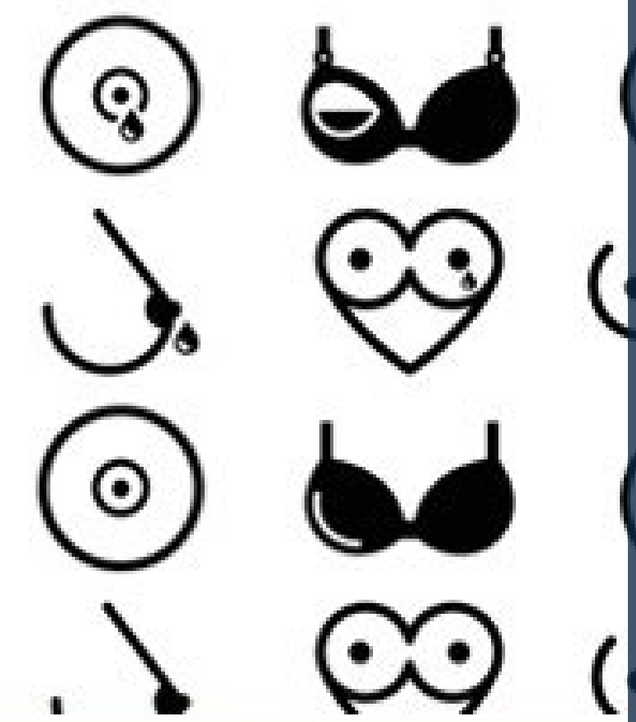
LACTATION ECONOMICS

Where we are, what we know, and opportunities for the future

Briana J. Jegier, PhD



GOALS AND OBJECTIVES

Review & Explore

1) Review the mechanisms of breastfeeding/lactation and their associated health benefits

2) Review the basis for economic evaluation of breastfeeding and lactation

3) Describe the existing evidence strengths and limitations.

Imagine

4) Identify opportunities for future collaboration in practice and research.

ABOUT ME

Education

BA – Communications - Interpersonal & Organization Development
MS – Health Systems Management
PhD – Public Health - Economics & Finance



Professional Service

American Public Health Association (APHA)
International Society for Research in Human Milk & Lactation (ISRHML)
Association of University Programs in Health Administration (AUPHA)


Fun Facts

Favorite Classes: Econometrics, Maternal and Child Health Epi, Corporate Finance
Growing up: Multi-generation Marine Corp Kid
Family: I am outnumbered by my 4 boys at home – Hubby & 3 Sons
Interests: I still play softball, soccer, and basketball and sing in the choir
Random: I have visited and/or lived on 6 of the 7 continents.



FUNDING

Served as the statistical and/or economic principal or co-investigator on a variety of projects related to patient outcomes for premature infants, stroke patients, disaster preparedness, outcomes in the hospital setting, economic modeling for whole population health interventions, and development and evaluation of college programs.

Current Projects

Multi-site PI: Tennessee COVID-19 Community-engaged Research Coalition (TCCRC)
Site PD: Community Health Worker Training Program Partnership
Site PD: Community-Academic Collaborative: Community Health Worker Training
Co-I/Consultant: Economics of Baby Friendly Hospital Initiative

Past Funders

Agency for Health Research and Quality
National Institutes of Health
Centers for Disease Control and Prevention
Health Resource and Service Agency
Office of Minority Health
W.K. Kellogg Foundation
Other Foundation, Corporations, and Government Agencies

Disclosures

Career Funding Sources (2001-present)

Breastfeeding and Lactation Related Projects
Health and Human Services (IPA 16IPA1604494)
Agency for Healthcare Research and Quality (1 R36 HS016012)
Medela, Inc, McHenry, IL
National Institutes of Health (1 R01 NR010009)
WK Kellogg Foundation

Other work
Programs and Pathways Projects
Department of Labor, Health Services Research Agency, Community Partners of Western New York – DY6, Office of Minority Health

Projects Addressing Equity
Community Partners of Western New York – DY6, Office of Minority Health, Tennessee Department of Health, TN CEAL

Evaluation and Statistical Projects
Buffalo Public Schools, National Institutes of Health, Office of Minority Health, Chainlink Solutions, Robert Wood Johnson Foundation, Metis Advisory Group, RUSH

Personal (1980-present)

Past chair of the Breastfeeding Forum of APHA

APHA Member Rep to USBC

Certified lactation counselor (lapsed)

Mom of 3 boys

8 years of breastfeeding and pumping

Breastfeeding Economist

3rd Generation Marine Corp Kid

Childhood Primarily as a Rural Resident

White, German-Irish Catholic

Wife, Daughter, Sister, Aunt, Friend

I love putting the right people with the right resources to achieve the greatest good.

WITH THANKS TO ALL OF MY AMAZING COLLABORATORS THESE MANY YEARS AND THE PATIENTS, FAMILIES, AND COMMUNITIES WHO INFORMED MY RESEARCH AND CAREER

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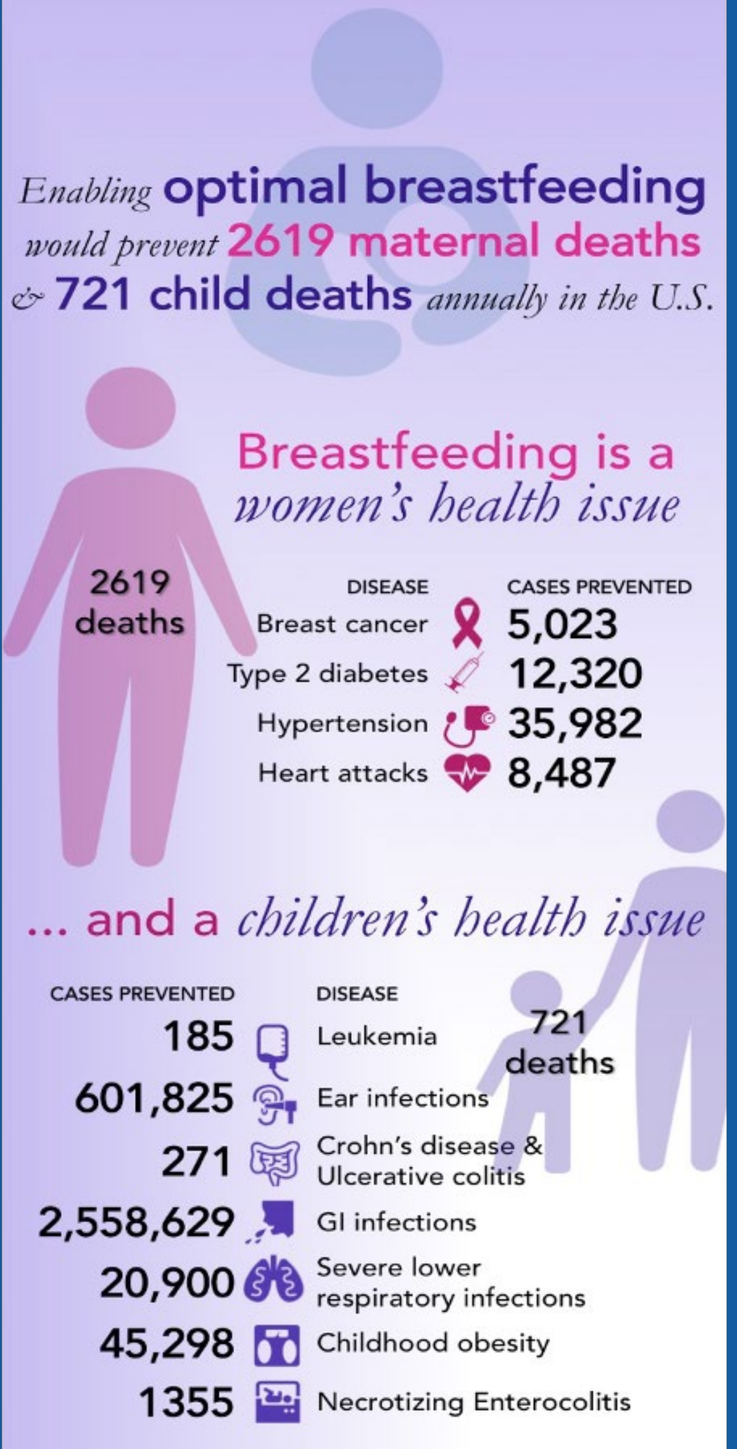
Ellen Boundy, PhD
Cria Perrine, PhD
Renee Cadzow, PhD
Jeremiah Davie, PhD
David Stewart, PhD
Katia Noyes, PhD, MPH
Julie Smith, PhD
Sam Hohmann, PhD
Melissa C. Bartick, MD, MSc
Debra L. Bogen, MD
Eleanor Bimla Schwarz, MD, MS
Tarah T. Colaizy, MD, MPH
Brittany D. Green, MSc
Noah S. Green
Jamus T. Jegier, MS
Arnold G. Reinhold, MBA
Andrew J. Schaefer, PhD
Alison M. Stuebe, MD, MSc
Fabiola Loera
Gina Camodeca, PhD
Ebbin Dotson, PhD
Ann Dozier, RN, PhD, FAAN
Eileen Fitzpatrick, DrPH, MPH, RD, CLC

Lactation Economics

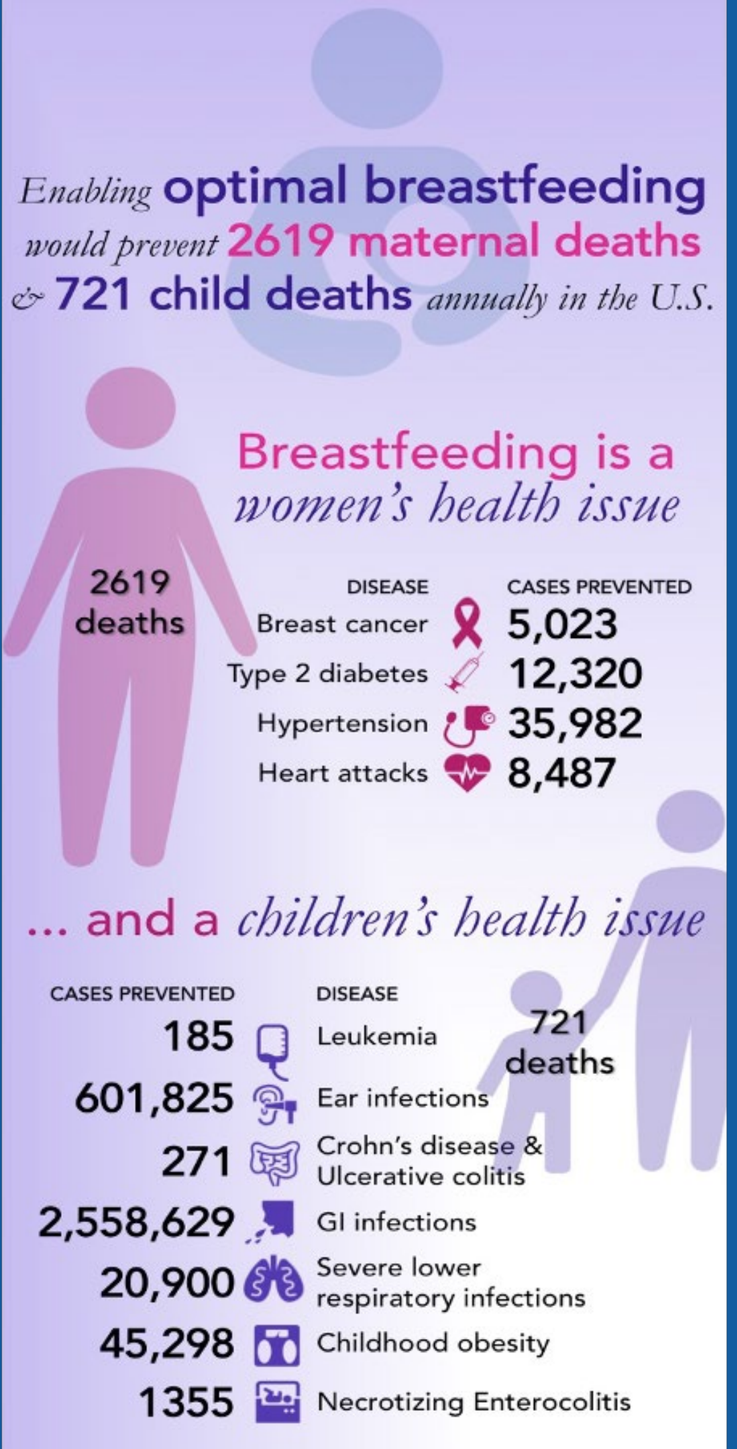
Where we are, what we know, and opportunities for the future



HEALTH AND ECONOMIC BENEFITS

Mother / Lactating Parent

- Improved bonding and attachment (Peñacoba & Catala, 2019)
- Robust epidemiological evidence of lower risk of chronic diseases and mortality and associated cost savings/avoided (Renfrew et. al 2012, Bartick et. al, 2016, Victora, et al. 2016, Rollins, N. C., et al. 2016, Walters, D. D., et al., 2019, Wang, et al, 2022)
- Positive impact on labor through higher employee satisfaction and lower absenteeism and turnover (Galtry, 1997 Ball & Bennett, 2001, DHHS, 2008)



HEALTH AND ECONOMIC BENEFITS

Infant / Child

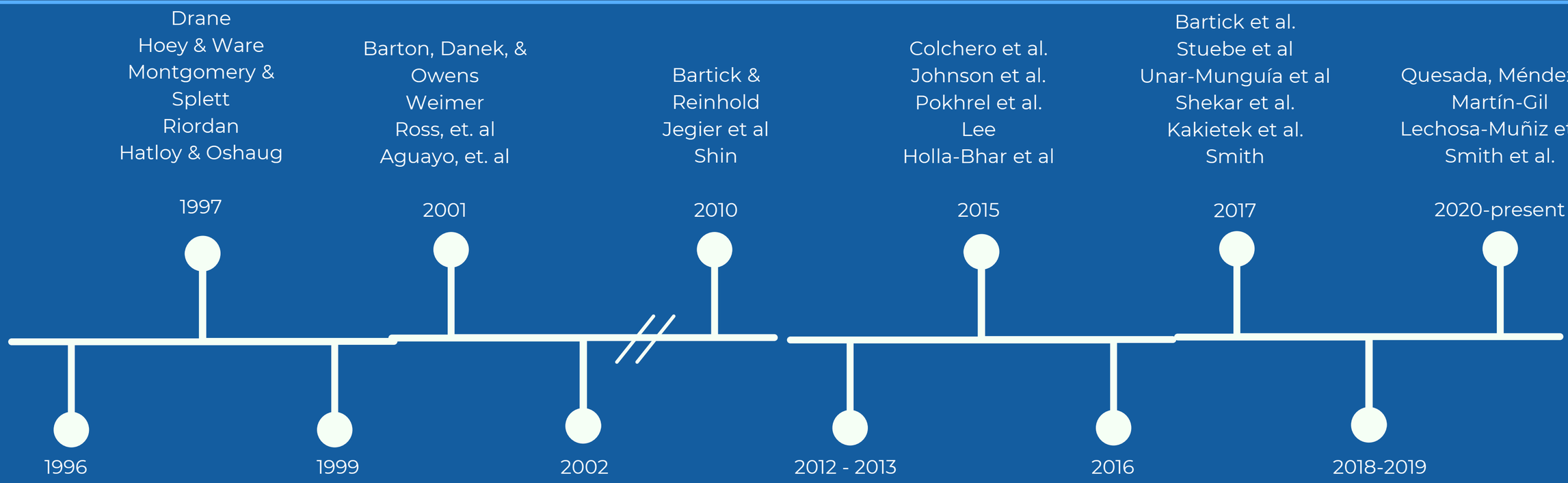
- Improved physiological stability, bonding, and attachment (Linde, et al 2020)
- Robust epidemiological evidence of lower risk of infectious disease, some chronic diseases, and mortality and associated cost savings/avoided (Renfrew et. al 2012, Bartick et. al, 2016, Victora, et al. 2016, Li, et al. 2021, Sankar et al. 2015, Bowatte, et al. 2015, Horta, et. al. 2013)
- Improved cognitive function and associated long term cost (Hanushek & Woessmann, 2008, Rollins, et al. 2016, Walters, et al., 2019)
- For preterm infants, documented dose/response relationship particularly for necrotizing enterocolitis (NEC) (Miller et al 2018.)

HEALTH AND ECONOMIC BENEFITS

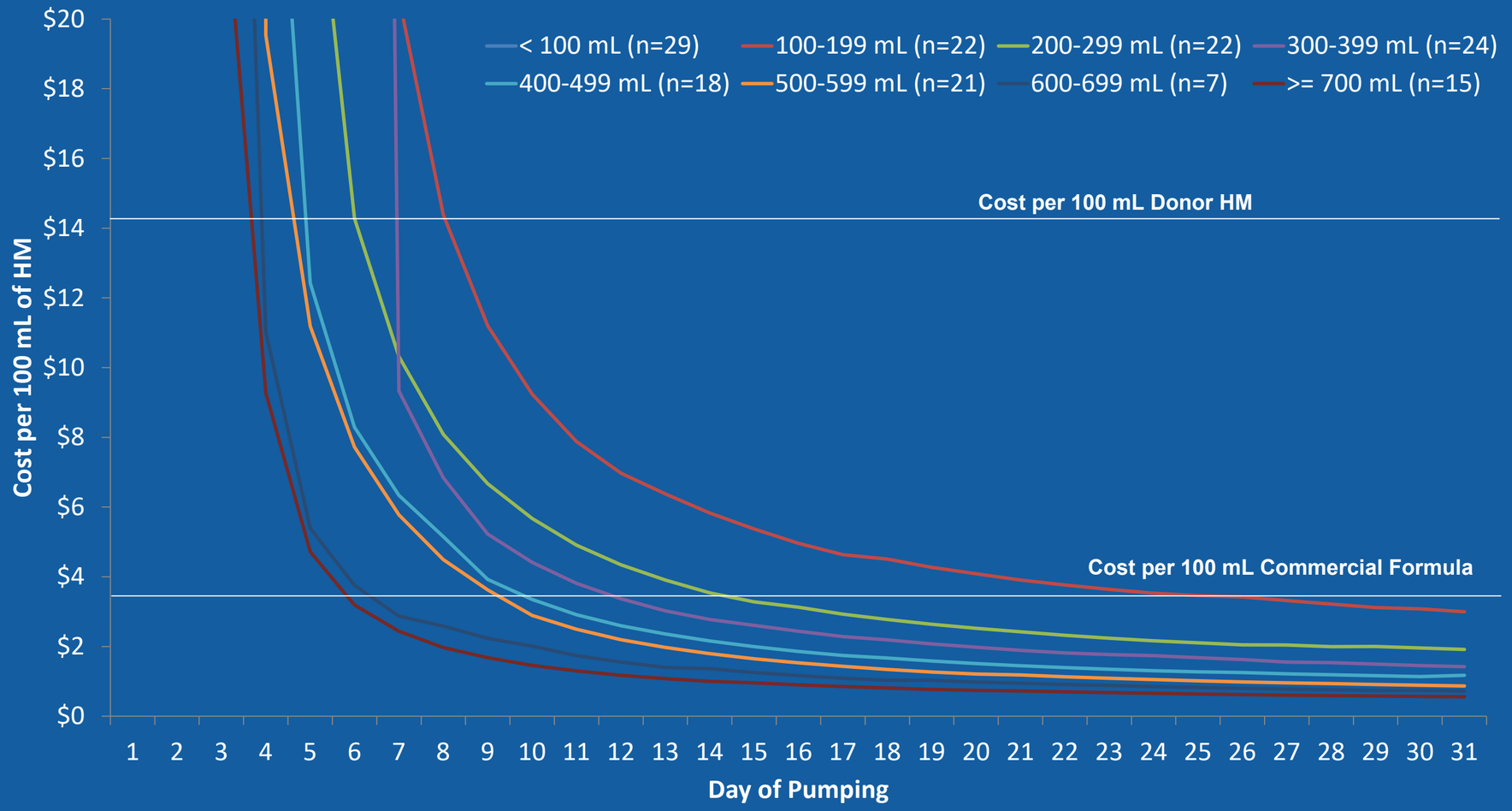
Society and the Environment

- Higher human capital potential and positive contribution to GDP (Rollins, et al. 2016, Smith, 2013, Smith, 2017)
- Cost savings/avoided from lower illness risk and preventable mortality (Renfrew et. al 2012, Bartick et. al, 2016, Victora, et al. 2016, Walters, et al., 2019)
- Lower environmental impact (Linnecar, et al 2014, Andresen, et. al 2022)

TIMELINE OF LACTATION ECONOMICS RESEARCH



HUMAN BREAST MILK (HM) FROM THE INFANT'S PARENT IS THE LEAST EXPENSIVE FEEDING OPTION FOR HOSPITALS



The day HM becomes less expensive:

- Is related to maternal production
- Is feasible in the first month of life only if average daily production is ≥100 mL

Jegier, BJ et al., 2013

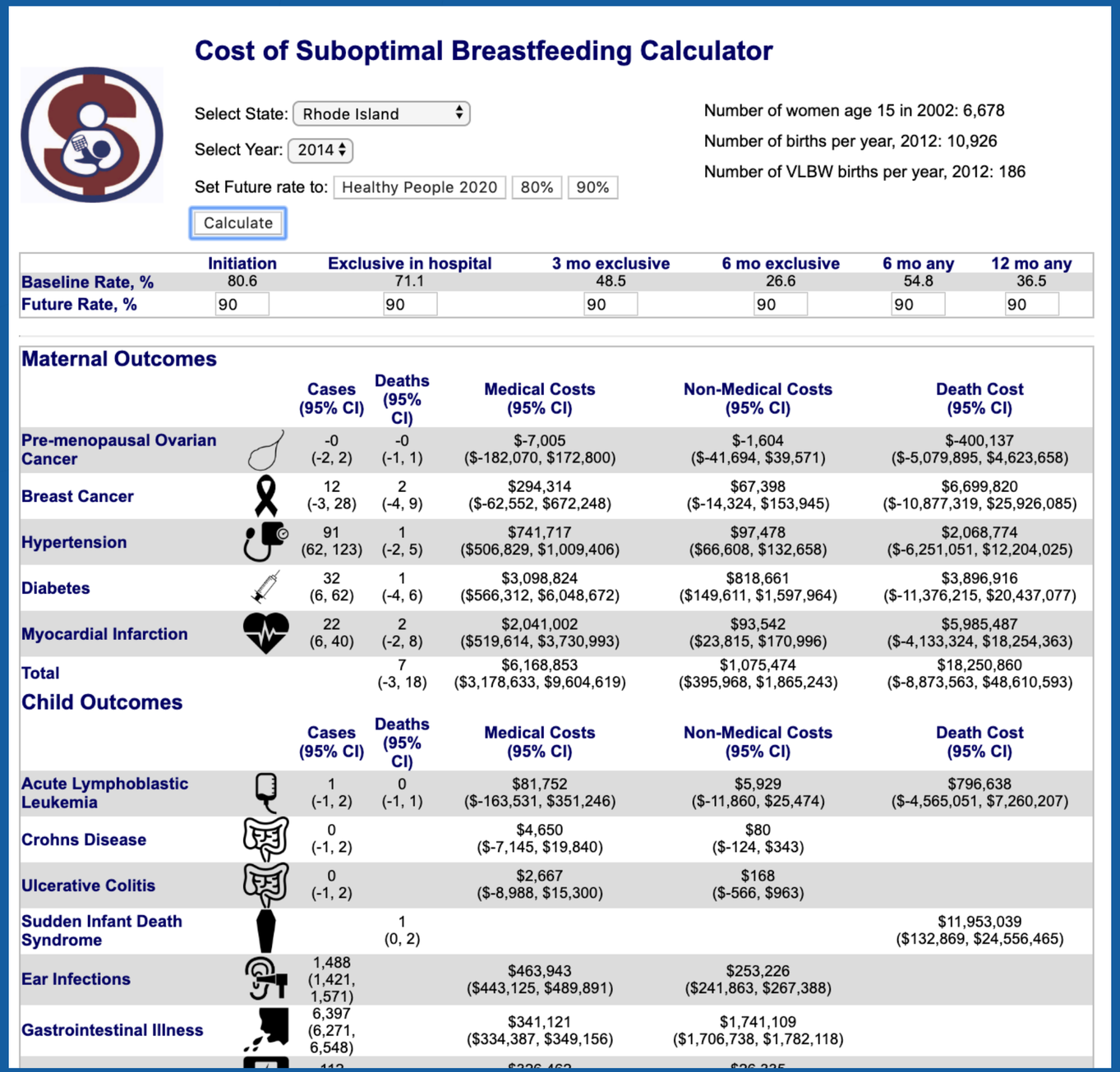
HOSPITAL STRATEGIES LIKE THE BABY FRIENDLY HOSPITAL INITIATIVE ARE RELATIVELY INEXPENSIVE.

A small case-series of 4 Academic Medical Centers identified the following costs per birth to obtain BFHI designation (US$2017)

External costs paid per birth: $4.94 ($3.65-$7.23)

Total cost paid per birth: $26.44 ($19.17-$65.34)

Conference Proceedings: Jegier, BJ et al., 2019



Cost of Suboptimal Breastfeeding Calculator

Select State: Rhode Island

Select Year: 2014

Set Future rate to: Healthy People 2020 | 80% | 90%

Calculate

Number of women age 15 in 2002: 6,678

Number of births per year, 2012: 10,926

Number of VLBW births per year, 2012: 186

	Initiation	Exclusive in hospital	3 mo exclusive	6 mo exclusive	6 mo any	12 mo any
Baseline Rate, %	80.6	71.1	48.5	26.6	54.8	36.5
Future Rate, %	90	90	90	90	90	90

Maternal Outcomes

	Cases (95% CI)	Deaths (95% CI)	Medical Costs (95% CI)	Non-Medical Costs (95% CI)	Death Cost (95% CI)
Pre-menopausal Ovarian Cancer	-0 (-2, 2)	-0 (-1, 1)	$-7,005 ($-182,070, $172,800)	$-1,604 ($-41,694, $39,571)	$-400,137 ($-5,079,895, $4,623,658)
Breast Cancer	12 (-3, 28)	2 (-4, 9)	$294,314 ($-62,552, $672,248)	$67,398 ($-14,324, $153,945)	$6,699,820 ($-10,877,319, $25,926,085)
Hypertension	91 (62, 123)	1 (-2, 5)	$741,717 ($506,829, $1,009,406)	$97,478 ($66,608, $132,658)	$2,068,774 ($-6,251,051, $12,204,025)
Diabetes	32 (6, 62)	1 (-4, 6)	$3,098,824 ($566,312, $6,048,672)	$818,661 ($149,611, $1,597,964)	$3,896,916 ($-11,376,215, $20,437,077)
Myocardial Infarction	22 (6, 40)	2 (-2, 8)	$2,041,002 ($519,614, $3,730,993)	$93,542 ($23,815, $170,996)	$5,985,487 ($-4,133,324, $18,254,363)
Total		7 (-3, 18)	$6,168,853 ($3,178,633, $9,604,619)	$1,075,474 ($395,968, $1,865,243)	$18,250,860 ($-8,873,563, $48,610,593)

Child Outcomes

	Cases (95% CI)	Deaths (95% CI)	Medical Costs (95% CI)	Non-Medical Costs (95% CI)	Death Cost (95% CI)
Acute Lymphoblastic Leukemia	1 (-1, 2)	0 (-1, 1)	$81,752 ($-163,531, $351,246)	$5,929 ($-11,860, $25,474)	$796,638 ($-4,565,051, $7,260,207)
Crohns Disease	0 (-1, 2)		$4,650 ($-7,145, $19,840)	$80 ($-124, $343)	
Ulcerative Colitis	0 (-1, 2)		$2,667 ($-8,988, $15,300)	$168 ($-566, $963)	
Sudden Infant Death Syndrome		1 (0, 2)			$11,953,039 ($132,869, $24,556,465)
Ear Infections	1,488 (1,421, 1,571)		$463,943 ($443,125, $489,891)	$253,226 ($241,863, $267,388)	
Gastrointestinal Illness	6,397 (6,271, 6,548)		$341,121 ($334,387, $349,156)	$1,741,109 ($1,706,738, $1,782,118)	

Increasingly there are tools that you can use to project the value of improving breastfeeding and lactation in your community.

US calculator: (Available on the US Breastfeeding Committee website)

Stuebe, A. M., et al. (2017)

In Revision: Jegier & Bartick

The cost of inadequate breastfeeding due to preventable deaths.

Child mortality	$232,852,013
Maternal mortality	$52,198,483
Combined child and maternal mortality	$285,050,496
Total as % GNI	0.053%

The cost of inadequate breastfeeding due to cognitive losses

Total in USD	$3,976,034,327
As a % GNI	0.735%

The total cost of inadequate breastfeeding (combined health system, mortality, and cognitive losses)

Total in USD	$4,284,267,125
As a % GNI	0.114%

Increasingly there are tools that you can use to project the value of improving breastfeeding and lactation in your community.

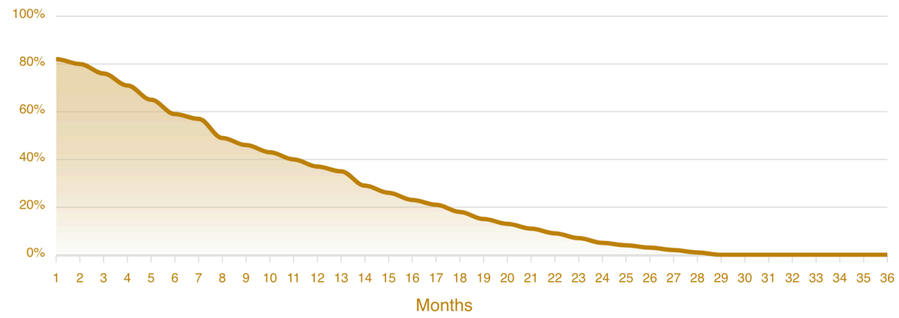
Global Cost of Not Breastfeeding Calculator (Available on the Alive & Thrive website)

Walters, D. D., et al., 2019

United States of America

ISO Code: USA
Region: North America
Income class: High-Income
Data collection year: 2018
Data source: Partial data, Source: National survey
Number of data points: 28
No. of livebirths: 3,991,000
Year: 2020
Exchange rate US$ 1: 1
Currency: US Dollar
CurrencyCode: USD
Currency rate date: 01-Apr-23

Prevalence of Breastfeeding



Milk Production, Value and Loss

All three years (0-35.9 months)	Milk volume in million liters	Value in million USD	Value in million USD
1. Actual annual production of breastmilk	604.55	60,454.52	60,454.52
2. Potential production of breastmilk	1,686.13	168,612.88	168,612.88
3. Lost breastmilk	1,081.58	108,158.36	108,158.36
4. Percent lost	64%		

Increasingly there are tools that you can use to project the value of improving breastfeeding and lactation in your community.

Mother's Milk Tool (Available at https://mothersmilktool.org/#/)

Smith, et al., 2023

SUMMARY OF EXISTING LITERATURE

STRENGTHS

- Robust epidemiological models that provide risk ratios for a wide variety of maternal health and child health and development outcomes by infant feeding exposure
- Costs estimates measured from multiple perspectives including individual, institutional/payer, and societal
- Over the past 12 years, marked increase in the availability of geographically diverse estimates
- Electronic tools that are readily accessible to policymakers and the public

WEAKNESSES

- Limitation of observational designs on causality
- Limitations of existing studies measurement and definition of the “exposed population” and of incidence ratios
- Methodological assumptions and technical weaknesses related to costing, discounting, and sensitivity analyses
- Unpaid work for lactation related activities and for the care of illness are largely unaccounted for in existing studies
- Limited research on the price elasticity and externalities of breastfeeding and lactation

EXTERNALITIES AND ELASTICITIES

Externality: Condition where the consumption, production, and investment decisions of individuals, households, and firms affect people not directly involved in the transactions. Individuals, households, and firms do not internalize the indirect costs of or the benefits from their economic transactions. (Helbling, 2010)

Elasticity: A measure of the sensitivity of a variable in accordance with another variable's change. (Economic Times, 2024)

EXTERNALITIES AND ELASTICITIES

Breastfeeding is the biological norm that connects all mammalian species

Mother/Parent/ Surrogate

Time

Energy

Environment

ALTERNATIVE OR SUBSTITUTE?

Substitute: products or services in different forms that have the same functionality

Alternative: products or services with different functions that serve the same purpose

(Hopkins, 2024, Hamilton, et. al 2014)

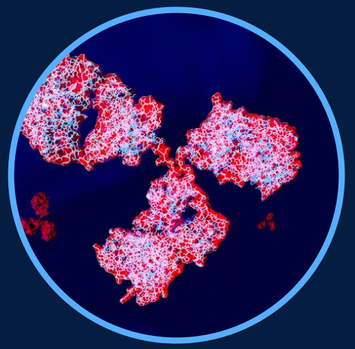
ALTERNATIVE OR SUBSTITUTE?

Breastfeeding is the biological norm that connects all mammalian species

Nutrition

Bonding

Early life programming of gut microbiota



Signaling to young & provision of immunity

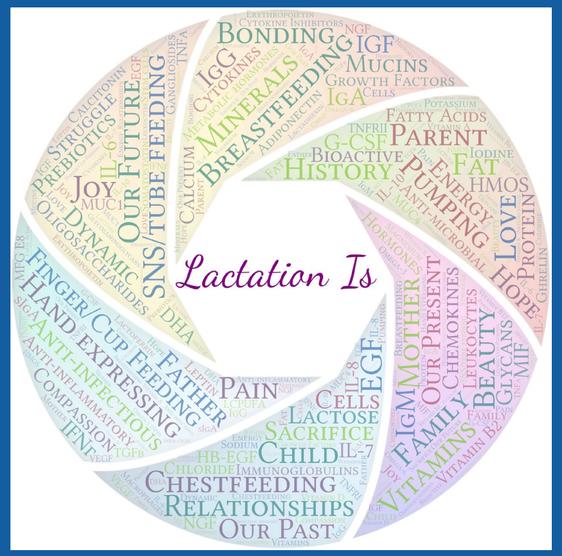
SUMMARY

Breastfeeding and lactation have significant health and economic impact at the individual, familial, institutional, and societal levels.

Regardless of measure, investing in the infant's breastfeeding/lactating mother/parent FIRST is the most economically efficient approach for generating health and cost benefits.

There are many free tools available that you can use to estimate the potential impact of your breastfeeding interventions.

Greater research is needed to understand the economics of human milk lactation as well as the mechanisms for incentives and optimal support through public health programs, health care delivery systems, insurance, and other societal investments.


Lactation Is
Bonding
IGF
Mucins
IgG
Cytokines
Minerals
Growth Factors
IgA
Breastfeeding
Fatty Acids
Parent
G-CSF
Bioactive
History
Fat
Pumping
Energy
HMOs
Joy
Our Future
SNS/Tube Feeding
Love
Protein
Hope
Dynamic
Finger/Cup Feeding
Father
Hand Expressing
Anti-Infectious
Anti-Inflammatory
Pain
Cells
Lactose
Sacrifice
Child
Chestfeeding
Relationships
Our Past
EGF
Mother
Our Present
Chemokines
Leukocytes
Family
Beauty
Glycans
MIF
IgM
Vitamins

IMAGINE

OPPORTUNITIES FOR NEXT STEPS

Research and Sponsored Projects

Partnering across disciplines to pursue funding opportunities and to demonstrate efficacy of different care models.

Talent Development and Deployment

Utilizing the multi-sector nature and opportunity in breastfeeding and lactation to create a continuum of care and support wherever there is a need.

Recognition and Service

Intentionally partnering in care models as well as distributing service to the professions to maximize impact at the local, state, and national levels.

Thank you for your time!

Please share your questions now.

Connect on Linkedin