

- Amount of the drug excreted into human milk.
- Extent of oral absorption by the breastfeeding infant.
- Potential adverse effects on the breastfeeding infant.
- Age of the infant.

Toxicity to the infant can occur if the drug enters the milk in pharmacologically significant quantities. The concentration in milk of some drugs (for example, iodides) may exceed the concentration in the maternal plasma so that therapeutic doses in the mother may cause toxicity to the infant. Some drugs inhibit the infant's sucking reflex (for example, phenobarbital). Drugs in breast milk may, at least theoretically, cause hypersensitivity in the infant even when the concentration is too low for a pharmacological effect.

The following table lists drugs: which should be used with caution or which are contraindicated in breast-feeding for the reasons given above; which, on present evidence, may be given to the mother during breast-feeding, because they appear in milk in amounts which are too small to be harmful to the infant; which are not known to be harmful to the infant although they are present in milk in significant amounts.

For many drugs sufficient evidence is not available, and it is advisable to administer only drugs essential to a mother during breast-feeding. Because of the inadequacy of information on drugs in breast milk the following table should be used only as a guide; absence from the table does not imply safety.

Advice in the table may differ from other sources, including manufacturer's product literature.

Table 1.3 : Breast feeding and drugs

Drug	Comments
Abacavir	Antiretroviral drugs may be present in breast milk, and may reduce viral load in breast milk and reduce the risk of transmission through breast-feeding. However, the concentration of antiretroviral drugs in breast milk may not be adequate to prevent viral replication and there is therefore possibility of promoting the development of drug-resistant virus which could be transmitted to the infant. Avoid breast-feeding if possible. Otherwise, exclusive breast-feeding is recommended during the first months of life, then should be discontinued as soon as feasible
Acetazolamide	Amount too small to be harmful
Aciclovir	Significant amount in milk after systemic administration, but considered safe to use
Alcohol	Large amounts may affect infant and reduce milk consumption
Allopurinol	Present in milk—not known to be harmful
Amiloride	Manufacturer advises avoid—no information available
Amitriptyline	Presence in milk possible; monitor infant
Amlodipine	Presence in milk possible; monitor infant
Amoxicillin	Trace amounts in milk; safe in usual dosage; monitor infant
Amoxicillin + clavulanic acid	Trace amounts in milk
Ampicillin	Trace amounts in milk; safe in usual dosage; monitor infant

Drug	Comments
Artemether + lumefantrine	Discontinue breast-feeding during and for 1 week after stopping treatment; present in milk in animal studies
Asparaginase	Breast-feeding contraindicated
Aspirin	Short course safe in usual dosage; monitor infant; regular use of high doses could impair platelet function and produce hypoprothrombinaemia in infant if neonatal vitamin K stores low; possible risk of Reye syndrome
Atenolol	Significant amounts in milk; safe in usual dosage; monitor infant
Atropine	Small amount present in milk; monitor infant
Azathioprine	Breast-feeding contraindicated
Azithromycin	Present in milk; limited information available—use only if no suitable alternative
Beclometasone	Systemic effects in infant unlikely with maternal dose of less than equivalent of prednisolone 40 mg daily; monitor infant's adrenal function with higher doses—the amount of inhaled drug in breast milk is probably too small to be harmful
Benzathine penicillin	Trace amounts in milk; safe in usual dosage; monitor infant
Benzyl-penicillin	Trace amounts in milk; safe in usual dosage; monitor infant
Betamethasone	Systemic effects in infant unlikely with maternal dose of less than equivalent of prednisolone 40 mg daily; monitor infant's adrenal function with higher doses
Bleomycin	Breast-feeding contraindicated
Bupivacaine	Amount too small to be harmful
Carbamazepine	Continue breast-feeding; adverse effects possible (severe skin reaction reported in 1 infant), monitor infant for drowsiness
Cefixime	Probably present in milk but safe in usual dosage; monitor infant
Ceftazidime	Excreted in low concentrations; safe in usual dosage; monitor infant
Ceftriaxone	Excreted in low concentrations; safe in usual dosage; monitor infant
Chlorambucil	Breast-feeding contraindicated
Chloramphenicol	Continue breastfeeding; use alternative drug if possible; may cause bone-marrow toxicity in infant; concentration in milk usually insufficient to cause 'gray baby syndrome'
Chloroquine	For malaria prophylaxis, amount probably too small to be harmful; inadequate for reliable protection against malaria; avoid breast-feeding when used for rheumatic disease
Chlorpheniramine	Safe in usual dosage; monitor infant for drowsiness
Chlorpromazine	Continue breast-feeding; adverse effects possible; monitor infant for drowsiness
Ciclosporin	Present in milk—manufacturer advises avoid
Ciprofloxacin	Continue breast-feeding; use alternative drug if possible; high concentrations in breast milk
Cisplatin	Breast-feeding contraindicated

Drug	Comments
Clindamycin	Amount probably too small to be harmful but bloody diarrhoea reported in 1 infant
Clofazimine	Limited information available—can cause reversible skin discoloration in nursing infant
Clomifene	May inhibit lactation
Clomipramine	Small amount present in milk; continue breastfeeding; adverse effects possible; monitor infant for drowsiness
Cloxacillin	Trace amounts in milk; safe in usual dosage; monitor infant
Codeine	Amount too small to be harmful
Contraceptives, oral	Combined oral contraceptives may inhibit lactation—use alternative method of contraception until weaning or for 6 months after birth; progestogen-only contraceptives do not affect lactation (preferably start 6 weeks after birth or later)
Cyclophosphamide	Breast-feeding contraindicated during and for 36 hours after stopping treatment
Cytarabine	Breast-feeding contraindicated
Dacarbazine	Breast-feeding contraindicated
Dactinomycin	Breast-feeding contraindicated
Dapsone	Although significant amount in milk risk to infant very small; continue breast-feeding; monitor infant for jaundice
Daunorubicin	Breast-feeding contraindicated
Deferoxamine	Manufacturer advises use only if potential benefit outweighs risk—no information available
Dexamethasone	Systemic effects in infant unlikely with maternal dose of less than equivalent of prednisolone 40 mg daily; monitor infant's adrenal function with higher doses
Diazepam	Continue breast-feeding; adverse effects possible; monitor infant for drowsiness
Didanosine	see abacavir
Digoxin	Amount too small to be harmful
Diloxanide	Manufacturer advises avoid
Dimercaprol	Avoid
Doxorubicin	Contraindicated
Doxycycline	Continue breastfeeding; use alternative drug if possible (absorption and therefore discoloration of teeth in infant probably usually prevented by chelation with calcium in milk)
Efavirenz	see abacavir
Eflornithine	Avoid
Enalapril	Amount probably too small to be harmful
Ephedrine	Irritability and disturbed sleep reported
Ergocalciferol	Caution with high doses; may cause hypercalcaemia in infant
Erythromycin	Only small amounts in milk—not known to be harmful
Ethambutol	Amount too small to be harmful
Ethinylestradiol	Use alternative method of contraception; may inhibit lactation; see also contraceptives, oral
Ethosuximide	Significant amount in milk; continue breast-feeding; adverse effects possible; monitor infant for drowsiness
Etoposide	Contraindicated
Fluconazole	Present in milk; safe in usual dosage; monitor infant

Drug	Comments
Flucytosine	Manufacturer advises avoid
Fluorouracil	Discontinue breast-feeding
Fluphenazine	Amount excreted in milk probably too small to be harmful; continue breast-feeding; adverse effects possible; monitor infant for drowsiness
Furosemide	Amount too small to be harmful
Gentamicin	Amount probably too small to be harmful; monitor infant for thrush and diarrhoea
Glibenclamide	Theoretical possibility of hypoglycaemia in infant
Griseofulvin	Avoid—no information available
Haloperidol	Amount present in milk probably too small to be harmful; continue breast-feeding; adverse effects possible; monitor infant for drowsiness
Halothane	Present in milk
Hydralazine	Present in milk but not known to be harmful; monitor infant
Hydrochlorothiazide	Continue breast-feeding; may inhibit lactation
Hydrocortisone	Systemic effects in infant unlikely with maternal dose of less than equivalent of prednisolone 40 mg daily; monitor infant's adrenal function with higher doses
Ibuprofen	Amount too small to be harmful; short courses safe in usual doses
Imipenem + cilastatin	Present in milk—manufacturer advises avoid
Indinavir	see abacavir
Insulin	Amount too small to be harmful
Iodine	Stop breast-feeding; danger of neonatal hypothyroidism or goitre; appears to be concentrated in milk
Isoniazid	Monitor infant for possible toxicity; theoretical risk of convulsions and neuropathy; prophylactic pyridoxine advisable in mother and infant
Ivermectin	Avoid treating mother until infant is 1 week old
Lamivudine	Present in milk; see abacavir
Levamisole	Breast-feeding contraindicated
Levodopa + carbidopa	Present in milk—levodopa may inhibit lactation
Levonorgestrel	Combined oral contraceptives may inhibit lactation—use alternative method of contraception until weaning or for 6 months after birth; progestogen-only contraceptives do not affect lactation (preferably start 6 weeks after birth or later)
Levothyroxine	Amount too small to affect tests for neonatal hypothyroidism
Lidocaine	Amount too small to be harmful
Lithium	Present in milk and risk of toxicity in infant; continue breast-feeding; monitor infant carefully, particularly if risk of dehydration
Lopinavir + ritonavir	see abacavir
Lumefantrine	see artemether + lumefantrine
Mebendazole	Amount too small to be harmful

Drug	Comments
Medroxy-progesterone	Present in milk—no adverse effects reported (preferably start injectable contraceptive 6 weeks after birth or later)
Mefloquine	Present in milk but risk to infant minimal
Mercapto-purine	Breast-feeding contraindicated
Metformin	Present in milk but safe in usual doses; monitor infant
Methadone	Withdrawal symptoms in infant; dose should be as low as possible and infant monitored to avoid sedation
Methotrexate	Breast-feeding contraindicated
Methyldopa	Amount too small to be harmful
Metoclopramide	Present in milk; adverse effects possible; monitor infant for adverse effects
Metronidazole	Significant amount in milk; continue breast-feeding; avoid large doses; use alternative drug if possible
Mifepristone	Avoid breast-feeding for 14 days after administration
Misoprostol	No information available—manufacturer advises avoid
Morphine	Short courses safe in usual doses; monitor infant
Nelfinavir	see abacavir
Neostigmine	Amount probably too small to be harmful; monitor infant
Nevirapine	Present in milk; see abacavir
Nifedipine	Small amount in milk; continue breast-feeding; monitor infant
Nitrofurantoin	Only small amounts in milk but could be enough to produce hemolysis in G6PD deficient infants
Norethisterone	Combined oral contraceptives may inhibit lactation—use alternative method of contraception until weaning or for 6 months after birth; progestogen-only contraceptives do not affect lactation (preferably start injectable contraceptive 6 weeks after birth or later)
Nystatin	No information available, but absorption from gastrointestinal tract negligible
Ofloxacin	Continue breast-feeding; use alternative drug if possible
Oxamniquine	No information available, but considered preferable to avoid
Paracetamol	Small amount present in milk: short courses safe in usual dosage; monitor infant
Penicillamine	No information available—manufacturer advises avoid unless potential benefit outweighs risk
Pentamidine isetionate	Manufacturer advises avoid unless essential
Pentavalent antimony compounds	Avoid
Phenobarbital	Continue breast-feeding; adverse effects possible; monitor infant for drowsiness
Phenoxymethyl-penicillin	Trace amounts in milk; safe in usual dosage; monitor infant
Phenytoin	Small amount present in milk; continue breast-feeding; adverse effects possible; monitor infant for drowsiness
Potassium iodide	Stop breast-feeding; danger of neonatal hypothyroidism or goitre; appears to be concentrated in milk

Drug	Comments
Povidone-iodine	Avoid; iodine absorbed from vaginal preparations is concentrated in milk
Praziquantel	Avoid breast-feeding during and for 72 hours after treatment; considered safe to continue breast-feeding in treatment of schistosomiasis
Prednisolone	Systemic effects in infant unlikely with maternal dose of less than prednisolone 40 mg daily; monitor infant's adrenal function with higher doses
Primaquine	No information available; risk of haemolysis in G6PD-deficient infants
Procainamide	Present in milk; continue breastfeeding; monitor infant
Procaine benzylpenicillin	Trace amounts in milk; safe in usual dosage; monitor infant
Procarbazine	Breast-feeding contraindicated
Proguanil	Amount probably too small to be harmful when used for malaria prophylaxis; inadequate for reliable protection against malaria in breastfed infant
Promethazine	Safe in usual dosage; monitor infant for drowsiness
Propranolol	Present in milk; safe in usual dosage; monitor infant
Propylthiouracil	Monitor infant's thyroid status but amounts in milk probably too small to affect infant; high doses might affect neonatal thyroid function
Pyrazinamide	Amount too small to be harmful
Pyridostigmine	Amount probably too small to be harmful
Pyrimethamine	Significant amount—avoid administration of other folate antagonists to infant; avoid breast-feeding during toxoplasmosis treatment
Quinidine	Significant amount but not known to be harmful
Quinine	Present in milk—continue breast-feeding and monitor infant; risk of haemolysis in G6PD-deficient infants
Ranitidine	Significant amount present in milk, but not known to be harmful
Retinol	Theoretical risk of toxicity in infants of mothers taking large doses
Rifampicin	Amount too small to be harmful
Ritonavir	see lopinavir with ritonavir
Salbutamol	Safe in usual dosage; monitor infant
Saquinavir	see abacavir
Senna	Continue breast-feeding; monitor infant for diarrhoea
Silver sulfadiazine	Continue breast-feeding; monitor infant for jaundice—small risk of kernicterus in infants particularly with long acting sulphonamides, and of haemolysis in G6PD-deficient infants
Sodium valproate	see valproate
Spectinomycin	No information available
Spironolactone	Amount probably too small to be harmful
Stavudine	see abacavir
Streptomycin	Present in milk; continue breast-feeding—monitor infant for thrush and diarrhoea

Drug	Comments
Sulfadiazine	Monitor infant for jaundice—small risk of kernicterus in infants and of haemolysis in G6PD-deficient infants; caution in ill or premature infants
Sulfadoxine + pyrimethamine	Monitor infant for jaundice—small risk of kernicterus in infants and of haemolysis in G6PD-deficient infants (due to sulfadoxine); caution in ill or premature infants
Sulfamethoxazole + trimethoprim	Monitor infant for jaundice—small risk of kernicterus in infants and of haemolysis in G6PD-deficient infants (due to sulfamethoxazole); caution in ill or premature infants
Sulfasalazine	Use with caution; monitor infant for jaundice—small amounts in milk (1 report of bloody diarrhoea and rashes); theoretical risk of neonatal haemolysis especially in G6PD-deficient infants; caution in ill or premature infants
Tamoxifen	Suppresses lactation; avoid unless potential benefit outweighs risk
Testosterone	Avoid; may cause masculinization in the female infant or precocious development in the male infant; high doses suppress lactation
Tetracycline	Continue breast-feeding; use alternative drug if possible (absorption and therefore discoloration of teeth in infant probably usually prevented by chelation with calcium in milk)
Thiamine	Severely thiamine-deficient mothers should avoid breast-feeding as toxic methyl-glyoxal excreted in milk
Thiopental	Present in milk—not known to be harmful
Trimethoprim	Present in milk; safe in usual dosage;
Valproic acid	Amount too small to be harmful
Vaccine, Influenza	Not known to be harmful
Vancomycin	Present in milk—significant absorption following oral administration unlikely
Verapamil	Amount too small to be harmful
Vinblastine	Breast-feeding contraindicated
Vincristine	Breast-feeding contraindicated
Warfarin	Risk of haemorrhage; increased by vitamin K deficiency. Trace amounts of warfarin found in breast milk. Amounts too small to reduce the blood clotting. Use cautiously.
Zidovudine	see abacavir

12. Prescribing in renal impairment

Reduced renal function may need adjustment in drug therapy for the following reasons:

1. The failure to excrete a drug or its metabolites may produce toxicity.
2. The sensitivity to some drugs is increased even if the renal elimination is unimpaired.
3. The tolerance to adverse effects may be impaired.
4. The efficacy of some drugs may diminish.

The dosage of many drugs must be adjusted in patients with renal impairment to avoid adverse reactions and to ensure efficacy. The level of renal function below which the dose of a drug must be reduced depends on