



Breastmilk Transmitted Infections

Nellie Said, MD

UCI-CHOC Pediatrics



Rates of Breastfeeding

United States (2015, CDC Report)

4 out of 5 (83.2%) started to breastfeed

Half (57.6%) were breastfeeding
at 6 months

Over one-third (35.9%) were breastfeeding
at 12 months

Worldwide (2018, UNICEF Report)

95% of babies receive breastmilk at some point

Low- and middle-income countries
4% are never breastfed

High-income countries
21% of babies are never breastfed

Major Protective and Anti-inflammatory Factors in Human Milk

Factors	Function
Immunoglobulins Secretory IgA, IgM, IgG	Generate immune response to specific antigens
Lactoferrin	Antibacterial effect, especially against <i>Escherichia coli</i> , inhibition of complement, carries iron
Lysozyme	Bactericidal and anti-inflammatory
Casein	Inhibits microbial adhesion to mucosal membranes
Lipids	Protect against enveloped viruses, anti-infective efforts
Prostaglandins	Cytoprotective
Cytokines	Activate the immune system
Glycoconjugates	Antiviral, antibacterial protection
Phagocytes	Absorb pathogens, release IgA
Lymphocytes	Essential for cell-mediated immunity; antiviral activity Memory T cells give long-term protection
Prolactin	Enhances development of B and T lymphocytes Stimulates proliferation of intestinal mucosa
Human growth factors	Mucosal barrier to antigens

Immunologic Benefits of Breastfeeding

Gastrointestinal benefits from Ig

- Infantile diarrhea
- Enteric pathogens: *Campylobacter jejuni*, *Clostridium difficile*, *Escherichia coli*, *Giardia lamblia*, rotavirus, *Salmonella typhimurium*, *Shigella sp*, and *Vibrio cholerae*

Respiratory tract benefits

- Protection against ear infections
- Atopic protection
- *Haemophilus influenza* bacteremia and meningitis
- *Streptococcus pneumonia* pneumonia
- Protection against RSV

Non-infectious Contraindications

Medical Disorders

Galactosemia

Medications Contraindicated During Breastfeeding

Not a Contraindication

Tobacco smoking

Breast Cancer (when not on chemo)

Cow's milk protein allergy

Drug/Class	Possible Adverse Effects in Infant
Antineoplastic agents	Fetal death, congenital anomalies, organ system toxicity
Immunosuppressants	Potential suppression of the immune system
Lithium	High potential for toxicity
Chloramphenicol	Blood dyscrasias, aplastic anemia
Ergot alkaloids	Ergotism poisoning
Radiopharmaceuticals	Potential toxicity; brief to full interruption of breastfeeding recommended
Bromocriptine	Suppresses prolactin secretion; hyperprolactinemic mothers taking drug can breastfeed successfully
Iodides	Thyroid suppression

Infectious Contraindications - Viral

Virus	Impact on Breastfeeding
HIV-1, HIV-2	Contraindicated
HTLV-1, HTLV-2	Contraindicated
Hepatitis B virus (HBV)	Not contraindicated, especially if infant receives HBV vaccine and HBV immune globulin
Hepatitis C virus	Not contraindicated. Nipple cracks or fissures may pose a risk for transmission.
Herpes simplex virus	Contraindicated only if active breast lesions are present
Cytomegalovirus	Not contraindicated. Some experts recommend stopping breastfeeding of preterm and immunosuppressed infants if mother becomes infected during lactation.
Rubella virus	Not contraindicated
West Nile virus	Not contraindicated

HIV=human immunodeficiency virus, HTLV=human T-cell lymphoma/leukemia virus

Active Zika virus infection is not contraindicated at this time

Infectious Contraindications - Viral

Virus	Impact on Breastfeeding
HIV-1, HIV-2	Contraindicated
HTLV-1, HTLV-2	Contraindicated
Hepatitis B virus (HBV)	Not contraindicated, especially if infant receives HBV vaccine and HBV immune globulin
Hepatitis C virus	Not contraindicated. Nipple cracks or fissures may pose a risk for transmission.
Herpes simplex virus	Contraindicated only if active breast lesions are present
Cytomegalovirus	Not contraindicated. Some experts recommend stopping breastfeeding of preterm and immunosuppressed infants if mother becomes infected during lactation.
Rubella virus	Not contraindicated
West Nile virus	Not contraindicated

HIV=human immunodeficiency virus, HTLV=human T-cell lymphoma/leukemia virus

Active Zika virus infection is not contraindicated at this time



Infectious Contraindications - Bacterial

Maternal Tuberculosis

Breast abscess where infant's mouth is in direct contact with purulent drainage

Not a Contraindication

Breast Abscess

Breast Cellulitis

Mastitis



Maternal Tuberculosis

Contraindicated

- Active and untreated
- Multi-drug resistant TB
- Mother must wear a mask

Not Contraindicated

- Infant is on isoniazid prophylactic therapy
- Mother is receiving complete treatment with 2 evidence of active infection in 2 weeks (sputum culture)

References

- Chandran, L. and P. Gelfer (2006). "Breastfeeding: The Essential Principles." Pediatrics in Review **27**(11): 409-417.
- American Academy of Pediatrics. Transmission of Infectious Agents via Human Milk. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. *Red Book: 2018 Report of the Committee on Infectious Diseases*. American Academy of Pediatrics; 2018; 115-121
- <https://www.cdc.gov/breastfeeding/data/reportcard.htm>
- https://www.unicef.org/publications/index_102824.html