

# ***Breastfeeding Grand Rounds***

**May 13, 1999  
7:30 – 9:30 a.m.**

## ***Agenda***

- I. Welcome and Introduction
  
- II. Drugs, Herbs & Breastfeeding                      Ruth A. Lawrence, M.D.
  
- III. Breastfeeding and the Workplace                  Mary Applegate, M.D., M.P.H.
  
- IV. Case Studies    Drs. Lawrence and Applegate

Participant questions will follow each case study:

Call: 1-888-313-4822 (toll free) or  
Fax: 518-629-8136

*Major support for this program comes from the New York State Department of Health and the USDHHS Maternal and Child Health Bureau.*

Presented by  
New York State Institute for Human  
Lactation  
jointly sponsored by the New York State  
Department of Health  
And  
The School of Public Health, University at  
Albany, SUNY

**Breastfeeding Grand  
Rounds**

**May 13, 1999**

**Ruth A. Lawrence, M.D.  
Mary Applegate, M.D., M.P.H.**

**Presented by**

**The New York State  
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**Part of the**

**Women's Health  
Grand Rounds Series**

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**New York State Department of  
Health**

**The School of Public Health,  
University at Albany, State  
University of New York**

**Today's Topics:**

**Drugs, Herbs and  
Breastfeeding: When to  
Worry**

**Breastfeeding and the  
Workplace**

# Drugs, Herbs, and Breastfeeding

## When To Worry

Ruth A. Lawrence, M.D.

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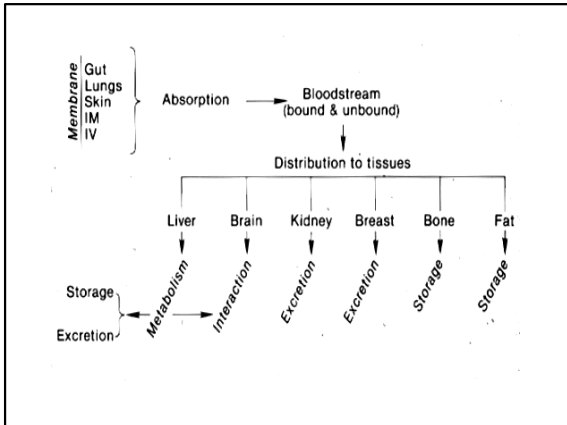
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### Drug

- pKa (ionization at plasma & milk pH)
- Solubility characteristics in fat & water
- Protein binding characteristics
- Molecular weight

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## Distribution Ratios

### Drug Concentrations in Milk and Plasma

	Milk/Plasma Ratio
Highly lipid soluble drugs	$\approx 1$
Small (mol. wt. <200) water soluble drugs	$\approx 1$
Weak acids	$\leq 1$
Weak bases	$\geq 1$
Actively transported drugs	$> 1$

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## Milk/Plasma Ratios and $pK_a$ of Sulfonamides

Sulfonamide	Milk/Plasma Ratio	$pK_a$
sulfacetamide	0.08	5.4
sulfadiazine	0.21	6.5
sulfathiazole	0.33-0.5	7.1
sulfamethazine	0.51	7.4
sulfapyridine	0.5-1.0	8.4
sulfanilamide	0.5-1.0	10.4

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## Maternal Pharmacology

- Drug Dose, Frequency, & Route
- Clearance Rate
- Plasma Protein Binding
- Metabolite Profile

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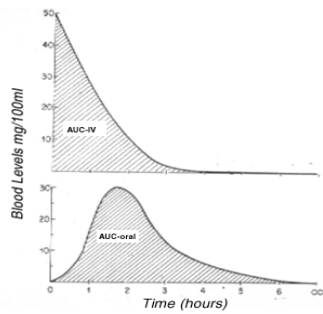


Figure 5. Mean blood levels and area under blood level versus time curve after intravenous oral administration of a hypothetical drug.

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### Factors Influencing Drug Effect on Infant

- Is it absorbed from GI Tract?
- Has it been changed to an inactive metabolite?
- Does the infant:
  - Detoxify?
  - Excrete?
  - Store?

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### Infant Factors Influencing Drug Effect

- Age and Maturity of Infant
- Frequency of Feeding
- Volume of Milk Consumed
- Other Diet than Milk

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**Substances that  
May Accumulate in the Neonate**

- > Phenytoin
- > Barbituates: Phenobarbital, Pentobarbital
- > Caffeine, Theophylline
- > Diazepam
- > Phenothiazines: Chlorpromazine, Promethazine
- > Antihistamines: Diphenhydramine, etc..
- > Local Anesthetics: Lidocaine, Carboncaine, Bupivacaine
- > Salicylic Acid

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**Drugs Which Displace  
Bilirubin From Serum  
Albumin**

- Salicylic Acid
- Sulfonamides
- Furosemide
- Phenylbutazone

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**Feeding Variables  
to be Considered  
When Mother is on Medication**

- Suckling behavior including equal time on each breast
- Amount consumed per feeding
- Feeding intervals (regular or irregular)
- Time of feeding in relation to maternal dosing

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## Risk: Benefit Ratio

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### Categories of Drugs by Risk (AAP Classification)

- Contraindicated drugs (Category I)
- Drugs of abuse (Category II)
- Temporary cessation of breastfeeding (pump and discard milk) (Category III)
- Pharmacologic properties that guide decision making when the drug has not been studied during lactation

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### Drugs That Are Contraindicated During Breastfeeding

Bromocriptine	Ergotamine
Cocaine	Lithium
Cyclophosphamide	Methotrexate
Cyclosporine	Phencyclidine (PCP)
Doxorubicin	Phenindione

AAP Pediatrics 93:137, 1994

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**Drugs of Abuse:  
Contraindicated During  
Breastfeeding**

- Amphetamine
- Cocaine
- Heroin
- Marijuana
- Nicotine (smoking)
- Phencyclidine

AAP Pediatrics 93:137, 1994

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**Radioactive Compounds That  
Require Temporary Cessation  
of Breastfeeding**

- |                    |                        |
|--------------------|------------------------|
| Copper 64 (Cu)     | Iodine 131 (131I)      |
| Gallium 67 (67Ga)  | Radioactive sodium     |
| Indium 111 (111In) | Technetium-99m (99mTc) |
| Iodine 123 (123I)  | 99mTc macroaggregates  |
| Iodine 125 (125I)  | 99mTcO <sub>4</sub>    |

AAP Pediatrics 93:137, 1994

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**If Taken As One Dose:  
Pump And Discard**

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## Breastfeeding and Thyroid Disease

- Hypothyroidism
- Hyperthyroidism

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## Breastfeeding and Maternal Hypertension

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## Beta Blockers during Lactation

<u>Drug</u>	<u>Maternal Dose</u> (% to infant)
acebutolol	3.5
atenolol	5.7 - 19.2
labetalol	.07
mepindolol	1.1
nadolol	5.1
oxprenolol	0.5 - 1.5
propranolol	0.2 - 0.9
sotalol	22

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## Risk:Benefit Ratio

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## Pharmacologically Active Materials in the Diet

- Caffeine
- Herbal Teas

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*Echinacea augustifolia*

### ECHINACEA

The Native Americans used echinacea, also known as "purple coneflower," for snakebites, fevers, and wounds. The herb soon became popular with early settlers; today it is appreciated as an important immune stimulant and antibacterial, ideal for almost any sort of infection.

PARTS USED: root

KEY USES: Whenever

there is infection - viral, bacterial, or fungal - echinacea has a role. It is the ideal choice for colds, flu, and kidney infections and can be helpful in viral based arthritis and sore throats. It can also be applied externally for some skin conditions.



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## Echinacea

Use: Treatment of common cold  
Immune system enhancement

Active Ingredient: 1, 2-D-fructofuranosides; product standardized to contain 2.4% active principle

Action: Activation macrophages

Route: Oral and by injection

Toxicity: None known

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**From The Herbal Experts**

Celestial Seasonings Herbal Comfort Lozenges contain high quality Echinacea extract in a carefully balanced herbal formula that includes Siberian Ginseng, Native American and early settlers' cherokee Echinacea for its natural properties. Siberian Ginseng is also recognized around the world for its unique benefits. Finally, these two root-for-you herbs are combined in one delicious lozenge that soothes and comforts your throat naturally. You'll know the Echinacea is present because you'll feel a unique tingling sensation on your tongue. Our lozenges contain all-natural flavors, no artificial colors or preservatives, and are caffeine free so when you want to care for yourself naturally, enjoy a soothing blend of herbs in Celestial Seasonings Herbal Comfort.

**SUGGESTED USE:** As a dietary supplement for adults take 2 lozenges (one at a time) 3 times daily - allow lozenge to dissolve slowly in the mouth.

**WARNING:** Echinacea should not be used by anyone with severe systemic illnesses such as tuberculosis, leukemia, collagen diseases, multiple sclerosis and similar conditions. Do not use for more than 8 weeks consecutively. Do not use if you have allergies to the genus family (Asteraceae) or if you are pregnant or nursing. As with any dietary supplement, keep out of the reach of children.

Echinacea Root Extract Standardized to 1% Total Phenols  
Siberian Ginseng Root Extract Standardized to 0.7% Eleutheroosides B & E

©1997 CELESTIAL SEASONINGS

<http://www.herbalcomfort.com>

**Supplement Facts**

Serving Size 2 Lozenges  
Servings Per Container 9

	Amount Per Serving	% Daily Value
Calories	25	
Total Carbohydrate	6g	2%
Sugars	4g	7
Echinacea Root Extract	100mg	7
<small>(Echinacea argentea &amp; Echinacea purpurea)</small>		
Siberian Ginseng Root Extract	50mg	7
<small>(Eleutheroosides B &amp; E)</small>		

\*Percent Daily Values are based on a diet of other people's dietary supplements.

Other Ingredients: Sugar, Corn Syrup, Palm Kernel Oil, Natural Flavors, Cellulose, Potassium Sorbate, Citric Acid, Orange Lemon Citrus Saps and Natural Colors.

351005

QUESTIONS: CALL 1-800-541-2854

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## Herbs For Nipple Problems

- Comfrey root ointment
- Yarrow leaf ointment
- Squaw vine (*Mitchella repens*)

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### Comfrey

*Symphytum officinale* L.  
Ass-ear, Blackwort, Bruisewort,  
Healing Herb, Knitback, Knitbone  
BORAGE FAMILY  
Boraginaceae



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## Herbs for Engorgement/Mastitis

### A. Oral Options

1. Echinacea
2. Polk root

### B. Topicals - Soaks, Compresses & Poultices

1. Cabbage leaves
2. Parsley leaf compress
3. Comfrey leaf compress
4. Raw potato poultice

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## Herbs as Galactagogues

- Fenugreek seeds
- Marshmallow root
- Cotton root
- Lemongrass oil
- Lemon verbena
- Hops

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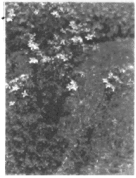
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### St. John's Wort

*Hypericum perforatum* L.

Amber Touch-and-heal, Goatweed  
Klamath Weed, Rosin Rose  
ST. JOHN'S WORT FAMILY  
Hypericaceae



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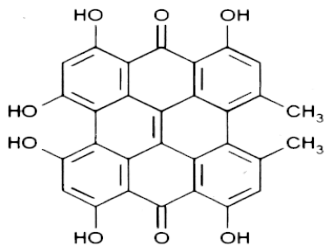
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### Hypericin



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## St. John's Wort Chemicals


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## St. John's Wort

**Active Ingredient:** hypericum perforatum

Hypericin is a reddish dianthrone pigment

**Preparation:** variable % of hypericum

**Peak plasma cone:** 6 hours

**Volume of distribution:** 162 L

**Elimination half life:** 10-37 hours

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## St. John's Wort Clinical Uses

- **Antidepressant** - mild to moderate depression

Causes: MAO inhibition

-Serotonin re-uptake inhibition

-Norepinephrine re-uptake inhibition

Dosing range - 200-1000 mg/day (100-500 mg/day extract)

- **Anti-retroviral** - ? Synergistic to AZT

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# RISK: BENEFIT



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## Herbal Diuretics

<b>Safest &amp; most effective:</b>	<b>caffeine, theobromine</b>
<b>Safe but ineffective:</b>	<b>dandelion root, quack grass</b>
<b>Toxic but effective:</b>	<b>juniper berries horsetail, ephedrine or Mormon tea: diuretic and stimulant</b>

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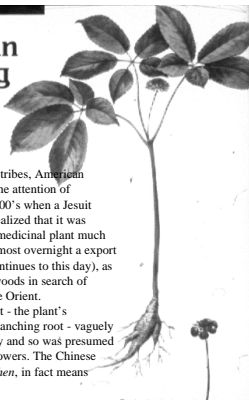
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## American Ginseng

*Panax quinquefolius L.*  
Five-fingers, Tatar Root  
GINSENG FAMILY  
Araliaceae

Valued by many Indian tribes, American ginseng first attracted the attention of colonists in the early 1700's when a Jesuit missionary in Canada realized that it was almost identical with a medicinal plant much in demand in China. Almost overnight a export trade developed (and continues to this day), as collectors combed the woods in search of ginseng for export to the Orient.

The prize they sought - the plant's contorted, sometimes branching root - vaguely resembles a human body and so was presumed to have great curative powers. The Chinese name for ginseng, *jen-shen*, in fact means "manlike," as does the



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## **GINSENG ROOT**

### **Metabolic Effects:**

- ↓ blood glucose
- ↓ serum cholesterol levels
- ↑ erythropoiesis and iron absorption
- ↑ blood pressure and heart rate
- ↑ GI motility
- ↑ CNS stimulation

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## **Ginseng Abuse Syndrome (Gas)**

- Average daily dose 3 g of root
- Ingested (capsule, extract or tea) or smoked
- Effect: stimulation
- Increase motor and cognitive performance
- Side effects: hypertension, diarrhea, nervousness, insomnia
- Inconsistent quality and quantity
- Habituating/withdrawal syndrome

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## **Herbal Toxic Syndromes**

- |                 |                                   |
|-----------------|-----------------------------------|
| ■ Ginseng Root  | ■ Jimson Weed                     |
| ■ Penny Royal   | ■ Oleander                        |
| ■ Chamomile Tea | ■ Pyrrolizidine Alkaloids         |
| ■ Pokeweed      | ■ Hepatotoxic herbal preparations |

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## **Risk:Benefit Ratio**

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### **Minimizing the Effect of Maternal Medication**

- Do not use long-acting form of drug
- Choose drug that produces least amount in the milk.
- Schedule doses so least amount gets into the milk.
- Watch infant for any unusual signs or symptoms.

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## **All Things In Moderation**

**Except Known Toxins**

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**Breastfeeding Support  
in the Workplace**

**Breastfeeding Grand  
Rounds 1999  
Mary Applegate, MD MPH**

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**Breastfeeding & Work**

- **Barriers to initiation of breastfeeding**
  - early return to work
  - ? combine work and breastfeeding
  - ? stop soon after starting

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**Breastfeeding & Work**

- **Barriers to continuing breastfeeding**
  - inadequate time, inflexible schedules
  - no support for breastfeeding

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Why Support Breastfeeding?

- **Lower medical costs**
  - Fewer hospitalizations
  - Lower pharmacy costs

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Why Support Breastfeeding?

- **Increased worker productivity**
  - Fewer absences
  - Greater loyalty and morale
  - Recruitment and retention

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Cost Effectiveness

- **Washington Business Group on Health**
- **Babies, Business and the Bottom Line**

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## Cost Effectiveness

- **LA Department of Water and Power**
  - each dollar spent saved \$3.50 to \$5
- **Aetna**
  - \$1435 saved per breastfed baby
  - 3:1 cost savings

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## Workplace Strategies

- **Time**
- **Space**
- **Support**

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## Workplace Policies

- **Visibly promote breastfeeding**
- **Health benefits covering:**
  - postpartum home visits
  - lactation consultant services

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## Workplace Policies

- **Maternity leave -- 6 weeks minimum**
- **Flexible hours and breaks**
- **Infants on site**

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## Workplace Facilities

- **On-site child care**
- **Lactation room**
  - comfortable, clean, private
  - electric pump, sink, refrigerator
  - resource center: books, pamphlets, videos

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## Workplace Services

- **Breastfeeding classes addressing concerns about work and breastfeeding**

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## Workplace Services

- **Staff Lactation Consultant**
  - classes and individual counseling
  - manage lactation facilities
  - products (pumps, pump kits, coolers, books)

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## Workplace Services

- **Working parents' support group**

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## Federal Legislation

- **Breastfeeding Promotion and Employers' Tax Incentive Act of 1999**
- **Employers' tax credit for 50% of expenses involved in providing lactation support**

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Special Role

**Hospitals & health departments:**

- Major employers with many young female employees

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Special Role

**Hospitals & health departments:**

- Stake in supporting breastfeeding for health reasons
- Serve as role models and resources

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## Case 1 – Breast surgery

- 32 y.o. primagravida
- History of cosmetic reduction mammoplasty
- Plans to breastfeed this infant
- ? Impact of surgery on ability to breastfeed
- ? Prenatal evaluation
- ? Postnatal management

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## Case 2 – Preterm infant

- 25 y.o. Para 2 mother, delivered at 28 weeks
- Breastfed first baby 2 years ago
- Assumes that prematurity and small size preclude breastfeeding this infant.
- ? Benefits of breastmilk for premature baby
- ? Key issues in supporting lactation

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## Case 3 – Candidiasis

- 26 y.o. Para 3 mother
- Severe breast pain 2 weeks postpartum – “searing, throbbing pain”
- History of recurrent vaginal yeast infections – none recently
- Exam: normal appearing, diffusely tender breasts
- Infant: white plaques inside mouth
- ? Likely diagnosis
- ? Appropriate management

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### **Case 4 – Adolescent mother**

- 15 y.o. primagravida at 34-week visit.
- Decided to breastfeed, encouraged by 19 y.o. sister successfully breastfeeding
- Returning to school in September
- ? Strategies for promoting breastfeeding among adolescents
- ? Physiologic factors influencing success
- ? Special management considerations

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**Thanks to**

**Ruth A. Lawrence, M.D.  
University of Rochester**

**Mary Applegate, M.D., M.P.H.  
Bureau of Women's Health, NYS  
Department of Health**

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