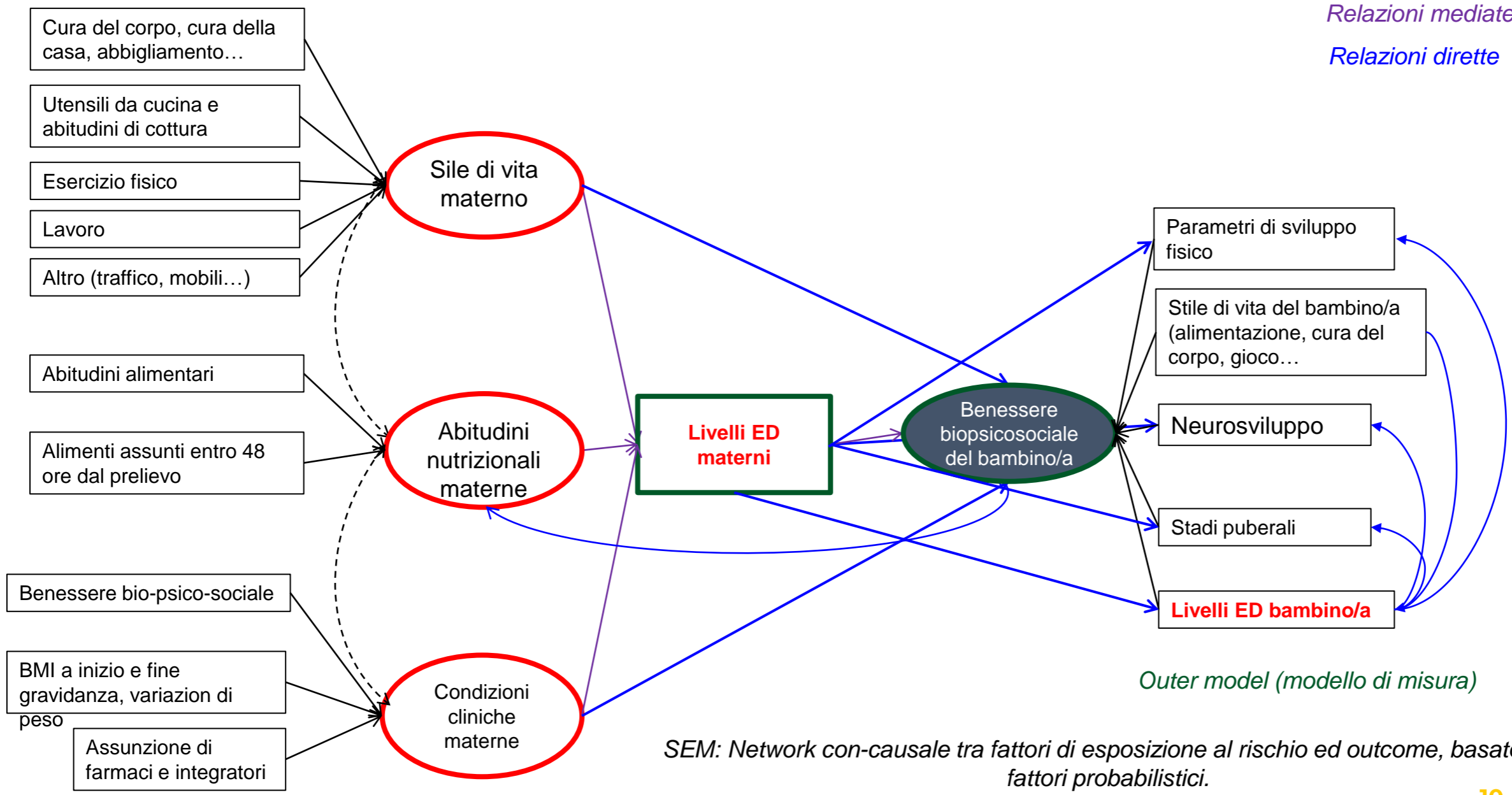


Prevention and awareness campaign to promote a lifestyle that will reduce maternal exposure to EDCs and improve mother-infant's health

... tradotta in SEM *longitudinale*

Inner model (modello di struttura, formativo)

Relazioni mediate
Relazioni dirette



Dr. Annalisa Pelosi, PhD
chief statistician

SEM: Network con-causale tra fattori di esposizione al rischio ed outcome, basato su fattori probabilistici.


- Based on the **risk model**, identify measures to reduce exposure to EDCs, and communicate them, in particular, to pregnant and breastfeeding women (and then to young women of childbearing age, health practitioners, including physicians, gynaecologists, paediatricians, family doctors, obstetricians and medical students)



⇒ **PREVENTION CAMPAIGN**
⇒ **INTERVENTION**

- **SECOND SCREENING** to evaluate the effectiveness of the prevention campaign & intervention by analyzing the levels of EDCs in the breast milk of the women who participated in the campaign during pregnancy/nursing
- **The hypothesis is that a change in lifestyle and food habits will reduce the levels of EDCs in the mother, the breastmilk and consequently in the child.**

OUTPUT

- **An evidence-based Risk Assessment Model => sources of exposure/ EDCs levels/developmental effects**
- **Information/awareness campaign and the monitoring of its actual impact**
- **EDCs in infant milk formula**  **Voluntary agreements and EDCs-free label**
- **Involvement of stakeholders (Cosmetics, Food packaging)**
- **Raising attention on breastfeeding and maternal nutriti**
- **Contribution to EU database (KTE LIFE EnvHealth Network)**

SYNERGIES

I PROGETTI LIFE AMBIENTE E SALUTE: INQUINAMENTO AMBIENTALE E SALUTE DEL BAMBINO

Introduzione a cura di
Paola Palanza e Francesco Nonnis Marzano
Università di Parma

26 Maggio 2023
10:00 - 17:00
Aula Magna
Università di Parma

www.lifemilch.eu

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Elena De Felip,
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Istituto Superiore di Sanità

Vassilios Fanos
Angelica Dessì
Università di Cagliari

Anna Maria Papini
Università di Firenze

- ✓ Networking
- ✓ Methods and tips to share
- ✓ Early biomarkers of exposure and effects
- ✓ Evidence based assessment of an information campaign on individual behaviors to reduce EDC exposure



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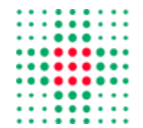
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Grazie a tutte le mamme e ai loro bambini!



OBIETTIVI PER LO SVILUPPO SOSTENIBILE

