antimicrobial therapy or immunizations: Very few contraindications to breastfeeding

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The Canadian Paediatric Society, Health Canada, the Dietitians of Canada and the Breastfeeding Committee for Canada, as well as the American Academy of Pediatrics, all recommend exclusive breastfeeding as the optimal method of infant feeding for the first six months of life for healthy, term infants.1,2 There are many benefits associated with breastfeeding: nutritional, immunological, psychological, developmental, environmental, social, economic and health-related (eg, a decreased risk of infectious diseases).1,2 To support breastfeeding, every effort must be made to minimize contraindications to breastfeeding, particularly unnecessary ones. The present article summarizes:

• the maternal infectious diseases for which continuing to breastfeed is recommended,
• the very few infectious diseases for which breastfeeding is not recommended,
• the rare instances where maternal antimicrobial therapy indicates a caution for breastfeeding, and
• when to continue breastfeeding as a mother, or her infant, receives a routine recommended immunization.

Maternal infectious diseases and breastfeeding

Almost immediately after birth, infants acquire intestinal flora that are seeded from their mother’s microbiota. An infant’s microbiota flora vary by mode of delivery3 and are further shaped by genetics, environment, and the mode of feeding.3,4 Breast milk influences the infant’s intestinal microbiota by contributing maternal skin organisms as well as components that nurture some microbes and offer protection from others.4,5 Breast milk also directly influences development of the infant’s immune system,4,5 and breastfeeding impacts health in many positive ways.2

While breast milk can be a source of maternally derived commensal and pathogenic microorganisms,6 there are very few maternal infectious diseases for which the cessation or interruption of breastfeeding is indicated.2

When a nursing mother presents with symptoms of an infectious disease, she has already exposed her infant to the pathogen. Cessation of breastfeeding does not prevent exposure, and may instead decrease the infant’s protection that comes through specific maternal antibodies and other protective factors found in human milk. Therefore, common maternal bacterial, fungal and viral infections in which the mother’s health is not compromised are not contraindications to breastfeeding (Table 1).
<table>
<thead>
<tr>
<th>Maternal infection/disease</th>
<th>Microbial agent(s)</th>
<th>Breastfeeding recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bacteria</strong></td>
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</table>
| Mastitis and breast abscesses | Staphylococcus aureus  
  Streptococcus species  
  Gram negative species: Escherichia coli  
  Rarely: Salmonella species, mycobacteria, Candida, Cryptococcus | Continue breastfeeding unless there is obvious pus, in which case pump milk and discard from the infected breast and continue to breastfeed from the other breast |
| Tuberculosis (TB)         | Mycobacterium tuberculosis                                                      | Main route of transmission is airborne, not via organisms in milk. With active untreated TB, delay direct breastfeeding until mother has received 2 weeks of appropriate anti-TB therapy; provide TB prophylaxis for infant.* Infant can be fed expressed breast milk during the 2-week period. |
| Urinary tract infection  | Gram negatives species: E coli, etc.                                             | Continue breastfeeding                                                                       |
| Bacterial infection abdominal wall post-cesarean section | Skin microbes                                                                 | Continue breastfeeding                                                                       |
| Diarrhea                  | Salmonella, Shigella, E coli, Campylobacter                                      | Continue breastfeeding. Practice meticulous hand hygiene                                      |
| Other bacterial infections where the mother’s physical condition and general health is not compromised | Wide range of bacterial microbes                                                 | Continue breastfeeding                                                                       |
| Brucellosis               | Brucella abortus, Brucella melitensis, Brucella suis, rarely Brucella canis    | Discontinue breastfeeding with untreated maternal brucellosis; infections might be passed through breast milk |
| **Parasites**             |                                                                                  |                                                                                               |
| Malaria                   | Plasmodium species                                                              | Continue breastfeeding                                                                       |
| **Fungi**                 |                                                                                  |                                                                                               |
| Candidal vaginitis        | Candida                                                                         | Continue breastfeeding. Practice meticulous hand hygiene                                      |
| **Viruses**               |                                                                                  |                                                                                               |
| Cytomegalovirus (CMV)     |                                                                                  | Continue breastfeeding with latent or active maternal CMV infection                           |
Hepatitis
- **Hepatitis A virus**: Continue breastfeeding; immunoglobulin prophylaxis for the infant. Practice meticulous hand hygiene

- **Hepatitis B virus**: Continue breastfeeding; routine prevention of infant HBV infection with HBIG at birth; immunization with HBV vaccine

- **Hepatitis C virus**: Continue breastfeeding; immunization with HBV vaccine

Herpes simplex virus
- **HSV-1, HSV-2**: Continue breastfeeding. Practice meticulous hand hygiene. Cover oral labial lesions with a mask. If there are lesions on the breast/HSV mastitis, verify that it is HSV not varicella-zoster virus. Interrupt direct breastfeeding until lesions are crusted over. Use expressed breast milk

Chickenpox, shingles
- **Varicella-zoster virus (VZV)**: Continue breastfeeding. For perinatal VZV, give VZIG; for postpartum, consider VZIG

Enterovirus
- Continue breastfeeding. Practice meticulous hand hygiene

HIV
- Breastfeeding and expressed breast milk both contraindicated. See text for details.

Human T-cell lymphotrophic virus type I or II
- Breastfeeding and expressed breast milk both contraindicated

Parvovirus
- Continue breastfeeding

West Nile virus
- Continue breastfeeding

Data from references 2, 5-9. HBIG Hepatitis B immune globulin; VZIG Varicella-zoster immune globulin


Maternal bacterial infections are rarely complicated by transmission to the infant through breastfeeding, with the possible exception of brucellosis. Mothers with mastitis or breast abscesses should be encouraged to continue breastfeeding. In instances of breast abscess where pain interferes with breastfeeding, the infant can continue to breastfeed on the nonabscessed breast. Similarly, maternal tuberculosis (TB) is compatible with breastfeeding, provided the mother is not contagious or she has received two weeks of appropriate TB treatment. Because transmission of TB is airborne and the infection cannot be transferred in human milk, continuing to breastfeed while on TB therapy is not a problem. TB medications appear to be safe to use while breastfeeding. The breastfed neonates of women on isoniazid therapy do not need pyridoxine supplementation, unless they are receiving isoniazid themselves. If mother and infant are both taking isoniazid, there may be concerns about possible excessive drug concentration in the infant. Consultation with an expert is indicated.

With parasitic infections such as malaria, breastfeeding should be continued provided the mother’s clinical condition allows for it. While the antimalarials chloroquine, hydroxychloroquine and quinine are found in variable quantities in breast milk, all three are regarded as compatible with breastfeeding unless the infant has glucose-6-phosphate dehydrogenase (G6PD) deficiency, in which case withdrawal of quinine is advised. Similarly, primaquine should not be used unless both mother and infant have normal G6PD levels. Precautions to minimize insect-borne infections should be encouraged. Insect repellents help to reduce mosquito bites, which may transmit malaria or viruses such as West Nile. There are no reported adverse events following use of repellents containing diethyltoluamide or icaridin/picaridin in breastfeeding mothers.

While maternal fungal infections such as candidal vaginitis can lead to infant colonization, this is not a contraindication to breastfeeding, nor is maternal treatment with topical or systemic antifungal agents such as fluconazole.
For most maternal viral infections, ongoing breastfeeding is recommended with few exceptions (Table 1). In cases of maternal HIV infection, breastfeeding is not recommended in resource-rich settings such as Canada, where a safe and culturally accepted replacement is available, because HIV transmission from mother to infant is well documented. Emotional support for the mother who cannot breastfeed may be required. In some instances, financial support for purchasing formula may also be necessary. In resource-limited regions of the world, and based on evaluation of current best evidence, the WHO recommends that HIV-positive mothers or their HIV-exposed infants take antiretroviral drugs throughout the period of breastfeeding and continue to breastfeed until the infant is 12 months old. The infant can reap the benefits of breastfeeding with minimal risk of becoming infected with HIV.

Breastfeeding is also not advised for mothers with human T-lymphotropic virus type 1 or 2 infection. In mothers with latent cytomegalovirus (CMV) infection, the virus reactivates in breast milk during the postpartum period and can be transmitted to the infant with breastfeeding. However, transmittal does not pose a risk to the term infant because serious disease is prevented by placentally transferred maternal antibody. Even in preterm infants, the value of breastfeeding appears to outweigh the potential risks of severe disease from breast milk-acquired CMV infection in the neonatal period. A definitive association with delayed development or sensorineural hearing loss has not been proven. Thus, breast feeding is recommended with both maternal latent and active CMV infection.

**Maternal antimicrobial therapy and breastfeeding**

<table>
<thead>
<tr>
<th>Maternal antimicrobial therapy</th>
<th>Breastfeeding recommendation</th>
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<tbody>
<tr>
<td><strong>Antibiotics</strong></td>
<td></td>
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<tr>
<td>Group 1: Penicillins, cephalosporins, carbapenems, macrolides, aminoglycosides, quinolones</td>
<td>Continue breastfeeding</td>
</tr>
<tr>
<td>Group 2: High-dose metronidazole</td>
<td>Discontinue breastfeeding for 12 h to 24 h to allow excretion of dose</td>
</tr>
<tr>
<td>Group 3: Chloramphenicol</td>
<td>Caution: Possible idiosyncratic bone marrow suppression</td>
</tr>
<tr>
<td>Group 4: Trimethoprim/sulfamethoxazole, sulfisoxazole, dapsone</td>
<td>Proceed with caution if nursing infant has jaundice or G6PD deficiency, and also if the child is ill, stressed or premature</td>
</tr>
<tr>
<td><strong>Antitubercular drugs</strong></td>
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<tr>
<td>Isoniazid, rifampin, streptomycin, ethambutol</td>
<td>Continue breastfeeding. Infants only need pyridoxine supplementation if receiving isoniazid themselves</td>
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<tr>
<td><strong>Antiparasitics</strong></td>
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</tr>
<tr>
<td>Group 1: Chloroquine, quinidine, ivermectin; maternal topical diethyltoluamide or icaridin/picaridin</td>
<td>Continue breastfeeding</td>
</tr>
<tr>
<td>Group 2: Primaquine, quinine</td>
<td>Contraindicated during breastfeeding unless both mother and baby have normal G6PD levels</td>
</tr>
<tr>
<td><strong>Antifungals</strong></td>
<td></td>
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<tr>
<td>Fluconazole, ketoconazole</td>
<td>Continue breastfeeding</td>
</tr>
<tr>
<td><strong>Antivirals</strong></td>
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<tr>
<td>Acyclovir, valacyclovir, amantadine</td>
<td>Continue breastfeeding. If considering prolonged use of amantadine, observe for milk suppression, as it can suppress prolactin production</td>
</tr>
</tbody>
</table>

Data from references 2,12,19 and LactMed. G6PD Glucose-6-phosphate dehydrogenase

**Maternal immunization and breastfeeding**

Breastfeeding is not a contraindication to the administration of routine recommended vaccines to the infant or the mother. Breastfeeding during immunization can help mitigate the infant's pain and should be encouraged.[23]

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**References**


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