
Percent of live births

1981: 9.4
1991: 10.8
2001: 11.9
2010: 7.6

27 percent increase

Healthy People Objective

From NCHS, 2002
Prepared by March of Dimes Perinatal Data Center, 2003

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Factors Associated with Increasing Rates of Preterm Birth

- Increasing rates of multifetal pregnancies
- Greater percentage of births to women of advanced maternal age
- Increasing rates of asymptomatic infections, labor inductions, cesarean births and scheduled births
- Advances in maternal-fetal management
Preterm Births by Maternal Race
United States, 1990 to 2000

From NCHS, 2002
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Socioeconomic Risks

Rates of preterm birth are higher among socially disadvantaged populations, including:

- Minorities
- Women with low levels of education
- Women with late or no prenatal care

(Basso et al., 1998)
Important Terminology Distinctions

- Preterm labor is birth before 37 completed weeks gestation.
- Low birthweight is birthweight <2,500 g.
- About one-half of preterm infants are low birthweight.
- About two-thirds of low birthweight infants are preterm, with the remainder being growth restricted at term.
Impact of Preterm Birth on Perinatal and Infant Mortality Rates

- Preterm birth is the largest single contributor to perinatal mortality, accounting for 75 percent of all fetal and neonatal deaths.
- Preterm infants are twice as likely as term infants to die by their first birthday.
- Preterm infants are more likely to suffer morbidities, such as RDS, IVH and NEC.
Leading Cause-Specific Infant Mortality Rates, United States, 1990 and 2000

From NCHS, 1990 final mortality data and 2000 linked birth/infant death data
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Health Consequences of Low Birthweight

A 20-year follow-up study comparing VLBW (<1,500 g) to normal birthweight showed:

- Fewer VLBW graduated high school or attended college.
- VLBW had higher rates of chronic medical conditions.
- Only 51% VLBW had normal-range IQs.
- VLBW had more neurosensory impairments, such as CP (Hack et al., 2002).
Survival Rates of Preterm Infants at the Boundaries of Survivability

Hack and Fanaroff (2000) showed survival rates for the following gestational ages:

- 23 weeks: 2 percent to 32 percent
- 24 weeks: 17 percent to 62 percent
- 25 weeks: 35 percent to 72 percent
Effects on Families

- Parents continue to exhibit high stress levels related to developmental delays at year 3 (Singer et al., 1999).

- During the first six months after the birth of LBW infants, most mothers have to leave employment (Gennaro, 1996).

- Families of VLBW infants have higher stress levels, ongoing medical problems and more school problems (Taylor et al., 2001).
Economic Consequences

- More than $11.9 billion is spent annually for preterm infant hospital care alone.
- Hospital costs, together with lifetime costs for care, are at least $500,000 per child.
- The average hospital charge for RDS is $82,648, with a length of stay of 27 days.
Preterm Birth Prevention Programs

- Programs are modeled on the work of Dr. Emile Papiernik in France in the 1970s.
- Interventions include educating patients and physicians about preterm labor and weekly patient assessments.
- Programs have produced inconsistent and discouraging results.
Progesterone: A Promising Intervention?

- For women with a previous preterm birth, weekly injections of progesterone offers significant protection against a recurrent preterm birth (Meis, 2003).

- Progesterone given vaginally to women with a previous preterm birth significantly reduces preterm birth (18.5 percent for placebo group vs. 2.7 percent for progesterone group) (DaFonseca et al., 2003).
Home Uterine Activity Monitoring

- Home monitors are licensed by the FDA for use only with women with a history of preterm delivery.
- Much controversy exists about their effectiveness.
- It may be daily contact with a nurse that accounts for its effectiveness.
Mechanisms of Preterm Labor

- **Activation of Maternal/Fetal HPA Axis**
  - Maternal-Fetal Stress
  - Premature Onset of Physiologic Initiators

- **Inflammation**
  - Infection:
    - Chorion-Decidual
    - Systemic

- **Decidual Hemorrhage Abruption**

- **Pathological Uterine Distention**
  - Multifetal Preg
  - Polyhydram
  - Uterine abnorm

- **Mechanical stretch**

**Chorion Decidua**
- CRH E1-E3
- Thrombin Rec
- Gap jet PG synthase Oxt recep

- **CRH**

**proteases**

**uterotonins**

**PROM**

**Uterine Contractions**

**PTD**

Etiologies of Preterm Labor

• Corticotropin-releasing hormone (CRH): Found in the placenta and stimulated by cortisol. Elevated CRH is implicated in preterm labor associated with stress, infection and hemorrhage.

• Cytokines: Products of activated macrophages that mediate inflammation. They stimulate prostaglandin production and promote cervical ripening.
High Risk and Low Risk

- At least 50 percent of all women who give birth prematurely have no identifiable risk factors for preterm labor.
- This is important in designing programs to decrease preterm birth.
- All women, both high- and low-risk, should be included in these programs.
Risk Factors

- Current multifetal pregnancy
- History of a preterm birth
- Uterine and cervical abnormalities
Biochemical Markers for Preterm Labor

- Fetal fibronectin: Glycoproteins produced during fetal life and found in the cervical canal early and late in pregnancy; best used to determine who will not go into preterm labor.

- Salivary estriol: Estrogen produced by the fetus and elevated before preterm birth; might be useful to determine who will not go into preterm labor.
Cervical Length

- Preterm labor is associated with shortened cervical length (<30 mm).
- Iam’s (2002) study of cervical length of 306 women found low positive predictive values and concluded that cervical length measurements are not useful as screening tools for preterm labor.
Infection

- Infections such as bacterial vaginosis, syphilis, gonorrhea and urinary tract infections are associated with increased risk of preterm birth.
- Randomized trials of prophylactic antibiotics and treating BV have been unsuccessful in preventing preterm birth.

Gibbs et al., 1992; Carey et al., 2000
Other Infections

- Vaginal douching and vaginal infections are associated with preterm labor. Kendrick and colleagues (1998) found that regular douching is associated with LBW.
- Subclinical infections, such as periodontal disease, may contribute to preterm birth.
Risk Reduction Counseling

- Counseling about risk reduction should be individualized for each pregnant woman.
- Women with symptoms of preterm labor should pay attention to what activities or situations contribute to symptoms and modify behavior accordingly.
Five A’s for Smoking Cessation

1. Ask about tobacco use.
2. Advise to quit.
3. Assess willingness to make an attempt.
4. Assist in quit attempt.
5. Arrange follow-up.

acog.org
Nutrition

• More preterm births occur in mothers with low pre-pregnancy weight-for-height (Hickey et al., 1997).

• A significant association exists between inadequate maternal weight gain and preterm birth (Carmichael et al., 1997).

• Nutritional counseling should begin before conception and continue through pregnancy.
Use of Illegal Substances

- The association between use of illegal substances and preterm labor is not universally accepted.
- Studies show association between cocaine use and LBW, preterm birth and placental abruption.

Hulse et al., 1997; Sprauve et al., 1997
Stress

- The association of stress with preterm birth has led to intervention studies that successfully reduced this risk factor.
- Nursing assessment should include asking the woman about her perception of stressors in her life.
Domestic Violence

- Preterm birth and LBW are more common in women who have been victims of domestic violence (Parker et al., 1994).
- Risk assessment should include domestic violence screening. Resources and plans should be in place to assist women who are experiencing abuse.
Early Recognition of Signs and Symptoms

Preterm labor diagnosis can be confusing:
- Symptoms are insidious and subtle.
- Symptoms are often normalized by health care providers.
- Symptoms are often diagnosed and treated as common discomforts of pregnancy.

Freston et al., 1997; Patterson et al., 1992; Weiss et al., 2002; Williams et al., 1999
Diagnostic Criteria

• Gestation between 20 and 37 weeks
• Persistent uterine contractions (four every 20 minutes or eight every 60 minutes) and
  Documented cervical change or
  Cervical effacement of >80% or
  Cervical dilatation of >1 cm

Adapted from AA & ACOG, 2003
Teaching Contraction Recognition

- A woman’s awareness of contractions is vital to seeking timely care.
- Many women have difficulty discerning contractions.
- Nurses should teach women how to detect uterine activity.
- Printed materials, videos and hands-on instruction are useful teaching tools.
Preterm Labor Symptoms

Between 20 and 37 weeks of pregnancy:

- Pelvic pressure
- Low, dull backache
- Menstrual-like cramps
- Change or increase in vaginal discharge
- Uterine contractions every 10 minutes or more often, with or without pain
- Intestinal cramping, with or without diarrhea
Action to Take if Symptoms Occur

Call your provider or hospital. You may be told to come in to be seen or you may be told to:

- Lie down on your left side for 1 hour.
- Drink two to three glasses of water or juice.
- Palpate for contractions.
Action to Take if Symptoms Occur
(Continued)

• If symptoms continue, call your health care provider or go to the hospital and describe what is happening.
• If symptoms abate, resume light activity but not what you were doing when the symptoms began.
• If symptoms come back, call the health care provider or go to the hospital and describe what is happening.
Urgent Symptoms

If any of the following symptoms occur, call your health care provider immediately:

- Fluid leaking from the vagina
- Vaginal bleeding
- Odorous vaginal discharge
- Contractions every 5 minutes or less
“Braxton-Hicks”: Implicated in Diagnostic Confusion

- The term “Braxton-Hicks” leads women to believe all contractions are normal.
- Without an evaluation, it is impossible to distinguish Braxton-Hicks contractions from preterm labor contractions.
- Nurses should teach women to report contractions and cramping between 20 and 36 weeks that do not go away.
Women at High-Risk for Preterm Labor

- More frequent prenatal visits are indicated.
- A study of nursing telephone support to at-risk women significantly reduced preterm births among low-income African-American women (Moore et al., 1998).
- Though controversial, many providers continue to offer home uterine activity monitoring.
Antenatal Glucocorticoids

- Accelerates fetal lung maturity and decreases rates of intraventricular hemorrhage.
- One course should be given to all women between 24 and 34 weeks when preterm birth is threatened.
- Contraindications are chorioamnionitis, fetal death or indication for immediate delivery.
Administration of Antenatal Glucocorticoids

These drugs must be administered quickly upon admission, as it takes 24 hours for the fetus to reach effective levels.

Betamethasone:
Two doses, 12 mg IM q 24 hours

OR

Dexamethasone:
Four doses, 6 mg IM q 12 hours
Tocolytic Therapy

- For most women, the best outcome gained is 24 to 48 hours.
- Some pregnancies can be extended for longer durations, though this is highly variable.
- Tocolytic therapy affords time for glucocorticoids and for transfer to an appropriate hospital.
Tocolytics

- There is no clear, first-line tocolytic to manage preterm labor.
- The drug choice should be individualized and based on maternal condition, potential side effects and gestational age.
- Prolonged use of tocolytics may increase maternal-fetal risk without offering clear benefit.
Classes and Actions of Tocolytics

- **Betamimetics:**
  Relax smooth muscle by stimulating cyclic AMP, resulting in an alteration in cellular calcium balance.

- **Magnesium sulfate:**
  Interferes with calcium uptake in myometrium cells, reducing muscular ability to contract.

- **Prostaglandin synthetase inhibitors:**
  Reduces contractions by lowering prostaglandins.

- **Calcium channel blockers:**
  Reduces contractions by inhibiting calcium from entering smooth muscle cells.
Activity Restriction

- Thought to decrease contractions and cervical change by improving perfusion and decreasing pressure on the cervix.
- No research conducted on singleton pregnancies to determine its effectiveness.
- Research on twin pregnancies shows improvement in fetal growth but increase in risk of very preterm birth.
Side Effects of Bedrest

• Physical effects: muscle dysfunction, weight loss and shortness of breath (Maloni et al., 1993)
• Psychosocial complications: maternal boredom, depression, isolation and anxiety
• Impact on the family: need for child care, financial strains, stress due to shifting roles and responsibilities
May 2003 ACOG Practice Guideline #43

“Bedrest, hydration and pelvic rest do not appear to improve the rate of preterm birth, and should not be routinely recommended.”
Coping with Activity Restriction

- Identify diversionary activities.
- Celebrate milestones.
- Counsel about medical leave of absence and the Family Medical Leave Act.
- Help the woman and her partner understand the rationale for sexual activity restriction and help them identify other ways to be close and affectionate.
Stainton’s (1994) Interventions for the Hospitalized Pregnant Woman

- Bracket time by setting short-term goals and celebrating their accomplishment.
- Acknowledge the importance of the woman’s efforts to have a healthy baby.
- Respond to requests for information in ways that make sense. Speak to the feelings underlying the questions.
Stainton’s (1994) Interventions (Continued)

• Assist the woman in maintaining family relationships and functioning.
• Give the woman as much control as possible.
• Help the woman focus on future possibilities.
Helping Families with Home Care

- Involve family members in developing the care plan.
- Assist the woman living alone to identify sources of support.
- Help family members renegotiate roles and routines.
- If indicated, arrange the physical space to minimize activity.
Helping Families with Home Care

- Emphasize the importance of asking for help from social networks.
- Acknowledge and commend the family for the hard work they are doing for the woman and the baby.
- Inform the family about local and national support groups.
Inevitable Preterm Delivery

Goals when preterm labor is advanced or unresponsive to treatment:

- Achieve short-term labor inhibition.
- Administer antenatal glucocorticoids.
- If indicated, transfer the woman before delivery to a higher level perinatal center.
- Correct inaccuracies about preterm labor and validate the normalcy of the woman’s feelings.
Preparing Parents for a Preterm Delivery

- Explain reasons and details for maternal transport.
- Give parents information about delivery and NICU care.
- Give counsel and support to parents of an infant on the threshold of viability.
- Support the family with compassion and grief counseling if resuscitation is not performed or discontinued.
Contributions of Nursing Research

- Effective strategies to teach symptoms
- Involving communities in prevention
- Helping women modify risk factors
- Helping women avoid delays in seeking care
- Understanding psychosocial responses to treatment
Contributions of Nursing Research (Continued)

- Utilizing stress reduction programs
- Conducting telephone support to aid in smoking cessation
- Effects of bedrest on physical parameters
- Effects of preterm birth on the family
Contributions of Nursing Research (Continued)

- Benefits of early hospital discharge and home follow-up of VLBW infants
- Strategies to promote breastfeeding in preterm infants

A review of nursing preterm labor research can be found in Freda, 2003.
Aims of the March of Dimes Prematurity Campaign

1. Raise public awareness of the problems of prematurity.
2. Educate pregnant women and their families to recognize the signs of preterm labor. Support parents of babies in NICUs.
3. Assist providers to improve prematurity risk detection.
Aims of the March of Dimes Prematurity Campaign (Continued)

4. Invest research dollars to identify causes and interventions for preterm labor.
5. Expand access to health insurance to improve prenatal care and infant health outcomes.
Summary

- Preterm birth is the most acute problem in maternal-child health.
- Care for the woman with preterm labor must be individualized.
- Care plans must be dynamic and responsive to changes in the clinical situation.
- The nurse and the woman should engage in a learning and discovery process to find out which lifestyle modifications and medical and nursing interventions work, and to modify the plan of care as needed.