AAP Updates on Neonatal Care for the Pediatrician
Implementing the Latest Evidence Into Everyday Practice
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I have no actual or potential conflict of interest in relation to this program.

Objectives
1. Immersion in Water During Labor and Delivery
2. The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics Pediatrics 2013;132:e796-e809
3. Updated Guidance for Palivizumab Prophylaxis Among Infants and Young Children for RSV
4. Hospital Stay for Healthy Term Newborn Infants

Committee Statements from AAP
- Policy statement
- Clinical report
- Technical report

Committee statements
- Policy statement: "Organizational principles to guide and define the child health care system and/or improve the health of all"
  - Includes recommendations
- Clinical report: guidance regarding best practices, state of the art: "does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate."
  - Does not include recommendations
Committee statements

- **Technical report**: stand alone or as background for Policy Statement
  - Does **not** include recommendations

AAP Statement Development

1. Committee chooses topic, identify lead author(s)
2. Review literature, define objectives
3. Submit intent
4. Board of Directors reviews intent
5. AAP Statement Development
6. Board of Directors approves intent *
7. Reviews by AAP/others
   - Author(s) revise(s)
   - (Input from COFN +/- Consultants)
8. Write/Revise
9. Executive Staff and Board review
10. Publication (if approved) *2 year deadline

Immersion in Water During Labor and Delivery

- **Clinical Report**
- Joint report with ACOG
- 2014

Immersion in Water During Labor and Delivery

- Immersion in water has been suggested as a beneficial alternative for labor, delivery, or both
- Approximately 1% of births in the United Kingdom include at least a period of immersion, and a 2006 joint statement from the Royal College of Obstetricians and Gynaecologists and Royal College of Midwives supported immersion in water during labor for healthy women with uncomplicated pregnancies.
Water Delivery

- The prevalence of this practice in the United States is unknown, because such data are not collected as part of vital statistics.
- A 2001 survey found that at least 143 US birthing centers offered immersion in water during labor, delivery, or both.

Evidence-Poor

- Most published articles that recommend underwater births are retrospective reviews of a single center experience, observational studies using historical controls, or personal opinions and testimonials, often in publications (and WEBSITES!) that are not peer reviewed.

Evidence-Poor

- Also of importance, there are no basic science studies in animals or humans to confirm the physiologic mechanisms proposed to underlie the reported benefits of underwater births.
- Humans are not whales—even if you feel like one at the end of pregnancy!

Stages of Labor

- Important to distinguish between 1st stage of labor and 2nd stage of labor when discussing the risks and benefits of underwater immersion
- Avoid term “underwater birth” and be specific about stage of labor being discussed
- Outcomes and benefits may differ greatly between stages

Other considerations

- Duration of immersion
- Temperature of water
- Depth of water
- Agitation of water
- In these studies—providers are not masked and may bias outcomes

Proposed Benefits From Immersion During Labor And Delivery

- Hydrostatic pressure promotes increased venous return and mobilization of extravascular fluid and edema.
- Possible benefits to such treatment, including:
  - a decrease in perinatal pain,
  - a greater sense of wellbeing and control,
  - a decreased rate of perineal trauma,
  - maybe decreases maternal stress and stress-associated hormone levels.
**Results of RCT**

- Immersion during the first stage of labor:
  - decreased use of epidural, spinal, or paracervical analgesia among those allocated to water immersion compared with controls
    - (478/1254 vs 529/1245; risk ratio [RR] 0.90; 95% [CI], 0.82 to 0.99; 6 trials).
  - a reduction in duration of the first stage of labor
    - (mean difference -32.4 minutes; 95% CI, -58.7 to -6.13).

**Reported Complications From Immersion During Labor And Delivery**

- Exact incidence of complications is difficult to assess
- Cases include:
  - Higher risk of maternal and neonatal infections, particularly with ruptured membranes (case reports of neonatal Pseudomonas pneumonia and death from tub water)
  - Drownings and near drownings
  - Difficulties in neonatal thermoregulation

**Neonatal Aspiration of Water**

- Has been claimed that neonates delivered into water do not breathe, gasp, or swallow water because of the protective "diving reflex"

- Studies in experimental animals and studies from meconium aspiration syndrome show in compromised fetuses and neonates, the diving reflex is overridden which leads potentially to gasping and aspiration of the surrounding fluid.

**Summary-First Stage**

- Immersion in water during the first stage of labor may be appealing to some and may be associated with decreased pain or use of anesthesia and decreased duration of labor; however, there is no evidence that immersion during the first stage of labor otherwise improves perinatal outcomes.
- Immersion therapy during the first stage of labor should not prevent or inhibit other elements of care, including appropriate maternal and fetal monitoring.

- **Reported Complications From Immersion During Labor And Delivery**
  - Case reports:
    - Umbilical cord avulsion and umbilical cord rupture while the newborn infant is lifted or maneuvered through and from the underwater pool at delivery with hemorrhage and shock
    - Respiratory distress and hyponatremia that results from tub-water aspiration (drowning or near drowning)
    - Seizures and perinatal asphyxia
Summary - Second Stage

- Safety and efficacy of immersion in water during the second stage of labor have not been established, and immersion in water during the second stage of labor has not been associated with maternal or fetal benefit.
- Given these facts and case reports of rare but serious adverse effects in the newborn, the practice of immersion in the second stage of labor (underwater delivery) should be considered an experimental procedure that only should be performed within the context of an appropriately designed clinical trial with informed consent.

The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics

- Clinical Report
- 2013
- This topic first had a policy written by AAP in 1983, last revision 2001
- Previous editions listed all drugs that were a concern

Current Report

- This Clinical Report realizes can no longer keep up and advises to go to LactMed on internet for individual drugs

LactMed

- Each record includes the following information:
  - Generic name
  - Scientific name
  - Summary of use during lactation
  - Drug levels
    - Maternal levels: based on studies that measure concentration in breast milk; includes relative infant dose
    - Infant levels: serum or urine concentrations from the literature
  - Effects in breastfed infants: adverse events
    - Possible effects on lactation: if known, including effects on infants that may interfere with nursing (eg, sedation)
    - Alternative drugs to consider: may not be comprehensive
    - Common herbal drugs are also included!
LactMed

Current Report

- Focuses on:
  - Psychotropic therapies
  - Drugs used to treat substance abuse
  - Narcotics
  - Galactagogues
  - Herbal products
  - Immunizations

History of Advice to Mothers

- Stop taking the drug
  OR
- Stop breastfeeding

Now we are aware very few drugs are actually contraindicated during lactation

Drugs During Lactation: Factors to Consider

- Need for drug by the mother
- Duration of maternal therapy
- Potential effects of drug on milk production
- Amount of drug excreted into human milk
- Extent of oral absorption by infant
- Potential adverse effects on infant
- Age of infant

Contraindications to Breastfeeding in the US

- Maternal HIV (treated or not)
- Drugs used to treat cancer or radionuclides that are highly toxic

Changes in Drug Labeling by FDA

- In the past drug labeling usually advised caution or to discontinue breast feeding for most drugs
- 2008 revision
- Current revision by FDA
  - New section labeled "Lactation"
    - Risk Summary
    - Clinical Considerations
    - Data
- Includes guidance for Industry
Antidepressants, Anxiolytics and Antipsychotics

- Long-term effect on the developing infant is still largely unknown.

- Many antianxiety drugs, antidepressants, and mood stabilizers appear in low concentrations in human milk, with estimated relative infant doses less than 2% of weight-adjusted maternal dose and/or milk-plasma ratios less than 1.

Antidepressants, Anxiolytics and Antipsychotics

- Percentage of maternal doses that approach clinically significant levels (10% or more) have been reported for:
  - Bupropion
  - Diazepam
  - Fluoxetine
  - Citalopram
  - Lithium
  - Lamotrigine
  - Venlafaxine

Antidepressants, Anxiolytics and Antipsychotics

- Mothers who desire to breastfeed their infant while taking these agents should be counseled about the benefits of breastfeeding as well as the potential risk that the infant may be exposed to clinically significant levels and that the long-term effects of this exposure are unknown.

- Consideration should be given to monitoring growth and neurodevelopment of the infant.

Drugs For Smoking Cessation Or To Treat Substance Abuse/Alcohol Dependence

- Although many women are appropriately advised to refrain from smoking, drinking, and using recreational drugs during and after pregnancy, in part because of adverse effects on their infants some are unable to do so and may seek assistance after delivery.

- Maternal smoking is not an absolute contraindication to breastfeeding.

- Methadone, buprenorphine, and naltrexone are 3 agents approved by the FDA for use in the treatment of opioid dependence.

- Continued breastfeeding by women undergoing such treatment presumes that the patient remains abstinient, is HIV negative, and is enrolled in and closely monitored by an appropriate drug treatment program with significant social support.

Methadone and Buprenorphine

- Potential adverse effects on breastfeeding infants include lethargy, respiratory difficulty, and poor weight gain.

- The long-term effects of methadone in humans are unknown.

- Methadone levels in human milk are low, with calculated infant exposures less than 3% of the maternal weight-adjusted dose.

- Plasma concentrations in infants are also low (less than 3% of maternal trough concentrations) during the neonatal period and up to 6 months postpartum.
Methadone and Buprenorphine

- Guidelines from the Academy of Breastfeeding Medicine encourage breastfeeding for women treated with methadone who are enrolled in methadone-maintenance programs.
- Buprenorphine is excreted into human milk and achieves a level similar to that in maternal plasma.
- Buprenorphine and buprenorphine/naloxone use is not advised by lactating women, because animal lactation studies have shown decreased milk production and viability of the offspring.

Smoking Cessation

- Only one-third of women successfully discontinue smoking without pharmacologic aids.
- Nicotine replacement therapy, bupropion, and varenicline are agents indicated for use as aids to smoking cessation treatment.
- Nicotine replacement therapy is compatible with breastfeeding as long as the dose is less than the number of cigarettes typically smoked, because nicotine passes freely into human milk and is orally absorbed as nicotine.

Pain Medications

- Codeine- rarely a breastfed infant may have high levels of metabolite-morphine
- Hydrocodone-metabolized via similar pathway-may receive up to 9% of maternal dose
- Reports of ultrafast metabolizers (infant)

Smoking Cessation

- Bupropion is excreted into human milk with exposures that may exceed 10% (range, 1.4%-10.6%) of the maternal dose.
- Case report of a seizure in a 6-month-old breastfed infant potentially related to bupropion.
- Varenicline label includes a boxed warning for serious neuropsychiatric adverse events, including suicidal ideation or behavior.
- FDA labeling discourages use of both these agents in lactating women.

Pain Medications

- When narcotic agents are needed to treat pain in the breastfeeding woman, agents other than codeine or hydrocodone are preferred.
- Butorphanol
- Morphine
- Hydromorphone
- Lowest doses and shortest duration should be prescribed for the mother.
**Narcotics**

- Other narcotic agents, such as
  - Oxycodone,
  - Pentazocine
  - Propoxyphene
  - Meperidine

  NOT recommended in the lactating mother.

- Relatively high amounts of oxycodone are excreted into human milk, and therapeutic concentrations have been detected in the plasma of a nursing infant.

  Central nervous system depression was noted in 20% of infants exposed to oxycodone during breastfeeding. Thus, use of oxycodone should be discouraged.

**Pain Relief**

- Short-acting agents, such as ibuprofen and acetaminophen, are acceptable.

- Nonsteroidal anti-inflammatory drugs (NSAIDs)
  - Celecoxib, flurbiprofen, and naproxen are considered to be compatible with breastfeeding, because less than 1% is excreted into human milk

- Aspirin

  - Low doses (75-162 mg/d) of aspirin may be acceptable
  - High-dose aspirin therapy during breastfeeding is not advised
    - Serum concentration of salicylate in breastfeeding infants has been reported to reach approximately 40% of therapeutic concentrations.
  - Adverse events, such as rash, platelet abnormalities, bleeding, and metabolic acidosis have also been reported.

**Galactagogues**

- Galactagogues, or agents to stimulate lactation, are often used to facilitate lactation, particularly for mothers of preterm infants.

- Have been used to induce lactation in an adoptive mother.

- Evidence to support these agents is lacking
  - Domperidone (Motilium)
  - Metoclopramide (Reglan)
  - Herbal treatments
  - Hormonal manipulation
Galactagogues

Several small trials (each with fewer than 25 subjects) published before 1990 suggested that metoclopramide increases prolactin concentrations and/or milk production in mothers of both term and preterm infants. However, more recent controlled studies do not replicate this finding.

To increase lactation

Nursing mothers should seek consultation with a lactation specialist and use nonpharmacologic measures to increase milk supply, such as:
- Ensuring proper technique
- Using massage therapy
- Increasing the frequency of milk expression
- Prolonging the duration of pumping
- Maximizing emotional support

Herbal Products

- Safety data are lacking for many herbs commonly used during breastfeeding, such as chamomile, black cohosh, blue cohosh, chastetree, echinacea, ginseng, gingko, Hypericum (St John's wort), and valerian.
- Beware of excessive dietary supplements (L-tryptophan)

Diagnostic Imaging

- Elective imaging procedures should be delayed until a woman is no longer breastfeeding
- Radiolabeled iodinated products are concentrated in the developing thyroid
- Radioactivity persists after imaging with most $^{131}$I and $^{125}$I
- Breastfeeding should be interrupted for a minimum of 3 weeks

Galactagogues

- Oxytocin nasal spray—no longer on the market
- Herbs also not effective or recommended
  - Fenugreek
  - Fennel
**Maternal Vaccines**

- Maternal immunization does not create any problems for breastfeeding infants.
- Breastfeeding does not interfere with the infant’s immune response to most routine immunizations despite the presence of maternal antibodies in human milk.

- Several vaccines, such as tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine and influenza vaccine, are recommended for the mother during the postpartum period to protect the infant as well as the mother.

- Most live vaccines are not associated with virus secretion in human milk (except smallpox and yellow fever).

**Updated Guidance for Palivizumab Prophylaxis Among Infants and Young Children for RSV**

- **Policy Statement**
  - Palivizumab first licensed in 1998
  - AAP has updated guidance 4 times since then

**Palivizumab**

- The updated recommendations in this policy statement reflect new information regarding:
  - Seasonality of RSV circulation
  - Palivizumab pharmacokinetics
  - Changing incidence of bronchiolitis hospitalizations
  - Effect of gestational age and other risk factors on RSV hospitalization rates
  - Mortality of children hospitalized with RSV infection
  - Effect of prophylaxis on wheezing
  - Palivizumab-resistant RSV isolates

- Palivizumab prophylaxis has limited effect on RSV hospitalizations on a population basis, no measurable effect on mortality, and a minimal effect on subsequent wheezing.

- The palivizumab package insert states: "Synagis is indicated for the prevention of serious lower respiratory tract disease caused by RSV in children at high risk of RSV disease."
**What is High Risk**

- Palivizumab use should be restricted to the populations detailed below.
- Clinicians may administer up to a maximum of 5 monthly doses of palivizumab (15 mg/kg per dose) during the RSV season to infants who qualify for prophylaxis in the first year of life.

**Preterm Infants Without Chronic Lung Disease Of Prematurity or Congenital Heart Disease**

- Palivizumab prophylaxis may be administered to infants born before 29 weeks, 0 days' gestation who are younger than 12 months at the start of the RSV season.

- For infants born during the RSV season, fewer than 5 monthly doses will be needed.

**Preterm Infants With CLD**

- Prophylaxis may be considered during the RSV season during the first year of life for preterm infants who develop CLD of prematurity defined as gestational age <32 weeks, 0 days and a requirement for >21% oxygen for at least the first 28 days after birth.

**Preterm Infants With CLD**

- During the second year of life, recommended only for infants with CLD of prematurity who continue to require medical support (chronic corticosteroid therapy, diuretic therapy, or supplemental oxygen) during the 6-month period before the start of the second RSV season.

- For infants with CLD who do not continue to require medical support in the second year of life, prophylaxis is not recommended.

**Preterm Infants With CLD**

- Infants in a neonatal unit who qualify for prophylaxis because of CLD, prematurity, or CHD may receive the first dose 48 to 72 hours before discharge to home or promptly after discharge.

- Palivizumab prophylaxis is not recommended for prevention of health care-associated RSV disease.

**Preemie Infants in NICU**

- Palivizumab prophylaxis is not recommended for prevention of health care-associated RSV disease.
Infants With Hemodynamically Significant CHD

- Certain children who are 12 months or younger with hemodynamically significant CHD may benefit from palivizumab prophylaxis.
- Children with hemodynamically significant CHD who are most likely to benefit from immunoprophylaxis include infants with acyanotic heart disease who are receiving medication to control congestive heart failure and will require cardiac surgical procedures and infants with moderate to severe pulmonary hypertension.

Pulmonary or Neuromuscular Disease

- Children with pulmonary abnormality or neuromuscular disease that impairs the ability to clear secretions from the upper airways may be considered for prophylaxis in the first year of life.

Native Americans

- The burden of RSV disease and costs associated with transport from remote locations may result in a broader use of palivizumab for RSV prevention in Alaska Native, Navajo and White Mountain Apache infants in the first year of life.

Infant Already had RSV That Season?

- Do not continue RSV prophylaxis
- Second year of life
  - Only those with CLD continuing to receive treatment for RSV

Immunocompromised Children

- Children younger than 24 months who will be profoundly immunocompromised during the RSV season may be considered for prophylaxis
- No evidence for use in infants with Down Syndrome
- May be considered in CF Infants

Hospital Stay for Healthy Term Newborn Infants

POLICY STATEMENT: Organizational Practices in Adhere to and Foster the Children's Health Care System's goals of improving the health of all children.

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN

HOSPITAL STAY FOR HEALTHY TERM NEWBORN INFANTS

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Hospital Stay for Healthy Term Newborn Infants

Policy Statement
The hospital stay of the mother and her healthy term newborn infant (mother-infant dyad) should be long enough to allow identification of problems and to ensure that the mother is sufficiently recovered and prepared to care for herself and her newborn at home.

Criteria for Discharge
Include physiologic stability, family preparedness and competence to provide newborn care at home, availability of social support, and access to the health care system and resources.

Recommendations
1. Clinical course and physical examination reveal no abnormalities that require continued hospitalization.

Readmission
Most common causes of readmission?
- Jaundice
- Dehydration
- Feeding difficulties

Associated factors:
- Asian race, primiparity, lower gestational age, maternal morbidities, instrumented vaginal delivery, SGA

Discharge Readiness
American Academy of Pediatrics Safe and Healthy Beginnings toolkit contains a discharge-readiness checklist that can aid clinicians with preparation of a newborn for discharge.

Recommendations
2. The infant’s vital signs are documented as being within normal ranges, with appropriate variations based on physiologic state, and stable for the 12 hours preceding discharge.

3. The infant has urinated regularly and passed at least 1 stool spontaneously.
Recommendations

4. The infant has completed at least 2 successful feedings.

5. There is no evidence of excessive bleeding at the circumcision site for at least 2 hours.

Recommendations

6. The clinical significance of jaundice, if present before discharge, has been determined.

7. The infant has been adequately evaluated and monitored for sepsis.

Recommendations

8. Maternal and infant laboratory tests are available and have been reviewed, including the following:
   - maternal syphilis, hepatitis B surface antigen, and HIV status
   - umbilical cord or newborn blood type and direct Coombs test result, if clinically indicated.

Recommendations

9. Initial hepatitis B vaccine has been administered.

10. If the mother has not previously been vaccinated, she should receive (Tdap) vaccine immediately after the infant is born.

Recommendations

11. Newborn metabolic, hearing, and pulse oximetry screenings have been completed per hospital protocol and state regulations.

12. The mother's knowledge, ability, and confidence to provide adequate care for her infant are documented.

Recommendations

13. A car safety seat appropriate for the infant's maturity and medical condition that meets Federal Motor Vehicle Safety Standard has been obtained and is available before hospital discharge.
Recommendations

14. Family members or other support persons, including health care providers who are familiar with newborn care and are knowledgeable about lactation and the recognition of jaundice and dehydration, are available to the mother and infant after discharge.

15. A physician-directed source of continuing health care (medical home) for the mother and infant has been identified.

Recommendations

16. Family, environmental, and social risk factors have been assessed.

17. For newborns discharged before 48 hours after delivery, an appointment should be made for the infant to be examined by a health care practitioner within 48 hours of discharge.

Any Questions?