

PRE-CONCEPTION CARE TRAINING CURRICULUM

Introduction

A comprehensive peri-natal program involves a coordinated approach to medical and psycho-social support that optimally begins before conception. Preconception care therefore should be an integral part of Well Women health care because it permits identification of those conditions or risk factors that could affect a future pregnancy or fetus, and promotes early intervention. Preconception care therefore, permits targeted prenatal care to optimize outcomes and potentially renders mother and fetus amenable to intervention. Preconception healthcare improves pregnancy outcomes for example, one of the causes of infant mortality in the United States is birth defects. Most birth defects occur between 17 and 56 days after conception, often before pregnancy is confirmed and advent of the first prenatal visit.

Additionally, when started at least one month before conception, folic acid supplements reduce the incidence of neural tube defects including Spina Bifida and Anencephaly. Many women have their first prenatal visit at eight weeks of pregnancy or later, the period of time before the first prenatal visit, however, carries the greatest risk to fetal development. (American Family Physician; June15, 2002)

Purpose

The purpose of this curriculum, is to provide a manual of instruction for Nurses and other practitioners serving women of childbearing age. It is designed to assist local health departments improve the knowledge base of reproductive health care providers, and to assure the delivery of preconception health care that will significantly impact infant mortality in populations at risk. Recommendations for maternal and child care are based on current practice standards from the American College of Obstetrics and Gynecology (ACOG), and the American Academy of Pediatrics (AAP), as well as State guidelines and other materials listed in the reference section. These materials reflect a consensus that women of child bearing age need preconceptional/ inter-conceptional care that is consistent, comprehensive, and risk-appropriate.

Preconception Care Defined

Preconception care is the provision of services directed towards the identification of medical and social problems prior to conception. It can be defined as care which adds a different dimension to the usual primary care, as it focuses on the provision of prevention and intervention strategies designed to promote healthy pregnancy outcomes. (American Academy of Pediatrics Fifth Edition)

Goal of Preconception Care

- To enhance knowledge, and improve attitudes and value for health care prior to conception
- To assure that women of childbearing age in the State of Illinois receive evidenced-based risk screening, health promotion, and intervention that will enable them to enter a pregnancy in good health.
- To identify reversible health risks to pregnancy outcome, emphasizing factors that must be acted on before conception or to achieve optimal pregnancy outcomes.
- To educate women on risk prevention before pregnancy. Education regarding exercise, obesity, nutrition, occupational hazards, family support, and financial issues related to pregnancy contribute to a better-prepared patient, whose prospects are good for a healthy outcome.

CDC recommendations to improve reproductive health include the following:

- Individual responsibility across the life span
- Consumer Awareness
- Preventive visits
- Interventions for identified risks
- Inter-conception Care
- Pre-pregnancy Checkup
- Health Insurance Coverage for women with low incomes

- Public health programs and strategies
- Research
- Evaluation

These recommendations require changes in consumer knowledge, clinical practice and public health programming, which will necessitate in-service education and training.

Learning Objectives

At the completion of a period of training, providers of preconception care will be able to:

- Assist client to develop a reproductive life plan.
- Increase public awareness of the importance of preconception health.
- Provide risk assessment, and health promotion counseling to women of child bearing age.
- Provide interventions for identified risks.
- Provide interventions to women who have had a previous pregnancy that ended in an adverse outcome.
- Provide pre-pregnancy check-up to couples planning a pregnancy.
- Increase awareness regarding the necessity of Health Insurance Coverage for women with low income
- Integrate components of preconception health into existing local public health programs
- Increase evidence based practice, and use of the evidence to improve preconception health.
- Develop measurable outcomes, and evaluate them to determine program effectiveness.

1 Reproductive Life Plan

Objective

Women of childbearing age, men, and couples should be encouraged to have a reproductive life plan.

Action Steps

- Develop, evaluate, and disseminate reproductive life planning tools for women and men in their childbearing years, respecting variations in age; literacy, including health literacy, within a cultural context.
- Develop, evaluate and disseminate individual health education materials for women and men regarding preconception risk factors, including materials related to biomedical, behavioral, and social risks known to affect pregnancy outcomes.

2 Consumer awareness

Objective

Increase public awareness of the importance of preconception health behaviors and preconception care services by using printed and electronic media this is sensitive to literacy, including health literacy, and cultural values.

Action Steps

- Develop and age-appropriate educational curricula and modules for use in schools' health education programs.
- Integrate reproductive health messages into existing health promotion campaigns (e.g. campaign to reduce obesity and smoking)
- Conduct consumer-focused research necessary to identify terms the public understands and develop messages for promoting preconception health and reproductive awareness.
- Develop messages for promoting preconception health knowledge and attitudes and behaviors among men and women of childbearing age.
- Engage media partners to assist in depicting positive role models for lifestyles that promote reproductive health (e.g. Delaying initiation of sexual activity, abstaining from unprotected sex, and avoiding alcohol and drug use).

3 Preventive Visits

Objective

Provide risk assessment and educational health promotion counseling to all women of childbearing age as a component of primary care visits, to reduce reproductive risks and improve pregnancy outcomes.

Action Steps

- Increase health care provider awareness regarding the importance of addressing preconception health among all women of childbearing age.
- Develop and implement curricula on preconception care for clinical instruction, and for continuing education of health care professionals.
- Develop a recommended screening and health promotion package.
- Develop a practical screening tool for primary care settings, which emphasizes preconception risk assessment (e. g. reproductive history, genetic, and environmental risk factors)
- Develop evidence-based models for integrating components of preconception care to facilitate delivery of and demand for prevention and intervention services.
- Establish benchmarks, provider training, and self audits to improve provider knowledge attitudes, and practices to reduce missed opportunities for screening and health promotion.
- Use federally funded collaboratives for community health centers and other Federally Qualified health Centers to improve the quality of preconception risk assessment, health promotion, and intervention provided through primary care.
- Develop fiscal incentives for screening the health promotion.

4 Interventions for Identified Risks

Objective

Increase the proportion of women who receive interventions as follow-up to preconception risk screening, focusing on those interventions with evidence of effectiveness and greatest potential impact.

Action Steps

- Increase provider awareness concerning importance of ongoing interventions for chronic conditions and identified risk factors.
- Implement modules on preconception care for specific clinical conditions for use in clinical practice, and for continuing education credits.
- Disseminate existing guidelines related to evidenced-based intervention for clinical conditions and risk factors.
- Disseminate evidenced based interventions that address risk factors that can be used in a primary care setting (i.e alcohol misuse; antiepileptic drugs, diabetes, folic acid deficiency hepatitis B, HIV/AIDS, hyperthyroidism, PKU, rubella seronegativity, obesity, oral anticoagulant, STD and smoking).
- Apply quality improvement techniques and tools, establish benchmarks, self audits, and participate in quality improvement collaborative groups.

5 Interconception Care

Objective

Use the interconception period to provide additional intensive interventions to women who have had a previous pregnancy that ended in an adverse outcome (i.e. infant death, fetal loss, birth defects, low birthweight, or preterm births).

Action Steps

- Monitor the percentage of women who complete postpartum visits.
- Develop, evaluate and replicate intensive evidenced-based interconception care and coordinate models for women at high social and medical risk.
- Enhance the content of postpartum visits to promote interconception health.
- Use existing public health programs serving women in the postpartum period, to link them to other

sources of interventions (e.g. Family planning, home visiting, WIC).

6 Prepregnancy Checkup

Objective

Offer one prepregnancy visit for individuals planning pregnancy, as a component of obstetric care.

Action Steps

- Review and revise existing professional guidelines to develop the recommended content and approach for such a visit.
- Recommend modification in payment regulations to permit payment for a prepregnancy visit.
- Educate women and couples regarding the value and availability of prepregnancy planning visits.

7 Health Insurance Coverage for Low Income Women

Objective

Recommend and advocate of increase public and private health insurance coverage for women with low incomes to improve access to preventive women's health and preconception and interconception care.

Action Steps

- Improve the design of family planning waivers by permitting options to offer interconception risk assessment, counseling and intervention along with family planning services.
- Increase health coverage among low income women of child bearing age by using federal options and wavers under public and private health insurance systems and the State Children's Health Insurance Program.
- Increase access to healthcare services through policies and reimbursement levels for private and public health insurance systems to include a full range of clinicians who care for women.

8 Public Health Programs and Strategies

Objective

Integrate components of preconception health care into existing local public health "well women's health care" and related programs, including emphasis on interconception interventions for women with previous adverse outcomes.

Objectives

- Use Federal and local community support to encourage more integrated preconception health practices in clinics and programs. Provide support for CDC programs to develop, evaluate, and disseminate integrated approaches to promote preconception health.
- Evaluate the preconception care activities used by other programs, and support replication projects.
- Use local task forces, coalitions or communities to discuss opportunities for promotion and prevention in preconception health at the community level.
- support public health practice collaborative groups to promote shared learning and dissemination of approaches for increasing preconception health
- Include content related to preconception care in educational curricula of schools of public health and other training facilities for public health professionals.

9 Recommendation Research

Objective

Increase the evidence base and promote the use of the evidence to improve preconception health.

Action Steps

- Prepare evidenced-based systematic review of all published reports on programs, and policy through the Agency of Healthcare Research and Quality.
- Support evaluation of model programs and projects, including integrated service delivery and community health promotion projects.
- conduct studies to advance knowledge of preconception risks, clinical and public health intervention,

including knowledge of more integrated practice strategies and interconception approaches.

- Design and conduct analysis of cost benefit and cost effectiveness as part of the study of preconception interventions.
- Examine factors that results in variation in individual use of preconception care (i.e., barriers and motivators that affect healthcare).

10 Recommendation

Monitoring Improvements

Objective

Monitor selected preconception health indicators (i.e., folic acid supplementation, smoking cessation, alcohol misuse, diabetes, and obesity).

Action Steps

- Use pregnancy Risk Assessment and Monitoring System to monitor individual experiences related to preconception care.
- Target preconception health programs and interventions to areas where high rates of poor health outcomes exists for women of reproductive age and their infants.
- Use perinatal records of risk to measure and monitor the proportion of risk attributable to the health of women before pregnancy,
- Include preconception, interconception, and health status measures in population-based performance monitoring systems (e.g. Title V programs).
- Include a measure of preconception care services delivery in the Healthy People 2010 Objectives.
- Develop and implement indicator quality improvement measures for all aspects of preconception care, example, use the Health Employer Data and Information Set Measures to monitor the percentages of women who complete preconception care and postpartum visits or pay for performance measures.

Preconception Care when Pregnancy is planned

Three elements which must be accomplished prior to conception are:

- Risk assessment
- Health promotion
- Medical and psycho-social interventions

1 Risk Assessment

The primary objective of risk assessment is to identify problems that need to be addressed.. The average women of child bearing age is healthy and should have no major problems during pregnancy or during post partum. However some medical, behavioral or psychosocial problems may be overlooked, and others may develop during the innatal period. It is therefore important the providers of well-women's care should pay particular attention to six problems that are commonly missed during prenatal or postpartum care. They are:

- Family violence - is common among pregnant and postpartum women in the US. Pregnancy is the leading cause of homicide among women of child bearing age in the US
- Infectious diseases
- Immunization
- Nutrition assessment
- Psycho-social assessment -depression and stress
- Medical history - preexisting disease states, Heart, Diabetes
- Physical exam
- Laboratory tests
- Family history - genetic issues
- Teratogens and environmental toxicans
- Substance abuse, alcohol and tobacco use
- Financial assessment

- Obesity - underweight

2 Health Promotion

Factors that could change timing of or choice to conceive include:

- Domestic violence
- Birth spacing
- Genetic disease
- Disease with poor prognosis (e.g. AIDS)
- Diseases dangerous to pregnancy (e.g. CHF)
- Conflict between needed maternal care and fetal well-being

Barriers to Preconception Care Include the Following:

- Unintended pregnancy - Incidence if unplanned pregnancy is 49%
- Usual entry into prenatal care in the 3rd month after LMP
- Planned pregnancies are seldom planned with a health care provider
- Unpreparedness of health care providers
- Ignorance about the importance of good health habits prior to conception
- Limited access to health services

Role of Providers in Preconception Health Care

Every provider of health care services, should provide preconception information and counseling to women of child-bearing age, and should take advantage of opportunities to recruit women into preconception care.

These include advising:

- Patients with a negative pregnancy test about preconception care
- Patients having evaluation of irregular menses about preconception
- All sexually active women of child-bearing age to be available for preconception care.
- Creating public awareness by stimulating consumer demand for preconception and in-conception care. (Recommendations from Perinatal Guidelines, Georgia 1999)

When should Pre-conception care be offered

Since so few pregnancies are planned, preconception care issues must be addressed at all encounters with reproductive aged individuals, and should be offered:

- As part of a routine health maintenance care
- At a defined preconception visit
- For women with chronic illness

Preconception Issues for Well Women

Family Planning

A short pregnancy interval may be associated with birth of an SGA infant in a subsequent pregnancy, (Lieberman 1989, Zhu 1999; and preterm birth in a subsequent pregnancy (Basso 1998, Zhu 1999) Family Planning and pregnancy spacing assessment should include the following:

- Family history
- History of depression and the potential for PP depression
- Maternal health risk
- Genetic History (both maternal and paternal)
- Medical, surgical, pulmonary and neurologic history
- Current medication (prescriptions and nonprescription);
- Social history, including alcohol, tobacco, and illicit drug use
- Domestic abuse and violence
- Physical and emotional stress
- Nutritional status

- Environmental and occupational exposures
- Immunity and immunization status
- Risk factors for sexually transmitted diseases
- Obstetric history
- Potential fetal health risks
- Gynecologic history
- General physical examination

Common Conditions Amenable to Preconception Care include, but not limited to:

- Diabetes
- Hypertension
- Seizure disorder
- Sickle Cell Trait /Disease
- Thyroid disorders
- Thrombo-embolic disease
- Hemoglobin disorders
- STDs
- Repetitive pregnancy losses
- Eating disorders
- Alcohol, tobacco and other drug use and abuse
- Domestic violence
- Poor nutrition

Common In-apparent Illnesses Amenable to Preconception Care Include:

- Hypertension
- Diabetes
- Renal conditions
- Rheumatic heart disease
- Substance abuse
- Thyroid abnormalities
- Chronic hepatitis
- HIV infection
- Depression

Preconception Care When Pregnancy is Contemplated Considers the Following:

- Future pregnancy when choosing medications for patients
- Immunizing teenage girls against rubella
- Teaching males and females about safe sex practices and HIV prevention

Routine Pre-conceptual Laboratory tests include

- Vaccination(s) should be offered to women pre-conception at risk for, more are susceptible to rubella, varicella, and hepatitis
- Hemoglobin and Hematocrit
- Urine screen for protein and glucose
- Papanicolaou cervical cytology (Pap Smear)
- Screening for Gonorrhea, Syphilis, Chlamydia
- Screening for human immunodeficiency virus (HIV) infection is recommended.

If positive, counseling and partner testing should be offered along with treatment. If negative, HIV prevention strategies should be reviewed.

Tests recommended for specific indications are as follows:

- Testing to assess proven etiologies of recurrent pregnancy loss

- Testing for maternal diseases based on medical or reproductive history
- Mantoux skin test with purified protein derivative for TB

Recommended Testing for Families at Risk for Specific Genetic Based Diseases or

Racial/Familial risk factors:

- Sickle cell hemoglobinopathies (People of African Descent)
- Thalassemia (Mediterraneans, Southeast Asians, and People of African descent "-thalassemia (People of African descent, and Thailanders
- Tay-Sachs disease (Ashkenazi Jews, French Canadians, and Cajuns)
- Gucher's Canavan, and Niemann-Pick disease (Ashkenazi Jews)
- CF, fragile X syndrome for family history of nonspecific, predominantly male-affected, mental retardation, Duchenne muscular dystrophy.

Preconception Genetic Counseling and Screening Include

- Family history of genetic diseases
- Discussion of age-related risks
- Discussion of disease-related risks
- Carrier Screening
- Potential options of donor egg or sperm or early genetic testing

General Preconception Counseling Include:

- Family planning, pregnancy spacing
- Exercise
- Obesity - weight reduction before pregnancy
- Increasing weight before pregnancy if underweight
- Nutrition - Healthy eating
- Abstinence from tobacco, alcohol, and illicit drugs
- Advise administration of daily vitamin supplement containing 400mcg Folic Acid, and 30mg of elemental iron beginning at least one month before conception.
- Women who have had a pregnancy with neural tube defect, should be advised to take 4.0mg of Folic Acid daily. (American Family Physician, June 15, 02)
- Maintaining good control of any preexisting medical conditions (e.g., diabetes, hypertension, systemic lupus erythematosus, asthma, seizures, thyroid disorders, and inflammatory bowel. disease)
Determining the time of conception by obtaining an accurate menstrual history, and providing instruction by using a menstrual calendar.

Substance Use and Preconception care

Patient education must be directed to the:

- The effects of substance on the fetus
- Screening for substance use and abuse
- Referrals to a treatment program
- Pregnancy may be a strong motivator for change

Preconception Care as it Relates to Alcohol Intake in Pregnancy

Patient must be counseled that:

- Fetal Alcohol Syndrome is the leading cause of preventable mental retardation
- No level of alcohol consumption is considered safe
- To abstain when attempting to conceive and during pregnancy
- Assessment for problem drinking will be conducted with a standardized screening tool

Preconception care as it Relates to Tobacco Use

Patient must be counseled that:

- Smoking is the leading preventable cause of low birth-weight- for every 10 cigarettes smoked daily, the risk of delivering an SGA infant increases by a factor of 1.5
- Smoking is associated with placental abruption, pre-term delivery, placenta previa, miscarriage
- Smoking cessation results in increased birth weight
- Exposure to environmental smoke in the household is associated with SIDS, childhood respiratory illness, asthma and otitis media

Preconception Care for Men must include counseling regarding the following:

- Alcohol - may be associated with physical and emotional abuse, as may decrease fertility
- Genetic counseling - Sickle Cell trait/disease
- Sexually transmitted diseases - syphilis, herpes, HIV, gonorrhea
- Preparedness for parenthood - psychological, financial, life plans for education, career

Inter-conceptual Care -Prenatal Care**Definition of Prenatal Care**

Regularly scheduled obstetric care beginning in early pregnancy and continuing through post-partum. Prenatal care involves the management of medical, nutritional. Psycho-social, and educational needs of the patient and her family. This is reevaluated at regular intervals, and revised in accordance with the progress of the pregnancy.

Rationale for Prenatal Care:

Access to prenatal care has long been associated with reduction in infant and maternal mortality and morbidity. Encounters between pregnant women and health care providers, afford opportunities for teaching when a foundation can be laid for learning good health habits which will benefit both mother and infant Women who receive prenatal care during the first trimester have better pregnancy outcomes than women who have little or no prenatal care.

Goals of Prenatal Care

- To maintain and improve maternal/ infant health and well-being through patient education including nutrition education
- Periodic surveillance, laboratory testing, and risk assessment including risks of genetic disease and birth defects.

Objectives of Prenatal Care

- To reduce maternal mortality, morbidity, fetal
- To reduce pre-term births, intrauterine growth retardation, congenital anomalies, and failure to thrive
- To promote health supervision, and healthy fetal growth and Development

Major Recommendations for quality Prenatal Care- All pregnant women:

- Should be assessed for peri-partum depression.
- Should be given folic acid supplementation prior to conception.
- The first prenatal visit should occur during the first trimester.
- Gestational age must be accurately established by 20 weeks, either by the last menstrual period correlating with exam the first trimester, or an ultrasound preferably at 18-20 weeks gestation, to allow for fetal survey.
- Should be screened for HbsAg before delivery.

Components of Prenatal Care.

Prenatal care involves the management of medical, nutritional. Psycho-social, and educational needs of the patient and her family. This is reevaluated at regularly scheduled intervals, and revised in accordance with the

progress of the pregnancy. In 1989 the US Public Health Service identified three basic components of prenatal care, they are:

- Early and continuing risk assessment, including laboratory testing
- Health promotion, including patient education
- Medical and psycho-social assessment, intervention and follow-up care.

Early and Continuing Risk Assessment

Prenatal care is more effective when the first visit takes place at 6-8 weeks gestation, and not delayed until the second or third trimester. The prenatal visit is a comprehensive process of assessing historical data, laboratory findings, medical, social and obstetrical risk indicators. One important goal of the prenatal visit is to prevent pre-term births which is the chief cause of infant mortality. Prenatal visits are designed:

- To provide primary health care
- Identify risks to fetal health and safety
- To prevent and or control disease
- To assure delivery of a healthy baby of appropriate weight.

Risk Assessment includes obtaining the following data:

- Demographic information
- Gynecologic history, including the date of the last menstrual period (LMP)
- History of contraceptive use
- Obstetric history
- Estimated day of delivery (EDD) determined by the last menstrual period if known. If the date is unknown or a size-date discrepancy exists, an ultrasound examination should be performed before 20 weeks.
- History of current pregnancy
- Accurately dating pregnancy
- Medical/surgical history
- Genetic history
- History of dental care
- Social history/Lifestyle behaviors
- Environmental exposures
- Pharmacologic history
- Nutritional assessment including pregnancy weight and body mass index (BMI)
- Psycho-social assessment
- Physical examination
- Employment history
- Financial planning

Assessment

The assessment process begins with the initial Prenatal visit, and will be more effective if a preconception visit occurred. It is on-going and ideally starts with the initial visit which should occur between 6-8 weeks of gestation. At the initial prenatal visit the patient's database is established, if not prior to conception, and involves assessment or collecting physical, historical and laboratory data from which a plan of care is developed and followed throughout the course of the pregnancy. Historical data include the following:

Demographics

The age of the mother is an example of a characteristic that is associated with both medical risk (because pregnancy at the extremes of the reproductive age span can have specific physiological consequences) and psycho-social risk. Marital status of the mother may provide a possible indicator of support if she is single, separated, divorced, or has no significant other to assist throughout her pregnancy and postpartum. It will

indicate whether there is a need to plan for child care for the baby and some occasional respite care for the mother.

Assessment of income and financial resources for pregnancy will allow the provider to assess the need for financial assistance through Medicaid, or other funding. All clients should be assessed for Medicaid eligibility via the Medicaid Presumptive Eligibility process. Education assessment is useful for at least two reasons. The client may need assistance to either continue schooling if an adolescent, or in pursuit of a G.E.D. if she dropped out of school. Education assessment can also offer insight into possible ability to comprehend information supplied by the provider. It is important to ascertain from the patient what her housing situation is: homeless, evicted, living in a shelter, etc.

Gynecological History

Menstrual history includes premenstrual syndrome, dysmenorrhea, fibroid tumors, irregular bleeding, abnormal Pap smears, pelvic surgeries or interventions; last normal menstrual period (LNMP), and Diethylstilbestrol (DES) exposure. The number of weeks that have elapsed between the first day of the LNMP (not the presumed time of conception) and the date of delivery is the means to calculate gestational age, regardless of whether the gestation results in a live birth or a fetal death.

Contraceptive History

Information should include whether this pregnancy was planned and is wanted, what contraception method was used, the current sexual relationship, is it monogamous, and if not the number of partners involved.

Past Obstetric History

This topic covers prior pregnancies, previous intrauterine growth retardation (IUGR), infant/pre-term birth, high parity, birth interval of less than two years, previous hemorrhage, stillborn or neonate death, sudden infant death syndrome (SIDS). Any of these would indicate greater risk factors for the client.

Medical/Surgical History

Ascertain whether the client has experienced any chronic diseases such as diabetes, hypertension, anemia, and what prescription or over the counter medications were or are being used. Gather information on infections such as hepatitis, toxoplasmosis, group B streptococcus infections, allergies. Trauma, surgical procedures, blood transfusions. Learn whether satisfactory resolution was achieved on any of these topics.

Genetics History

Is there a record of repeated spontaneous abortions, chromosomal and other congenital abnormalities, hemoglobinopathies such as sickle cell anemia. Has the client, spouse or family been exposed to radiation or other toxic substance exposure? Have there been multiple births? Is there a family history of chronic diseases (diabetes, hypertension, anemia, etc.)?

Life Style Behaviors

This section should assess the client's use of tobacco products, alcohol, illicit drugs, over the counter medications, prescription drugs, rest and sleep patterns, extremes of exercise or physical exertion, and dental care.

Employment History

Work, in general, is not associated with adverse pregnancy outcomes. Women should be screened early in pregnancy regarding strenuous occupational activity and advised to modify as indicated. If the work environment would place the pregnancy in jeopardy, for example, if the business of the company is chemicals, questions should be raised regarding the teratogenic nature of the chemicals, what degree of exposure the client

receives, and what safety measures are provided. Additionally, is there a need to request a change of duties to lessen exposure.

Environmental Exposures

The period of greatest sensitivity to the environment for the developing fetus is between 17 and 56 days after conception. Many structural anomalies have already occurred by the end of the eighth week and certainly by the end of the first trimester. In 1990, in Illinois, 20.7 percent of women received care only after the first trimester and 2.1 percent got no prenatal care at all, according to the Department's Illinois Center for Health Statistics. Preconception counseling may affect some patients who otherwise would not seek care until after this critical period.

A chemical exposure history should be obtained, ideally prior to conception. Women should avoid significant exposure to chemical solvents and metal fumes and should carefully follow current guidelines for handling antineoplastic agents, including the use of vertical laminar flow hoods in their preparation.

A number of chemicals are of potential concern to human pregnancy. The effects of most of these substances on human pregnancy are unknown, but several, such as heavy metals and organic solvents, have been implicated in a variety of reproductive disorders. It would seem prudent to educate women for whom pregnancy is a possibility regarding such hazards; help them identify their own exposure risks; and provide them with the facts available regarding the teratogenic potential of any drug, chemical, or environmental agent to which they are exposed.

It is important to ask the client about their environment contacts outside their daily work involvement. This history should include inquiry about activities and products used by the client, as well as by other household members. This will include such environmental things as: Interview the client to assess the type of and place of employment. If the work environment would place the pregnancies in jeopardy.

It is important to ask the client about their environment contacts outside their daily work involvement. This history should include inquiry about activities and products used by the client, as well as by other household members. This will include such environmental things as:

- Lead based paint
- Ceramic ware
- Soil/dust near lead industries
- Leaded gasoline
- Plumbing leachate

Inquiries regarding hobbies and related activities should include the following:

- Glazed pottery making
- Preparing lead shots
- Target shooting at firing ranges
- Fishing sinkers
- Stained glass making
- Lead solder (e.g electronics)
- Painting
- Furniture refinishing
- Car and boat repair
- Home remodeling

Questions should also be raised regarding a spouse taking home residue on clothing, e.g. in farm communities there may be exposure to pesticides and herbicides. Investigation regarding a safe water supply needs to be addressed. Learn whether the source of the client's water supply is a public water supply (municipal) or private. If it is private, it is advised that the private well be sampled once during the past year for coliform and nitrate.

The well should be free of coliform bacteria and contain no more than 10 mg./L. Of nitrates. Testing can be done through an approved private laboratory.

Psycho-social Assessment

It is important to do a review of the client and her environment to evaluate social and behavioral factors that affect the client's ability to function. This assessment includes a psycho-social history, determination of current functioning, counseling relative to need, and community referrals for services.

Components of the assessment derived from the interview and updated medical record should include family composition and functioning (strengths and needs), adjustment to pregnancy and parenting attitudes, perceptions of need for care, support systems of client and family (use of formal and informal resources), cultural issues regarding health care, pregnancy, family relationships, educational level, mental health status and history (family violence, depression, suicidal tendencies, key stressors and life events, maternal stress/anxiety extremes), pertinent medical history (e.g., substance abuse), and environmental needs and resources such as housing, financial resources, employment, clothing, transportation, child care and community violence.

Ascertain whether the client is experiencing any emotional highs or lows about becoming a parent, or whether she is experiencing increased fatigue or stress, particularly if there are other youngsters at home or if she is employed outside her home. The client may have headaches due to stress or the headaches may be indicative of serious medical problems such as hypertension, proteinuria, or edema of the extremities. In such cases prompt contact with the medical provider is indicated.

Physical Examination

The physical examination is performed for all women during the pre-conceptual visit or the first pregnancy visit. The elements of the physical examination include: general appearance and nutrition; blood pressure, pulse, height to weight profile, present weight; head and neck, heart and lungs, breasts, abdomen, pelvic area tenderness, extremities and back, neuromuscular; and pelvic evaluation - speculum and bimanual examination, clinic pelvimetry.

At each follow-up visit, the patient should be given an opportunity to ask questions about her pregnancy or comment on changes that she has noted. The physical exam should include general appearance, nutrition, blood pressure, weight (including pattern of weight gain), uterine size, heart rate of mother and fetus, and cervical check after 40 weeks. The cervical check should include dilatation effacement, fetal presentation, and station. The findings of this exam should be carefully documented and should be assessed during each visit. The patient should be asked about fetal movement at each visit. Urine should be checked to detect protein and glucose. Any change in the pregnancy risk assessment should be recorded after each evaluation and an appropriate management plan outlined. Continual risk assessment should be a standard part of the ante-partum care.

At 24 to 28 weeks gestation an interval history since the last visit should be obtained and should include questions on the general state of health, nutrition, fetal movement and unusual symptoms such as frequent contractions or vaginal bleeding. Continuing assessment is indicated of psycho-social risks, maternal stress or anxiety, and habits to determine significant changes and the need for support or other interventions. The physical examination should include weight as a measure of health for the woman and fetus; blood pressure as a continuing screen for hypertension; and auscultation of fetal heart rate, assessment of fetal activity, and fundal height for growth pattern.

A repeat hematocrit or hemoglobin is indicated during the second and third trimester to help monitor nutritional status and identify anemia. Since the one-hour glucose screen for diabetes is recommended for all women near 26 weeks, both laboratory tests can be done at this time. For Rh-negative women, a repeat Rh titer should be done at this visit and, if unsensitized, RhoGAM should be given. This is the beginning of the third trimester and

is 10 weeks after the previous risk assessment. At this time, diagnoses of problems such as toxemia, growth retardation, or abnormal fetal presentation may first be made. The timing also reflects the optimal screening time for pregnancy-induced diabetes and anemia.

At 32 weeks gestation take a pregnancy history since the last visit, maternal general well-being, nutrition, and signs and symptoms of complications (e.g. , bleeding, contractions, or pregnancy-induced hypertension). Psycho-social assessment should include changes in home environment, new environment risks or stresses, adaptation to the pregnancy, and planning for the post-delivery environment. The partial physical examination should include maternal weight; blood pressure as a screen for pregnancy-induced hypertension; and auscultation of fetal heart rate, assessment of fetal activity, and fundal heights for growth pattern. These interim assessments should be a part of every subsequent prenatal visit until labor. Urinalysis for protein is not suggested unless signs or symptoms of possible toxemia are present.

At 36 weeks gestation, the history and physical examination are the same as that set forth for the 32 weeks visit, with increasing emphasis on fetal lie, position, and presentation and on maternal blood pressure. No pelvic examination is indicated except in women at high risk for sexually transmitted disease or if risk of premature labor is suspected. A culture for gonorrhea should be obtained from the former.

At 38 weeks gestation, the interval history should focus on signs and symptoms of labor, fetal activity, and symptoms of pregnancy-induced hypertension. The partial physical examination should include weight, blood pressure, fetal heart rate, fundal height, fetal size estimate, descent, presentation and position.

At 40 weeks gestation, the history and physical are the same as those done during the visit in week 38, with emphasis on screening for pregnancy-induced hypertension and fetal condition, size, descent, and position.

The nulliparous woman is at increased risk for pregnancy-induced hypertension and therefore needs to be followed more closely at the end of pregnancy. Weekly visits are appropriate dependent on clinical status.

Accurately Dating Pregnancy

Nagele's Rule involves subtracting three months, adding one week and one year to the first day of the last menstrual period (LMP). Thus, if a woman's LMP was December 1, 2003, one would arrive at September 8, 2004, as an estimated date of delivery (EDD).

In spite of the fact the Nagele's Rule seems to misrepresent the mean length of gestation by a few days, the calculation of an EDD by this method, which is based upon a good menstrual history, is reasonably accurate. Spontaneous delivery will take place in approximately 90 percent of all gravid women by the end of the 41st week of pregnancy.

Women should be widely educated about the importance of recording their menstrual periods. Registration for prenatal care within the first six weeks of pregnancy should become standard practice. Menstrual history should be recorded carefully and completely on the first prenatal visit. If the uterus is too small to size on the first prenatal visit, the next visit can simply be scheduled at the usual interval, allowing the physical findings of the bimanual examination to contribute to the data base at the time. The practice of encouraging women to wait for several weeks to pass before prenatal care is initiated is counterproductive to a good history and contradicts what research has shown about the value of early prenatal care.

A "due date" should be presented as the midpoint in a four-week range. Women should be advised that prior gestational length that has not been affected by external factors may be a guide as to expectations for a current pregnancy. When insufficient information exists to make a reasonable judgment about gestational age at the time of a prenatal visit, the practitioner needs to make this clear. collecting historical data prepares the patient

for further investigation, whether that is assessed data confirmation or ordering laboratory work, or a request for an ultrasound examination.

Current pregnancy History

History of the current pregnancy include the following

Pregnancy history to date-support network, coping and stress levels experienced since last visit, nutritional intake/changes, behavioral changes regarding smoking, alcohol, substance abuse and exercise, any common discomforts.

Any problems or danger signs which have occurred since the last visit such as vaginal bleeding, infections (e.g., UTI), uterine contractions, or pelvic inflammatory disease (P.I.D.) signs and symptoms.

Confirmation that the client understands any recommendations made or treatments provided.

Ask the client to ascertain what normal and abnormal signs and symptoms of pregnancy she has experienced; inquire about the dates of the last menstrual period and the last normal menstrual period, and compute the estimated date of conception. Determine the weeks of gestation at the present time.

In addition to menstrual data and sonographic biometry, other information obtained from the patient's history can be important in determining gestational age. Basal body temperature data and other ovulatory history data must be considered and used to determine gestational age when available. Correction for a prolonged intermenstrual interval should be considered for determining the post-term gestation. History taking should also screen for factors that may cause delayed ovulation, such as irregular menses, ovulation-inducing agents, and recent discontinuance of oral contraceptive agents. Secondary to menstrual data, the fundus reaching the umbilicus at 20 weeks was the second most sensitive indicator of gestational age. Other parameters of measured fundal height, quickening, and first auscultated fetal heart tones were found to have equal accuracy. First-trimester examination of the pregnant uterus is usually helpful for verification of gestational age except in the obese patient or in the patient with uterine malformations..

Pharmacologic History

Client should be assessed for any prescription or over the counter medications she is taking to determine if these would have any adverse effect on her pregnancy. If so, she should be advised accordingly. Teach the client not to take any medicines unless her physician directs her to do so. Questions should include any immunizations such as DT, Rubella, flu, etc., and dates these were administered, medications since last conception, allergies to drugs, foods, dust, lint, etc., home remedies, folk remedies The extent of specific interactions depends on such variables as age, weight, gender, dosage, body size and overall health. Caffeine and alcohol influence the intensity of food-drug interactions. Instruct the client to always ask the pharmacist about possible food-drug interactions when purchasing any medicine.

During the preconception visit, a drug history and risk assessment should be completed for all women and counseling should be provided to prevent drug use during pregnancy A toxicology screen should be done on those women where a risk is indicated (e.g. all women in high drug use areas and in high-risk populations, and women whose risk assessment indicated need for validation). Provide a referral to a drug treatment program for a thorough drug history, diagnosis, and drug treatment if indicated.

At first prenatal visit, the drug history should be completed for all women either as part of the initial protocol, or if the client had a preconception visit then the protocol should be updated. Again, consultation to prevent drug use during pregnancy should be provided. For all subsequent prenatal visits, the drug history and risk assessment should be updated for all women. If drug use is suspected, the previously discussed procedures for validation and referral should be completed. From some women if drug abuse is occurring and referral has

already been made, drug testing and counseling in support of referral to drug treatment and compliance with drug treatment protocol should be carried out each visit.

During prenatal visits in the last trimester, continue to update the drug history and risk assessment for all women. If drug use is suspected, the previously discussed procedures for validation and referral should be completed. Counseling should include effects of drugs on prematurity, complications in labor and delivery, for the neonate, for breastfeeding, and care of the infant.

If the woman is abusing drugs, each visit could be the last before delivery. Update history, risk assessment, drug testing, compliance with drug referral and treatment, and counseling regarding effects of drug abuse in premature labor, or labor and delivery, the neonate and breastfeeding. Guidance regarding childbirth and infant care should be well in advance of that scheduled for healthy pregnant women. Counseling should include the effects of passive exposure to drugs in the home environment on the infant and young child.

Maternal drug abuse is a national problem requiring the coordinated efforts of all levels of government and the private sector. These efforts should focus on early identification of pregnancy among drug-abusing and drug-dependent women and the development of effective case management systems for these women and their children to ensure proper follow-up treatment. Three major points of entry in the health system exist for drug-abusing and drug-dependent pregnant women.

Drug programs in which the drug problem has been identified, but there is no knowledge of the pregnancy.

The health care system in which the pregnancy has been identified, but there is no knowledge of the drug abuse problem.

Screen and treat sexually transmitted diseases.

If the woman is pregnant and abusing drugs, the situation is more complex. Maternal withdrawal and detoxification from some drugs involves risk of fetal withdrawal, possibly resulting in death. Maternal withdrawal also constitutes fetal risk due to the possible effects of the mother's behavior on the well-being of the fetus. The drug-abusing woman rarely seeks or complies with prenatal care and drug treatment. Listed below are some commonly used drugs, with information about their effect(s) on the developing fetus.

Psychotropics

- *Lithium*. Of 183 reported cases, 20 had malformations, most involving the cardiovascular system.
- *Valium*. Recent well-controlled studies indicate no increase in clefting among fetuses exposed to valium

Anticonvulsants

- *Hydantoin*. A recognized syndrome is seen in approximately 11 percent of exposed infants. Effects include digital and nail hypoplasia, depressed nasal bridge, mental retardation, and slightly increased incidence of congenital heart disease.
- *Valproic acid*. This is associated with an increased risk of neural tube defects.
- *Phenobarbital*. There is no increased risk of malformation with the use of phenobarbital alone

Nutritional Assessment

Nutritional assessment during the initial prenatal visit should include the following subjective data:

- Pre-pregnancy weight (height to weight profile)
- Diet history with evaluation of barriers to adequate nutrition intake (e.g., financial, cultural, food fads, pica), and special dietary patterns (e.g., vegetarian, lactose intolerance, caffeine, Aspartame).
- Objective data should include:

- Height, weight, normal weight, percentile for height, weight, weight/height, desirable body weight.; desirable body weight, body frame,
- Fluctuations in weight gain vs weight loss.
- Age, race
- Significant laboratory data pertinent to nutritional status.
- Medications which may influence nutritional status.
- Dietary supplements, e.g. vitamins, calcium
- 24-Hour Diet Recall Results: Calculate the nutrient intake utilizing USDA Handbook 456, Food Values of Portions Commonly Used and/or other appropriate methods. Determine the appropriateness of the diet using the Recommended Dietary Allowances as a standard. Record the amounts of each nutrient, vitamin or mineral as appropriate for the specific diet requirements and/or nutritional status.
- Fluid Intake: the amount in cubic centimeters (cc.) and types of fluids.
- Drug/Nutrient Interactions: interactions that may increase/decrease absorption of the nutrient/drug, and increase/decrease toxicity of medication, and decrease effect of drugs.
- Environmental assessment related to nutrition include factors that affect nutritional status, e.g., no working refrigerator, no indoor plumbing, etc.
- Level of Understanding of Diet: Understanding of dietary needs of patient/significant other.

Patient Education

Patient education in pregnancy is very important in helping women, particularly women at risk to learn appropriate compliance behaviors aimed at appropriate outcomes. Patient education provides the following:

- Anticipatory guidance for expectations of pregnancy
- Clear directions for compliance with regimens aimed at delivering quality care, with assurance of positive outcomes
- Assessment of patient's knowledge base before discussing the following issues:
 - Scope of services provided
 - Laboratory studies likely to be performed
 - Expected course of the pregnancy
 - Signs and symptoms to be reported to the Physician or Nurse-Midwife (e.g. vaginal bleeding, rupture of membrane or decreased /cessation of fetal movement
 - Anticipated scheduled visits
 - Physician coverage of labor and delivery
 - Cost of prenatal care and delivery and services available (e.g. Insurance plan Preparation, WIC,)
 - Recommend practices to promote health maintenance
 - Educational programs available, and provide appropriate referral
 - Discharge planning for mother and child-care
 - Promote and encourage breast feeding
 - Choosing a Pediatrician
 - Danger signs in pregnancy, including signs and symptoms of premature labor
 - Frequency of prenatal visits
 - Childbirth and parenting classes
 - Maternal Nutrition including weight gain, exercise, rest, and fatigue
 - Effects of tobacco, alcohol and drug use on pregnancy outcomes
 - Continued employment, and the work environment's effect on pregnancy.
 - Personal hygiene, oral Health
 - Planning for hospitalization after 26-28th weeks, of pregnancy.
 - Recognizing signs and symptoms of false/true labor
 - Special regimens for women with specific medical conditions or diseases, e.g. Diabetes, Hypertension, Heart disease, HIV
 - Information on the pros and cons of circumcision

Explanation of Care/Prenatal Visits

The physician and others providing antepartum care should discuss with each patient the type of care that is provided in the office necessary laboratory studies, the expected course of the pregnancy, signs and symptoms to be reported to the physician (such as rupture of membranes), the timing of subsequent visits, health maintenance, education programs available, and the options for intrapartum care.

At some time during the prenatal period, communication between the prospective parents and a pediatrician may be helpful. The roles of the various members of the health care team, office policies (including emergency coverage), and alternate physician coverage should also be explained. Specific information regarding costs should be provided. Early in the third trimester, plans for hospital admission, labor, and delivery should be reviewed and information provided on what to do when labor begins, when membranes rupture, or if bleeding occurs.

Analgesic and anesthetic options should be discussed and an attempt made to identify risk factors (see “Analgesia and Anesthesia,” this chapter). Because a general anesthetic may be required for emergencies associated with delivery, the patient should be advised of the hazards of ingesting food or fluid after the onset of labor. Aspects of newborn care, including the pros and cons of circumcision of male neonates, should be discussed.

Patients should be provided information about balanced nutrition, as well as ideal caloric intake and weight gain. Patients should be made aware of the benefits of exercise and daily activity and cautioned that a sensation of fatigue suggests that activity has been excessive. Pregnancy is not the time for competitive or dangerous sports or the acquisition of new athletic skills.

Smoking and alcohol consumption should be strongly discouraged. Information regarding cessation programs, where available, should be provided. Patients should be cautioned on the use of drugs, particularly illicit drugs that can have a significantly detrimental effect on the fetus.

A woman with an uncomplicated pregnancy and a normal fetus may continue to work until the onset of labor if her job presents no greater potential hazards than those encountered in normal daily life in the community or home. Most women may return to work several weeks after an uncomplicated delivery. A period of six weeks is generally required for a woman’s physiologic condition to return to normal, but recommendations regarding the resumption of full activity should be based on the patient’s individual circumstances.

The patient should be referred to appropriate educational literature and urged to attend childbirth education classes. Childbirth education classes provide an excellent opportunity for women to obtain specific information about labor, delivery, and postpartum adjustment. Families should be encouraged to participate in childbirth education programs as well. Adequate preparation of family member can have a favorable and lasting effect on the mother, the neonate, and, ultimately, the family unit. Hospitals or community agencies or groups may offer such educational programs. The participation of physicians and hospital obstetric nurses in educational programs is desirable to ensure continuity of care and consistency of instruction.

Exercise During Pregnancy

The impact of exercise on the pregnant woman and her fetus has been the source of considerable debate resulting in conflicting recommendations. Physical fitness enthusiasts have championed maintenance of a high level of activity during pregnancy, whereas others, particularly those concerned with the effects of physical labor in the work environment, have voiced caution. Usual advice to pregnant women from the obstetric community has been to decrease activity and increase periods of rest, particularly in the later months of pregnancy. Over the last decade, a number of studies have been conducted regarding this issue. Unfortunately

most have been of weak scientific method and reflect the bias of the investigators.

The following is a composite of published recommendations for exercise during pregnancy:

To appropriately achieve the benefits of a training program, particularly its cardiovascular effects, exercise should occur on a regular basis. Three times a week for 20 to 30 minutes is minimally adequate. Sporadic intense exercise is to be avoided.

The intensity of exercise should be such to attain at least 60 percent of maximum heart rate. At the same time, women should avoid anaerobic exercise or exercising to maximum heart rate. Good guidelines include that a woman's heart rate during exercise should be above 120 beats per minute and below a maximum level. Recommendations for the maximum level generally are in the range of 140 to 150 beats per minute. A practical guide is that easy conversation should be possible at all times. Full recovery from exercise as judged by return to pre-exercise heart rate should occur within 15 minutes after each exercise session. Multiple exercise sessions of shorter duration are preferable to longer sessions. Particularly ones lasting more than 30 minutes. During the last trimester, and particularly the last month, the intensity of exercise should be reduced markedly.

Appropriate warm-up and stretching of the ligaments and muscles is important to prevent injury. On cessation of exercise, a gradual slowing with some leisurely walking or elevation of the legs will help venous return and prevent dizziness. The supine position should be avoided; lateral recumbency is the position of choice for prevention of syncope.

Exercises using large muscle groups, particularly those that are rhythmical in nature, such as walking, jogging, swimming, cross-country skiing, and bicycling, are to be encouraged. Those that require increased balance and coordination or those that involve the potential for injury, falls, or blows should be modified or avoided. Exercises (such as certain weight-lifting routines) that strain the lower back and use Valsalva's maneuver should be modified or avoided.

Adequate breast support with non-stretchable straps will aid in comfort and prevent stretching of Cooper's ligaments of the breasts.

Exercising in heat should be avoided. Hot tub and sauna bathing should be limited to five to 15 minutes.

Adequate diet, particularly carbohydrates intake, should be maintained.

Any condition that compromises uterine oxygenation should lead to discouragement of exercise. Contraindications to exercise include medical problems, such as cardiac or pulmonary problems and anemia, or obstetric conditions, including bleeding during pregnancy, diabetes, hypertension or preeclampsia, premature labor, multiple gestation, previous intrauterine growth retardation (IUGR), recurrent miscarriage, or history of premature labors.

The woman and the professional caring for her should discuss and agree upon the physical fitness program. Short term studies have noted transient fetal heart rate abnormalities during and after exercise.

It is prudent to advise women not to engage in very vigorous conditioning exercise during the third trimester.

The woman should resume exercising gradually during the postpartum period. If increase in fatigue levels, pain, or bleeding occurs with exercise, the woman should postpone increasing her physical activity. Lactation is not a contraindication to exercise; most women will find exercise more comfortable after nursing so that the breasts are not full. Exercise in the heat while nursing may lead to dehydration and decreased milk supply. Adequate oral fluids are essential.

Quickening

Quickening is defined as the first movements of the fetus felt in utero. It occurs from the eighteenth to the twentieth week of pregnancy. Movements have been felt as early as the tenth week and in rare cases are not felt during the entire pregnancy. The mother becomes conscious of slight fluttering movements in her abdomen which are due to movements of the fetus. The physician is often able to hear the fetal heart for the first time. If the fetus is born at this point, it may make a few efforts to breathe, but its lungs are insufficiently developed to cope with conditions outside the uterus and it invariably succumbs within a few hours.

Quickening is a term derived from an idea prevalent many years ago that at some particular moment of pregnancy life is suddenly infused into the infant. At the time this notion was in vogue, the first tangible evidence of intrauterine life lay in the mother's feeling the baby move, and the conclusion was only natural that the infant "became alive" at the moment these movements were first felt. We now know that the infant is a living organism from the moment of conception, but the old term "quickening" is still used in obstetric terminology.

Many fetuses, although alive and healthy, seem to move about very little in the uterus, and, not infrequently, a day or so may pass without a movement being felt. Inability to feel the baby move does not mean that it is dead or in any way a weakling but, in all probability, that it has assumed a position in which its movements are not felt so readily by the mother. Moreover, it is a well-established fact that the fetus sleeps in the uterus, and it seems likely that the periods of active movement and quiescence which the mother notices correspond to the phases of somnolence and wakefulness. Should three or four days pass without movements, the physician should be asked to listen for the fetal heart sounds. If these are heard, it means that the fetus is alive and presumably in good condition. Women occasionally misinterpret movements of gas in the intestines as motions of a baby and imagine themselves pregnant. Therefore, the patient's statement that she feels the baby move cannot be regarded as absolute proof of pregnancy.

Fetal Development

The woman should be informed about the importance of documenting the first perceived fetal movement in order to help confirm dating of the pregnancy. Use of a fetal growth and development chart may also be helpful.

At 12 weeks gestation the baby is about three inches long and weighs one ounce. The baby is beginning to open and close its mouth and move its hands, legs, and head.

At 16 weeks gestation baby's length is six to eight inches, weight is about six ounces, and organs such as the heart and lungs are formed.

At 20 weeks gestation, length is eight to 12 inches, weight is one-half of one pound, and the activity of the fetus increases moving side to side or turning around.

At 24 weeks gestation the baby is fully formed, with wrinkled skin, about 14 inches long and one and one-half pounds. The baby still needs to grow and fully develop vital organs such as lungs and brain.

At 28 weeks, length is 15 inches, weight is two to three pounds, bones are getting harder, and the woman may feel the baby kick and move more.

At 32 weeks, length is 18 inches, weight is about five pounds, baby can open its eyes, may turn around in the womb and stay in the new position for the rest of pregnancy.

At 36 weeks, length is 19 inches, weight is about six pounds and gains on-half pound each week.

At 40 weeks the baby is at “full term” (will have gone through the full length of pregnancy).

Socially used drugs

Alcohol and other drugs affect the health and well being of pregnant women and their children. Each drug acts on the body in its own unique way. Since each individual is different, reactions will differ among people using the same amount of the same drug.

The health of a substance affected pregnant woman, and her body’s response to the substances, may depend upon several factors beyond drug use, including:

- A family or maternal history of reproductive problems;
- Multiple previous pregnancies;
- Concurrent medical problems, i.e., S.T.D., diabetes, lupus, hypertension, and heart, liver, or kidney disease;
- Obesity or poor nutrition;
- Age less than 15 years;
- Substandard living conditions;
- Minimal education;
- Lack of exercise;
- Excessive stress;
- Inadequate prenatal care; and
- Chronic exposure to lead or X-rays.

Predicting health and development outcomes for infants of substance abusing women is also difficult. Timing of fetal exposure to a drug is crucial in producing certain effects, many of which may be irreversible, even though the mother avoids further drug usage.

Alcohol: Consumption of alcoholic beverages during pregnancy is associated with a broad range of adverse pregnancy outcomes. Even moderate alcohol consumption (one ounce to two ounces per day) may carry a significant risk. Exposure during pregnancy and delivery produces the following obstetrical complications: vaginal bleeding, premature separation of placenta from the uterine wall, spontaneous abortion, stillbirth delivery, poor maternal nutrition, and pre-term labor. Maternal consumption of alcohol during pregnancy is now the leading somatic cause of mental retardation, surpassing Down Syndrome. Fetal alcohol syndrome (FAS) is the most severe of the live birth outcomes associated with alcohol abuse. The incidence of FAS in the general U.S. population is one to two per 1,000 live births. Fetal Alcohol Syndrome include:

- prenatal and postnatal growth retardation;
- central nervous system involvement such as neurologic abnormality, developmental delay, and intellectual impairment, abnormal facial features such as small palpebral fissures and epicanthal folds of the eyes (slanted eyes) flat nasal bridge, short nose, in either the nose or lip a poorly developed vertical groove above the lip, a flat mid-face (cheek) area, low set ears, microcephaly (small head), or small chin. Other effects on the newborn include low birth weight, decreased length, small head and chest circumference.
- There is early epidemiological and animal model evidence that paternal drinking prior to pregnancy may adversely affect sperm production. Heavy drinking by the father may contribute to increased marital stress and family violence. Response to the problems of alcohol should include, in addition to primary prevention efforts, alcohol avoidance counseling, development of effective programs for women needing treatment for alcohol abuse, and provision of support for alcohol abusing women to prevent unwanted pregnancies.

Tobacco: The association between maternal smoking during pregnancy and low birth weight (both pre-term and intrauterine growth retardation) has been well documented. Growing public awareness of the harmful effects of smoking is reflected in increased rates of quitting during pregnancy and by the decreased prevalence of smoking during pregnancy. Nevertheless, 21 percent to 30 percent of pregnant women in the United States report smoking throughout the pregnancy despite known risks to the developing fetus and the mother.

- Like many other adverse health risks, smoking prevalence is inversely correlated with years of education. Among white, married mothers over 20 years of age sampled in the 1980 National Natality Survey, the percentages of smokers were 43 percent (less than 12 years of school), 28 percent (12 years), 20 percent (13 to 15 years), and 11 percent (16 years or more). White, unmarried women are more likely to smoke and to be heavier smokers. In general, the prevalence of smoking among married women is higher among white women than black women and is higher for women less than 20 years of age, irrespective of ethnicity.
- Approximately 4,600 of 87,000 (five percent) perinatal deaths annually and 14 percent of all pre-term deliveries in the United States have been attributed to maternal smoking. A recent estimate of the average cost of neonatal care is \$289 higher for infants born to smokers than those of non smokers. Intra-pregnancy smoking also is correlated with an increased incidence of early fetal loss, preeclampsia, abruptio placenta, and placenta previa. Adverse postnatal conditions associated with maternal smoking during pregnancy (and also exposure to passive smoke in the postnatal period) include acute respiratory conditions and sudden infant death. The long-term health risks for the mother (e.g., lung and other cancers and cardiovascular disease) are well documented.
- The most practical means of identifying smokers is via personal history. Ideally, at her first prenatal visit a woman is asked about her smoking history immediately prior to and during the early part of the pregnancy. Care must be taken to promote disclosure of this increasingly sensitive information. Instead of an oral questions with a “yes” or “no” response format, it is preferable to use a self-administered questionnaire that allows for gradations of response, in particular, an option such as “I smoke now but I have cut down since becoming pregnant.”
- A substantial proportion of women entering care (16 percent to 41 percent) will report that they quite smoking after becoming pregnant. Some of them will resume smoking during pregnancy. 20 percent in a health maintenance organization population to 35 percent in a primarily black, public maternity clinic population. Thus, this group should be asked from time to time about possible relapse. A high-priority subgroup is women who have not been abstinent for at least a week prior to their visit and/or who are not “very confident” that they could maintain abstinence.
- Over the past 30 years, research has shown the association between maternal smoking and reduced birth weight in diverse ethnic groups. The strength of this association is suggested by numerous studies that have adjusted for the effects of potential confounding factors, including maternal social class, age, parity, and height; maternal stress, diet and weight gain during pregnancy; fetal sex and gestational age; and perinatal mortality. Although the mechanism by which smoking retards intrauterine growth is not fully understood, the relationship is biologically plausible, as demonstrated by the higher concentrations than in maternal blood. Research of carbon monoxide suggest that the increase in carbo-oxyhemoglobin may deprive the fetus of adequate oxygen.

Nutrition Education

Over the past quarter century, there has been an increased awareness of the positive relationship between maternal weight gain during pregnancy and birth weight of the newborn. This awareness is compounded by the recognition of socioeconomic differences in dietary quality and the pregnancy performance which has heightened concern about the nutritional status of the pregnant woman. The woman’s body mass index should be determined at the initial prenatal visit to allow for preconceptional intervention recommendations if her status is under- or overweight. An individualized goal for weight gain during pregnancy should be set, and any major or potential nutritional risk factors should be identified. The woman should be asked about her food intake, and, if necessary, she may be referred to a registered dietitian or nutritionist for dietary counseling. A

woman's nutrition before pregnancy may have profound effects on reproductive outcome. Underweight women who gain little weight during pregnancy are at particularly high risk. Educational materials on nutrition that are available from the American College of obstetricians and Gynecologists, the U.S. Public Health Service, and the March of Dimes may be given to the patient. All patients should be referred to the Women, Infants, and Children (WIC) program for assistance.

Ante-partum Dietary Recommendations: The recommended dietary allowances (RDA) and recommended energy intakes for adolescent and young adult women when nonpregnant, pregnant, and lactating are listed in the table in this section of the manual. These recommendations should be considered a general guide to nutrition in formulating a balanced diet.

Although energy intakes are based on median weights, RDA for nutrients are judged to meet the known needs of practically all healthy persons. Changes in the RDA from those published a decade ago include listing allowances for micro-nutrients during pregnancy, rather than increments, and separating recommendations for the lactating woman by the length of lactation.

- **Caloric Intake:** It is important to try to balance the benefits of increased fetal growth with the risks of complicated labor and delivery and of postpartum maternal weight retention. The increased demands of pregnancy require on average 300 kcal/d, but the actual caloric intake will vary based on the mother's pre-pregnancy height and weight. Weight gain will also vary if the mother is carrying twins. Regardless of maternal weight gain, there is little evidence that caloric intake influences fetal development.

Prenatal Laboratory Testing at Initial Visit

- Blood Rh negative titer, antibody screen
- Rubella titer
- Syphilis screen
- Pap smear (cervical cytology)
- Urinalysis, including microscopic exam and infection screen
- Urine protein and glucose
- Urine screen for urinary tract infection (UTI)
- Gonorrhea
- Hepatitis B titer
- HIV titer
- Maternal serum alpha-feto-protein (MSAFP) (16-18 weeks gestation)
- Toxoplasmosis - if indicated
- Tuberculosis - if indicated
- Group B Streptococcus - if indicated
- Cytomegalovirus (CMV) - if indicated
- Oral glucose tolerance testing when there is history of macrosomic, or malformed infant, fetal death; or first degree family history of diabetes

Hemoglobin and hematocrit

Abnormal maternal hematological status, defined as both low and high hemoglobin (Hgb) hematocrit (Hct) values, may potentially be associated with adverse pregnancy outcomes for the infant as well as the mother. The initial test should be done as early as possible in the pregnancy.

The normal range of hemoglobin value in the nonpregnant healthy adult female is 14 - 20 g/dL. However, a large majority of women in the reproductive age have hemoglobins in the lower end of this range (12 to 13 g/dL). During pregnancy, the hematocrit and hemoglobin concentration begins to fall during the first trimester as the plasma volume expands more rapidly than the red cell mass.

Most of the plasma volume increase occurs before the third trimester, but the red cell mass steadily increases

until term, resulting in a continued rise of hemoglobin in the third trimester. In normal pregnancy, therefore, most women experience a lowering of hemoglobin and hematocrit in the second trimester and a rise in the third. Early in the third trimester, at 26 to 28 weeks, the hemoglobin and hematocrit level should be measured again. This test should again be repeated at 32 - 36 weeks gestation. The extent to which a decrease in hemoglobin can occur and still be considered physiologic is unclear, and, therefore, it is difficult to define anemia in pregnancy.

However, in various epidemiologic studies the lower limit for hemoglobin concentration has ranged from 10 to 12 g/dL. The value of 10 g/dL is often considered as approximating the demarcation between physiologic fall of hemoglobin and the presence of true anemia. In the postpartum phase and in women's health visits, hemoglobin and hematocrit should be performed as indicated by history and physical examination.

Blood Rh, Rh negative titer, antibody screen

The Rh antigen was identified by Landsteiner and Weiner in 1940. Rho(D) immune globulin (RhoGam) was introduced in the United States in 1963 for the prevention of Rh sensitization in women with Rh-negative blood. These developments have significantly improved the outcomes of pregnancy for Rh-negative women and their infants.

Rh(D) isoimmunization is one of the most common forms of blood group incompatibility between mother and fetus. It can cause extensive destruction of fetal red blood cells leading to significant morbidity and mortality in the fetus and newborn infant. Prior to the advent of effective prophylaxis, between 0.5 percent and 1.0 percent of all pregnant women were Rh(D) isoimmunized

Rh(D)-positive infants born of Rh(D)-negative mothers who have been sensitized to the red cell antigen during a prior pregnancy or via blood transfusion are at risk for red cell destruction in utero.

This hemolytic process occurs when anti-Rh(D) immunoglobulins cross the placenta from the maternal to the fetal circulation. The circulating antibodies attach to fetal Rh(D)-positive red cell membranes and initiate the hemolytic process. This process increases bilirubin production in infants, which can potentially produce permanent brain damage. More importantly, severe hemolytic anemia can cause tissue hypoxia, heart failure, and gross anasarca of the fetus, a condition often referred to as *hydrops fetalis*.

Current recommendations state that all pregnant women should be screened for Rh blood type and Rh(D) antibodies, and many authorities suggest screening for atypical antibodies known to cause hemolytic anemia of the newborn. Screening at the first prenatal visit will identify the 15 percent of Caucasians and four percent to eight percent of Black women at risk for Rh(D) isoimmunization as well as the 1.6 percent of pregnant women sensitized to atypical red cell antigens. Those at risk for Rh(D) sensitization are again screened for anti-Rh(D) antibody at varying intervals during pregnancy. Once a sensitized woman has a significant titer against red cell Rh(D) or an atypical red cell antigen, management focuses on identification of fetal anemia and its consequences.

An unsensitized, Rh-negative patient should have another antibody test at approximately 28 weeks of gestation. If the patient is still unsensitized, she should receive Rho(D) immune globulin prophylactically. In addition, any unsensitized, Rh-negative patient who has an ectopic gestation, undergoes abortion (either spontaneous or induced), or has a condition associated with maternal-fetal hemorrhage (e.g., abruptio placentae) should receive Rho(D) immune globulin unless the father is Rh negative.

Rubella titer (if immunity not previously documented)

The screening of pregnant women for their serologic status to rubella should be accomplished during the first trimester of gestation. Those seronegative individuals should have a subsequent evaluation if (1) clinical symptomatology indicative of clinical rubella appears during the gestation or (2) if known exposure occurs. At the termination of gestation, it is recommended that the seronegative postpartum female be vaccinated with rubella vaccine prior to discharge from the hospital. Breastfeeding is not contraindicated.

The individual who seroconverts during the first trimester should be counseled regarding the possibility of fetal anomalies and choices regarding termination of the pregnancy. Pregnant women should not be given the rubella vaccine. However, in >250 women inadvertently vaccinated in the first three months of pregnancy, none of the fetuses developed congenital rubella syndrome. Pregnant women should not provide care for children with suspect rubella unless they are known to be seropositive.

Syphilis

Screening by serology at the preconception and/or early pregnancy visit is indicated and a repeat test in the third trimester (28 weeks) is required. Congenital syphilis is a leading cause of infant mortality and morbidity and has become a significant health problem in Illinois. During the past several years, the incidence of congenital syphilis has increased significantly in Illinois and the U.S. Since 1988, reported cases in Illinois and the U.S. have increased 15-fold (20-300) and five-fold (658 to 3,264), respectively.

Several factors have contributed to the significant increase in congenital syphilis in Illinois. The dramatic increase in females of child bearing age infected with primary and secondary syphilis has led to the transfer of infections from pregnant women to their fetuses. Since 1985, the incidence of primary and secondary syphilis in Illinois women has increased 533 percent (175 to 1,109) and the percentage of cases among women has increased from 31 percent to 45 percent. African Americans in Illinois have been particularly affected by the epidemic of syphilis. From 1985 to 1991, the incidence of primary and secondary syphilis among African Americans has increased 22-fold (100 to 2,252) and the percentage of cases among African Americans has increased from 17 percent to 92 percent.

In 1992, 41 percent (30 of 74 cases) of females in Illinois (excluding Chicago) delivering infants with congenital syphilis had no prenatal care. Without prenatal care, infections are not detected and treated and there is no chance to prevent the fetus from becoming infected. Although Illinois has one of the strongest prenatal testing laws in the U.S. (Testing in both the first and third trimesters is required), many women at risk for infection are not receiving prenatal care.

Papanicolaou (Pap smear)

A pap smear should be done at the initial prenatal visit, as early as possible in pregnancy for cervical cytology. In the postpartum period and in women's health visits, the pap smear should be done as indicated. The Pap test, a cytologic test, is widely known for its use in early detection of cervical cancer. For the test, secretions are scraped from the patient's cervix and spread on a slide. After the slide is immersed in a fixative, it is sent to the laboratory for cytologic analysis. This test relies on the ready exfoliation of malignant cells from the cervix. Although cervical scrapings are the most common test specimen, this test also permits cytologic evaluation of the vaginal pool, prostatic secretions, urine, gastric secretions, cavity fluids, bronchial aspirations, sputum, and solid tumor cells obtained by fine needle aspiration. It also shows cell maturity, metabolic activity, and morphology variations.

Urinalysis for protein and glucose

Tests for urine protein and glucose should be done at preconception visit and at every visit thereafter, to assess for diabetes, preeclampsia, or infection. Proteinuria in preeclampsia can range from minimal levels to levels consistent with the nephrotic syndrome. Some pre-eclamptic patients have severe proteinuria with minimum hypertension, and in others, hypertension is more prominent. A diabetes screen should be done at 24 weeks to 28 weeks gestation.

Urine screen for urinary tract infection (UTI), kidney disease

A symptomatic bacteriuria occurs in two percent to eight percent of pregnant women, and pyelonephritis occurs in one percent to two percent. Pyelonephritis is increased, owing to bacteriuria in the presence of stasis and dilation of the upper urinary tract in pregnancy. Group B streptococci and *Pseudomonas* species are infrequent

causes of urinary tract infections in obstetric patients.

Screening should be carried out in early pregnancy in all pregnant women to detect and treat asymptomatic bacteriuria. Many women with significant bacteriuria are missed by selective screening. Selection of antimicrobial agents for treatment is based on susceptibility test results. Asymptomatic bacteriuria should be treated for 10-14 days. Single-dose therapy is accompanied by a higher failure rate in most studies. Assessment after treatment is important to detect recurrences and treatment failures. As cystitis is caused by the same organisms that produce asymptomatic bacteriuria, its treatment is the same as that for asymptomatic bacteriuria. In women with recurrent cystitis or recurrent bacteriuria, eradication of the organism and suppressive antibiotics are appropriate. The patient may develop recurrent bacteriuria even while on suppressive therapy. Thus it is necessary to check for bacteriuria at regular intervals, such as monthly throughout the pregnancy and at the postpartum visit.

Gonorrhea

Screening high risk individuals by culture should occur at the preconception and/or during the first pregnancy visit and in the third trimester. Screening low-risk women should probably be performed at the preconception or initial pregnancy visit.

Hepatitis B titer

All women should be screened for hepatitis B surface antigen at the preconception visit or during pregnancy. At the preconception or first pregnancy visit, women at high risk for acquiring hepatitis because of life-style or work situation should be screened for antibody status, and, if not immune, vaccination may be appropriate.

Women who are HBsAg negative but who have a history placing them at continuing high risk of HBV infection should be counseled about the advisability of vaccination. The adult dosage of 1 ml. Injected in the deltoid muscle; intramuscular injection in the buttocks is not as effective. A series of three doses is required; the second and third doses are given 1 and 6 months, respectively.

Household contacts and sexual partners of HBsAg-positive women identified through prenatal screening should be vaccinated, after testing to determine susceptibility to HBV infection when feasible. Hepatitis B vaccine should be given at the age-appropriate dose of those determined to be susceptible or judged likely to be susceptible to hepatitis B infection.

HIV titer

HIV testing should be offered to all women. Screening of individuals or populations at high risk is reasonable at the preconception or first pregnancy visit and again in the third trimester. Issues related to informed consent, confidentiality, counseling, support, and follow-up should be worked out in advance. The Department has established standards for both pre-test and post-test counseling (77 Ill. Adm. Code 697); these are available from the AIDS Activity Section,
Division of Infectious Diseases,
Office of Health Protection,
Illinois Department of Public Health,
525 West Jefferson Street,
Springfield, IL 62761.

The protection of confidentiality is essential to prevent these recommendations from being implemented in such a way as to pose additional barriers to early and continuous prenatal care.

Maternal serum alpha-fetoprotein (MSAFP)

Screening at 15-20 weeks gestation, is optimal at 18-18 weeks gestation. Alpha fetoprotein (AFP) screening

during pregnancy has had a major impact on the prenatal detection of fetal abnormalities. Elevated MSAFP levels correlate with an increased risk of Neural tube defects (NTD), whereas low MSAFP levels are suggestive of an increased risk of fetal Down syndrome. It is important to begin with the use of MSAFP as a standard test. All patients should have the MSAFP test performed, or sign a waiver stating they reject the administration of the MSAFP test on themselves. The majority of clinical values are associated with a normal fetus. When a defects are present, half are NTDs and half are abdominal wall defects.

Open neural tube defects (NTD) are virtually always associated with elevated levels of amniotic fluid AFP and the presence of acetylcholinesterase, but they are not always associated with elevated levels of MSAFP. Closed NTDs, including those associated with hydrocephalus, are not associated with abnormal AFP findings. Elevated MSAFP levels also exist in multiple pregnancies and certain fetal abnormalities (e.g., omphalocele, congenital nephrosis, Turner syndrome with cystic hygroma, fetal bowel obstruction, teratoma). Moreover, small-for-date fetuses and fetal death may be associated with high levels of AFP in amniotic fluid or maternal serum. Incorrect assessment of gestational age may create falsely high or low MSAFP levels.

Patients with a personal or first-degree family history of NTD should be advised of the risk of having an affected fetus. Because MSAFP screening will detect only 70 percent to 80 percent of open NTDs, these patients should be offered amniocentesis at 15-16 weeks of gestation with amniotic fluid AFP testing. Ultrasound evaluation of the fetus for NTD at 16-18 weeks of gestation can add further information. In patients with no history of ND (i.e., most of the obstetric population), it is now accepted practice to offer the MSAFP screening at 15-20 weeks of gestation. Maximal accuracy requires that the initial sample be obtained at 16-18 weeks of gestation. MSAFP levels are elevated (2.5 multiples of the median (MOM) in 80 percent to 90 percent of pregnancies in which the fetus has an NTD. Because considerable overlap exists between the MSAFP level in normal pregnancy and the MSAFP level characterized by a fetus with NTD, false-negative and false-positive values are inevitable. Thus, sequential protocols for distinguishing the reason for an elevated MSAFP level other than NTD are needed. Either a second MSAFP test, performed within one to two weeks of the time of the first sample, or an ultrasound evaluation without a repeat of the MSAFP test may be performed, depending on the protocol of the laboratory.

Pregnancies with fetal Down syndrome may be associated with low MSAFP levels. A more accurate estimate of the risk of fetal Down syndrome can be made by using a combination of MSAFP level and maternal age. For example, in a 25-year-old woman the risk of delivering an infant with Down syndrome, based on age alone, is one in 1,250. If her MSAFP level is 0.36 MOM at 16 weeks of gestation, however, the risk is increased to one in 257. The benefit of amniocentesis in such a couple may then outweigh the low yet finite risk of the procedure. When a protocol is used in women under age 35 years, 20 percent to 30 percent of fetuses with Down syndrome can be identified by performing amniocentesis in two percent to four percent of women. Obstetricians should consult their local provider of genetic diagnostic services concerning the implementation of MSAFP screening and interpretation of results for this purpose. The current practice of offering prenatal diagnosis of the detection of chromosomal abnormalities based on advanced maternal age alone (i.e., 35 years of age or older at the EDD) should continue irrespective of the MSAFP level. In addition to low MSAFP levels, other maternal serum markers proposed to aid in the screening for fetal Down syndrome include elevated levels of the hCG and low levels of unconjugated estriol.

The following screening tests should be performed in endemic areas or for women with risk factors:

Toxoplasmosis

An educational program at the preconception and/or first pregnancy visit is appropriate. Screening by serology at the first pregnancy visit may be appropriate, but only for those known to be at risk (i.e., those who have a new or "outside" cat or who eat raw meat). A retest should be done at 16 to 20 weeks. Converters may be referred to a tertiary center for percutaneous fetal blood sampling and culturing, and, if positive, treatment

versus termination. Because of the high prevalence of maternal infection and the seriousness of prenatal transmission, routine preconception screening is recommended. The presence of antibodies provides reassurance about immunity. The absence of antibodies underscores the need for education.

Tuberculosis

Persons at high risk for tuberculosis include: Persons with HIV infection and those at risk for HIV, close contacts of infectious tuberculosis cases, persons with medical conditions which increase the risk of tuberculosis, foreign-born persons from high prevalence countries, low-income populations (including high-risk minorities), alcoholics and intravenous drug users, residents of long-term care facilities (including prisons), and the homeless. Screening by skin test should be performed only in women at high risk for the disease or in high-risk populations or in endemic areas.

Herpes Simplex

At the preconception visit or during pregnancy, obtain a history of herpes lesions. If lesions are present, a single culture to confirm the diagnosis may be indicated. Routine prenatal screening by culture is not indicated. Examination of the cervix and vagina for lesions in early labor should be performed.

Varicella

Routine pregnancy screening is not indicated. During pregnancy, titers to determine immunity to infection may be useful for counseling, in the event of exposure to a woman lacking a history of chickenpox. Treatment of the exposed seronegative mother with varicella-zoster immune globulin is controversial, but recommended by some authorities. Additional research is warranted. In the event of maternal chick pox or herpes-zoster, appropriate counseling about risk of congenital varicella syndrome should be performed. Appropriate treatment of the newborn with recent active chick pox with varicella-zoster immune globulin is indicated. The pending release of varicella vaccine raises the potential for vaccination of susceptible women prior to conception.

Chlamydia

Screening is recommended by immunofluorescent and antibody testing for those women at high risk, with treatment of those testing positive. The test should probably be performed in the third trimester, until efficacy for prevention of pre-term labor has been clarified. Chlamydia trachomatis has been generally detected in the cervix of approximately two percent to 13 percent of pregnant women, but the prevalence is as high as 25 percent in selected populations. The prevalence tends to be highest in young women (< age 20 years) and in those with a history of other sexually transmitted diseases. Most infected women are asymptomatic, but Chlamydia may cause urethritis and mucopurulent (nongonococcal) cervicitis. Chlamydia infection is also associated with postpartum endometritis and infertility. Infection may be transmitted from the genital tract of infected mothers to their neonates during birth; 60 percent to 70 percent of neonates born to infected mothers without prophylaxis acquire C. trachomatis. Purulent conjunctivitis occurs in approximately 30 percent to 50 percent of neonates born vaginally to women with chlamydia infection, and neonatal pneumonia occurs in 10 percent to 20 percent.

Important risk factors for chlamydia infection include single marital status, age younger than 20 years, residence in a socially disadvantaged community (e.g., inner city), history or presence of other sexually transmitted diseases, and little or no prenatal care. However, routine screening of all pregnant women for C. trachomatis is not recommended. Treatment should be administered to women with known C. trachomatis infection (i.e., with mucopurulent cervicitis) and to women whose sexual partners have nongonococcal urethritis and who are presumed to be infected when diagnostic tests are not performed. Erythromycin base is the drug of choice (500 mg four times daily for 10 days is effective; alternatively, erythromycin base, 250 mg four times daily for 15 days). Simultaneous treatment of the male partner or partners with tetracycline or doxycycline is an important component of the therapeutic regimen.

Chlamydia infections in the neonate are generally mild and responsive to antimicrobial therapy; prophylactic cesarean delivery is not warranted. Prophylactic instillation of topical erythromycin or tetracycline into the conjunctival sac of the neonate shortly after birth helps to prevent inclusion conjunctivitis. The effectiveness of 0.5 percent erythromycin ophthalmologic ointment in the prevention of chlamydia conjunctivitis in one study has not been confirmed in subsequent studies. *C. trachomatis* also is susceptible to tetracycline, but studies of clinical efficacy of tetracycline ointment in the prophylaxis of chlamydia conjunctivitis have also given conflicting results. Neither erythromycin nor tetracycline prevents chlamydia pneumonia. Neonates with inclusion conjunctivitis should be managed with drainage/secretion precautions. Those with chlamydia pneumonia should be managed similarly, and they should also be separated from neonates who are uninfected and neonates who are infected with other respiratory agents. Transmission of chlamydia infections within nurseries has been suspected, but not proved.

Group B Streptococcus

Group B Streptococcus (GBS) is the leading cause of perinatal bacterial infection in the United States.

Approximately 15 percent to 40 percent of pregnant women are asymptomatic carriers of GBS. Studies of the distribution of GBS by anatomic site have demonstrated that vaginal and rectal colonization is more common than colonization of the cervix or urinary tract. The rectum may be the depot site for chronic GBS carriage. The colonization rate shows both geographic and individual variability. For instance, vaginal cultures taken serially during pregnancy may be intermittently positive in the absence of specific therapy against GBS.

In the United States, approximately 12,000 proven neonatal GBS infections occur each year. Fifty percent of all perinatal GBS colonization is transmitted from mother to baby at parturition. Colonized infants may be born with or may develop early-onset (#7 days after birth) infections manifested by bacteremia, pneumonia, or meningitis. Of early-onset infections, two thirds are clinically apparent within six hours of birth. As a group, early-onset infections have a mortality rate of 15 percent or higher. While the overall attack rate (infection in colonized infants) for this form of early-onset neonatal sepsis due to GBS is only 1-3/1,000 live birth, the attack rate is increased to 10/1,000 in babies born to mothers with perinatal vaginal colonization. This attack rate increases to as high as 40/1,000 (1/25) if there are additional risk factors, such as prematurity, prolonged rupture of membranes, amniotic fluid colonization, maternal fever during labor, or an infected prior child.

When neonatal GBS infection occurs after the first few days of life, meningitis becomes a predominant part of the clinical syndrome. The overall attack rate for this late-onset neonatal infection is 0.5-1.0/1,000 live births. The route of transmission in late-onset infections may be from mother to infant intrapartum (approximately 50 percent of cases) or from nosocomial or community sources.

Manifestations of symptomatic maternal infection due to GBS include chorioamnionitis, endomyometritis, cystitis, and pyelonephritis. It has been reported the rate of postpartum fever to be 22 percent in women colonized during the second trimester and only four percent in controls. The incidence of maternal puerperal infection due to GBS on a clinic service was shown to be 13/1,000 deliveries; 95 percent of these infected patients were delivered by cesarean birth. Heavy colonization of the genitourinary tract increases the attack rate for both mothers and babies. Cesarean delivery appears to be a particularly prominent risk factor for postpartum endomyometritis. Additional risk factors reported to have statistical significance include low serum antibody to the capsular antigens of GBS and maternal diabetes.

Culture is the usual method for the diagnosis of GBS colonization. The isolation of GBS may be enhanced by the use of selective broth media that inhibit the growth of other microorganisms. Use of non-selective broth (routine transport medium) and plating onto a non-selective solid medium (e.g., blood agar plates) diminishes the detection of GBS vaginal colonization by 50 percent or more. The only limitation of culture as a method is the time required for a result making its use most practical antenatally. A highly reliable rapid screening test for

intrapartum detection of light and heavy GBS colonization of the lower genital tract is not yet available.

Rapid diagnostic tests based on direct identification of the group-specific polysaccharide antigen of GBS have been developed for commercial use. These tests use latex agglutination or enzyme-linked immunosorbent assay (ELISA) technology. In optimal circumstances, the result can be obtained in less than one hour from the time of specimen collection. Some of these tests may be suitable for use at the site of clinical care, rather than in a central laboratory. Rapid antigen tests may enhance clinical decision-making when a prompt decision is needed regarding antibiotics or delivery. However, the clinician should be aware that rapid tests will have both false-positive and false-negative results when compared with cultures.

Antigen tests will outperform the Gram stain, which is not recommended for screening. Both rapid antigen tests and culture methods can be adapted to provide a semi-quantitative measurement of the degree of GBS colonization. It is generally accepted that the likelihood of symptomatic perinatal infection increases with increasing colonization and that both cultures and rapid antigen tests yield more accurate results in patients with high counts of GBS.

No one site has been shown to be exclusively predictive of perinatal infection. Over the course of pregnancy, a positive culture site may spontaneously become negative, while a negative culture site spontaneously becomes positive. However, when antenatal lower vaginal and rectal cultures have been performed concurrently, their predictive value for maternal GBS colonization at delivery is 96 percent. When screening has been done, the patient should be informed of the result and of the factors that will require intrapartum antibiotic administration. The pediatrician should be informed of culture-positive antepartum patients who have had an uncomplicated delivery without antibiotic chemoprophylaxis.

Cytomegalovirus (CMV)

Of women susceptible to CMV, the risk of primary infection during pregnancy is approximately one percent of live births. Primary CMV infections during pregnancy are usually asymptomatic, but the probability of intrauterine transmission of infection to the fetus is approximately 50 percent. Only five percent to 10 percent of these congenitally infected infants have clinically apparent disease. Of those who do, the mortality ranges from 20 percent to 30 percent, and more than 90 percent of survivors develop significant sequelae. Of the congenitally infected infants who do not have clinically apparent infection as newborns, 10 percent develop late complications, with sensorineural hearing loss being the most common. Maternal infection can be either primary or recurrent, and both are associated with risks for the fetus, although these risks are far greater following maternal primary infection. Among susceptible women, namely those seronegative, the risk of seroconversions during pregnancy averages 2.0 percent to 2.5 percent; however, the rate of seroconversion is far higher among middle- and upper-class individuals than other groups. Maternal primary infection leads to fetal infection in approximately 40 percent of cases, and only 11 percent of infected infants have clinical manifestations of disease at birth. The risk of subsequent sequelae in this group is 10 percent. The risk of sequelae is higher when the maternal infection occurred prior to 20 weeks gestation.

Recurrent maternal infection is more common since as many as 10 percent to 12 percent of women who are seropositive can reactivate the virus during gestation. Maternal immunity to CMV, unlike rubella or toxoplasmosis, does not prevent either maternal virus reactivation or transmission of infection to the fetus. In a low socioeconomic population, the frequency of congenital infection as a consequence of maternal reactivation was 1.5 percent. It was significantly lower in a middle-class population, being only 0.19 percent.

No specific recommendations can be made to prevent CMV infections of pregnant women. Routine serologic screening of pregnant women is not recommended because there is no reliable way to determine whether intrauterine infection or fetal disease has occurred, and the incidence is very low. In cases of severe I.U.G.R. it may be appropriate to rule out C.M.V. as an etiologic factor.

In general, the risk of neonatal disease with subsequent complications is higher if the mother has a primary CMV infection during the first half of pregnancy. Neonates of seronegative mothers are at risk of severe morbidity or death if they acquire CMV infection. Although the risk of congenital CMV infection is lower in seropositive mothers, perinatal infection can occur. These infections can be transmitted to neonates by transfusion of blood from seropositive donors or by ingestion of CMV-contaminated milk from human milk banks. Transmission of CMV by these routes can be virtually eliminated by the use of blood or milk from CMV-negative donors or of frozen deglycerolized red blood cells by removal of the buffy coat or by filtration to remove the white blood cells. The use of CMV hyper-immune globulin is under investigation.

Providing a Continuum of Perinatal Services

Pregnant women should have access to readily available and regularly scheduled obstetric care, within their communities. The services include:

- Access to Out-Reach Programs - Outreach programs for women should target teens and low-income women. Outreach programs which make contact with the family of every newborn should be coordinated to ensure that no infant is missed and that services are unduplicated.
- Access to outpatient/ambulatory services is essential to improving maternal and infant health. Women of child-bearing age should have access to preconception care including:
 - Timely availability of family planning services
 - Early verification of pregnancy and basic pregnancy care
 - Risk assessment and medical specialty referrals when necessary
 - Parenting education or referrals for parenting education
 - Referrals for bereavement counseling in cases of spontaneous abortion (miscarriage), fetal death (stillbirth) or infant death
 - Referrals for social problems, e.g., domestic violence
 - Family Case management and follow-up
- **Access to in-patient services** should be available in spite of medical and/or social problems such as financial barriers, lack of transportation or inability to speak English.
- **Access to Neonatal and Infant services** Every neonate/infant should have services capable of providing:
 - Well-child and preventive care, e.g., immunizations
 - Acute problem care
 - Medical specialty referrals when necessary
 - Referrals for early intervention (e.g., newborn hearing screening, vision screening, speech therapy, physical therapy) to prevent developmental delays
 - Case management and follow-up
 - Clinical Management during the First, Second, and Third trimesters
 - **First Trimester** (Return visits)
 - **Patient Education** include the following:
 - Explanation of care/prenatal visits
 - Nutritional requirements of pregnancy
 - Nausea and vomiting during first trimester
 - Weight gain during first trimester
 - Fetal growth
 - Drug use during first trimester / risk to pregnancy
 - Quickening
 - Maternal blood pressure
 - Danger signs in pregnancy
 - First trimester bleeding / Danger signs
 - Resources for emergency care

- Genetic counseling
- Physical exercise in pregnancy / limits
- Working while pregnant / Hazards to pregnancy
- Maternal seatbelt use
- Exposure to environmental toxic substances / risks to pregnancy
- Oral hygiene / dental care during pregnancy.
- Financial plan
- **Second Trimester** (Repeat Visits)
 - Maternal vital signs
 - Ongoing physical assessment
 - Ongoing nutritional assessment/counseling
 - Maternal weight gain
 - Sexual activity during pregnancy
 - Partner involvement
 - Physical activity during pregnancy / limits
 - Enrollment in prepared childbirth classes
 - Fetal development
 - Fetal growth
 - Fetal heart rate
 - Preparing breasts for Breast-feeding /Breast feeding promotion and education
 - Maternal seatbelt use
 - Pre-term labor symptom recognition
- **Third Trimester** (Repeat Visits) Assessment during the third trimester will include the
 - Maternal vital signs
 - Preparation for labor/birth
 - Fetal heart rate monitoring
 - Fetal movement counting
 - Work/activity counseling
 - Introduction to Infant car seat use
 - Infant care and feeding, including breast-feeding support
 - Signs/symptoms of true and false labor
 - What to do when in true labor
 - Fetal monitoring
 - Preparation for parenting
 - Instructions regarding Immediate postpartum period
 - Nutritional needs
 - Wound care / abdomen / episiotomy / Vagina / personal hygiene
 - Family planning method / when to

The Assessment Process is On-going and involves the following:

Confirming demographic information

- Review of gynecologic history, including the date of the last menstrual period (LMP)
- Review Obstetric history
- Confirming Estimated day of delivery (EDD) determined by the last menstrual period if known. If the date is unknown or a size-date discrepancy exists, an ultrasound examination should be performed before 20 weeks.
- Review History of current pregnancy
- Accurately dating pregnancy

- Review Medical/surgical history
- Genetic history review
- Social history/Lifestyle behaviors
- Environmental exposures
- Pharmacologic history
- Nutritional assessment including pregnancy weight and body mass index (BMI)
- Psycho-social assessment
- Physical examination
- Financial planning

Routine Laboratory Tests at return Visits

Blood Rh negative titer, antibody screen

Urinalysis, including microscopic exam and infection screen

Urine protein and glucose

Urine screen for urinary tract infection (UTI)

Maternal serum alpha-feto-protein (MSAFP) (16-18 weeks gestation)

Toxoplasmosis - if indicated

Tuberculosis - if indicated

Group B Streptococcus - if indicated

Cytomegalovirus (CMV) - if indicated

Oral glucose tolerance testing when there is history of macrosomic, or malformed infant, fetal death; or first degree family history of diabetes

Key Points

- All pregnant patients should be assessed periodically, to determine medical risk indicators for adverse maternal and infant outcomes.
- A subset of patients will have a medical history of obstetric risk indicators.
- Some pregnant patients will experience socio-behavioral-economic events that may be associated with adverse outcomes.
- Social risk indicators should not be viewed as isolated events, but should be regarded as having a synergistic adverse effect on the pregnancy whether in combination with medical risk indicators or in combination with other social risk indicators.
- All patients should be periodically assessed for these events and managed according to their unique pattern of risk.
- All pregnant patients should be assessed for allergic or adverse reactions to latex products. The findings should be communicated to the Labor and Delivery unit prior to admission, where possible, or as soon after admission as practicable.

Prenatal Scheduled visits

[Note: There is limited evidence as to what represents an adequate number of prenatal care visits. More frequent visits may be necessary for high-risk patients.]

	First Trimester			Second Trimester			Third Trimester		
	1 st Visit	8-12 wks. Once	12-16 wks: Once	16- 20 wks: Once	20-24 wks: Once	24-28 wks: Once	28-32 wks: Once	32-36 wks: Once	36 + wks: Wkly
Demographic Information									
Gynecologic History									
Obstetrical History									
Menstrual History									
Sexual History									
Contraceptive History									
Family & Genetic History									
Infection History									
Psychosocial History/ P/D Depression									
Nutritional History/Update									
Current Pregnancy History									
Accurate Pregnancy Dating									
Medical/Surgical History									
Genetic History									
Social History/Lifestyle Behaviors									
Environmental Exposures									
Pharmacologic History									
Employment History									
Financial History									
Physical Exam									
Height									
Weight									
Blood Pressure									
Complete Physical Exam									
Fetal Heart Rate									
Fundal Height									
Fetal Lie									
Pelvic Exam									
Digital Cervical Exam									
Lab Tests & Procedures									
Hemoglobin/Hematocrit									
Hemoglobinopathies (if indicated)									
Hepatitis B Titer									
HIV									
Rh Factor									
Rubella Titer									
STD Screening [GC, Chlamydia, VDRL]									
Urinalysis or urine Culture									
Urine Dipstick (protein & sugar)									
Diabetes Screen									
Triple Screen									
Non-Stress Test (NST)									
Group B Strep Culture									

Maternal serum alpha-feto-protein (MSFP)f 16-18 weeks gestation) Toxoplasmosis-if indicated
Group B Streptococcus, and Cyomegalovirus (CMV) - if indicated

Group B Streptococcus if indicated

Medical and General Risk Indicators include;

Infections:

- Oral, teeth and gums
- Gastro- Intestinal
- Reproductive tract infections, e.g., bacterial vaginosis
- Chronic infections, e.g., urinary tract infections
- Sexually transmitted diseases (STDs)
- Human Immunodeficiency Virus (HIV)
- Tuberculosis

Disease States

- Diabetes mellitus
- Cardiovascular disease, e.g., hypertensive disorders, valvular heart disease
- Pulmonary disease, e.g., asthma
- Hepatic disease
- Collagen disease
- Metabolic disorders
- Endocrine disorders
- Convulsive/neurologic disorders
- Isoimmune Thrombocytopenia
- Hemoglobinopathies
- Severe anemia
- Sickle Cell Disease

Nutritional Disorders

- Hyperemesis, anorexia
- Bulimia
- Inappropriate weight gain

Alternative Diets,

- Vegans (complete vegetarians) need B-12 supplements

Obstetric History - Risk Indicators

- Poor obstetrical history
- Multiple gestation
- Infant with congenital anomalies
- Low birth weight Infant.
- Premature labor (< 37 weeks).
- Rupture of membranes > 24 hours before the birth, regardless of gestational age
- Bleeding after 20 weeks
- Pregnancy induced hypertension
- Uterine structural anomalies
- Abnormal amniotic fluid volume
- Intrauterine growth restriction
- Fetal cardiac arrhythmias

- Abnormal fetal lie
- Isoimmunization
- Chorioamnionitis

Socio-Economic Risk Indicators

- Minority ethnic identity
- Unemployment
- Low income employment.
- Household income < 150% federal poverty level.
- Patient unable to make co-payments
- Patient has no telephone
- Homeless
- Lives in shelter

Socio-Behavioral Risk Indicators

- Social isolation/lack of social support
- Maternal education < 12 years³
- Unintended pregnancy.
- Failure / inability to prepare for birth.
- No prenatal care before 28 weeks
 - Single parent with no father identified
 - Mother < 17 years old at conception
 - One or more children < 2 years old
 - Conception interval < 6 mo.
- Alcohol/drug use/abuse
- Maternal smoking
- Gestational depressive episodes
- Inexperience in child care
- Partner abuse/violence
- Spouse/family member death
- Occupation loss, patient/partner
- Residential move
- Multiple sex partners
- Sex partner at high risk for HIV or IV drug use

Risk of Genetic Disease / Birth Defects

Genetic conditions are frequently associated with untoward outcomes of pregnancy. It is therefore essential that assessment that these diseases or defects are thoroughly investigated. Advances in medical research have provided mechanisms to identify and possibly to treat genetic diseases and birth defects prenatally. Perinatal care providers should be prepared to offer appropriate assessment, genetic counseling, or referral to a genetic consultant when there is significant risk of genetic disease or birth defect. Genetic risk factors include:

- Advanced maternal age- 35 or older at Estimated Date of Delivery (EDD) (See pages for a chart on risk of abnormalities as a function of maternal age)
- Repetitive spontaneous abortions or unexplained fetal deaths
- Personal or family history of birth defect, chromosomal abnormality or genetic disease (e.g., congenital heart disease, Down's syndrome muscular dystrophy, cystic fibrosis, Autosomal recessive diseases, (e.g., Tay-Sachs disease, sickle and Thalassemia Hemoglobin types

- Autosomal dominant diseases, e.g., Huntington's Chorea, gender or X-linked diseases, e.g., hemophilia) in either parent or in a previous offspring or other near relatives of either parent. Procedures available to detect genetic disease or defects, and most metabolic disorders include:
- Ultrasound (U/S)
- Amniocentesis with various analyses as indicated
- Percutaneous Umbilical Blood Sampling (PUBS)
- Chorionic Villus Sampling (CVS)

Recommended Guidelines for Perinatal Care in Illinois June 2004

Chromosome Abnormalities in Liveborns

Maternal Age	Risk for Down >s Syndrome	Total Risk for Chromosomal Abnormalities
20	1/1,667	1/526
21	1/1,667	1/526
22	1/1,429	1/500
23	1/1,429	1/500
24	1/1,250	1/476
25	1/1,250	1/476
26	1/1,176	1/476
27	1/1,111	1/455
28	1/1,053	1/435
29	1/1,000	1/417
30	1/952	1/385
31	1/909	1/385
32	1/769	1/322
33	1/602	1/286
34	1/485	1/238
35	1/378	1/192
36	1/289	1/156
37	1/224	1/127
38	1/173	1/102
39	1/136	1/83
40	1/106	1/66

Source:Hooks, et. al. Table 3.2, “Chromosome Abnormalities in Liveborns,” in *Guidelines for Perinatal Care*, 3rd edition, American Academy of Pediatrics, American College of Obstetricians and Gynecologists, and March of Dimes Birth Defects Foundation.

The objective for pre-conception/ inter-conception care is ultimately to reduce Infant mortality.

Significance of Infant Mortality

Pregnancy is a dynamic process involving actual and potential health status changes . These changes necessitate frequent assessments of risk in order to initiate the type and range of services that will ensure the best outcomes. For individuals with increased medical, nutritional or psycho-social risks, the benefits of comprehensive health care, result in significantly lower mortality and morbidity rates. In all cases, perinatal care that focuses on the client's individual needs, can improve health outcomes of mothers and their infants.

The goal for reducing infant mortality and closing the disparities in health outcomes between the racial and ethnic groups, is to educate women of child-bearing age of the importance of early access to prenatal services. Through the Bureaus of Maternal and Infant Health, and Community Health Nursing, programs, such as Family Case Management, WIC, Targeted Intensive Prenatal Case Management, and Family Planning, have focused attention on public education, reducing unplanned pregnancies, and sexually transmitted diseases. In spite of several years of steady progress, and general improvement in health outcomes for child -bearing women, in many communities of Illinois, infant mortality, unintended pregnancies, and high STD rates continue to challenge our health care delivery system.

Infant mortality is frequently used as an indicator of the health of a community and a nation. During the 20th century, infant mortality rates declined in the United States by 90%. Many of the large cities of the U.S however, continue to have high infant mortality rates compared with national rates. Studies of U.S infant mortality by region document persisting geographic disparities and differences across racial and ethnic groups (CDC. MMWR Weekly April19, 2002/51(15;329-332,343)

Trends in Infant Mortality

Overall, the U.S infant mortality rate has declined from 20 deaths per 1,000 live births in 1970 to 6.9 deaths in 2000. The 1999 rate of 7.1 deaths has fallen 4% since 1995 and 22% since 1990. In1999, the leading causes of infant mortality were congenital anomalies, disorders related to immaturity (short gestations and unspecified low birth-weight, SIDS, and maternal complications.

Trends by Race/Ethnicity

Trends by Race/Ethnicity Between 1998 and 1999, the mortality rate for white infants decreased 3% to 5.8 deaths per 1,000 live births, while the rate for black infants was 14.6%. Although the trend in infant mortality rates among blacks and whites have been on the decline, the proportional discrepancy between black and white rates has increased. The total Hispanic infant mortality rate in 1999 was 5.8 In the year 2000, 83,2% of mothers began prenatal care within the first trimester of pregnancy, continuing a positive trend dating back to 1989. Disparities in access to prenatal care between white, black, and Hispanic mothers narrowed during this period. In 2000 the percentage of black mothers who initiated first trimester prenatal care was 74.3%, compared to 74.4% for Hispanic mothers and 88.5% for whites. 33% of teen mothers received no prenatal care in the year 2000. (United States Department of Health & Human Services. Fact Sheet, March 18, 2002)

Trends by Geography

Since 1970 there has been a consistent decline in the infant mortality in Illinois from 21.3 per 1,000, to 8.3 in 1900, to 7.2 deaths per 1000 live births in the year 2002. Between 2001 and 2002 the decline of 3.6 percent.. Although there is an overall decline in infant mortality rates in Illinois, infants born to African American mothers died at a higher rate than white or Hispanic babies during 2002. In Chicago, the infant mortality rates have steadily declined from 15.6 in 1990, to 11.5 in 1999 to 8.6 in 2002, the lowest rate recorded by the city. However, the death rate for African-American children in Chicago was 14.8 in 2002, down slightly from 15.1/1,000 in 2001, while deaths for white infants declined from 5.5 in 2001 to 5.1 in 2002. The downstate rate in 2002 for African American babies was 16.7, an increase of 14.6 from 2001, while the rate for whites dropped from 6.0 in 2001 to 5.6 in 2002. (IDPH, 3/04)

Trends by Maternal Age

There is a definite relationship between maternal age and infant mortality, with rates being highest for infants born to teenage mothers, lowest for mothers in their late twenties and early thirties, and again higher for mothers in their forties and over. (National Vital Statistics report, Vol. 48, No. 12 July 20, 2000) Children born to young adolescent mothers are at greater risk for infant mortality and low birth weight. Teen mothers are less likely to receive prenatal care and have the financial resources, social supports, and parenting skills required for child rearing. At the beginning of the 1990s, school age birth rates peaked and declined during the decade. There was a 29% decline in the rate of teenagers giving birth in this country from 1991-2000. This decline was found in the three major ethnic groups. This decline followed a period of increase in the 1970s and 1980s. In general the highest mortality rates are found among infants born to teens less than 16 years of age (Grand Round. Pediatrics Vol 110 No. 6 December 2002, pp1163-1168)

Causes of Infant Mortality

Over four million babies are born in the United States every year. In the year 2002, 12.1% of these babies were born prematurely. This represented a 29% increase in the premature births since 1981. (NGA Center for Best Practices. Issue Brief; June 28, 2004) The leading cause of infant mortality is prematurity. In combination with congenital anomalies, disorders associated with unspecified low birth-weight and SIDs, accounted for 46% of all infant deaths in the United States in 1998. (CDC. MMWR Weekly April 19, 2002)

Low birth-weight also contributes to infant mortality. Together with short gestation, low birth weight accounts for one out of five deaths that occur in the first 28 days of life. The United States Department of Health and Human Services reports that the percentage of births that are low birth weight or very low birth weight has actually been increasing in this country in the past decade. (National Vital Statistics Report; CDC Vol. 48, Number 12)

Sudden Infant Death Syndrome (SIDS) is yet another cause of infant mortality. The sudden and unexpected death of an infant under one year of age, which remains unexplained after a thorough investigation, is the leading cause of death among infants beyond the newborn period.

Approximately 2,100 babies die each year of SIDS in the United States at the rate of about one baby every four hours. In 2001, 1,379 infants died of SIDS and other causes, at the rate of one child every six hours. These statistics demonstrate a need for measures for reducing the infant mortality rates in Illinois, and closing gap in racial disparity.

Although there is still no known cause of SIDS, research in early 1990 revealed specific behaviors that can lower the risk of SIDS, and ultimately reduce infant mortality. These are:

- Preventing accidental suffocation and entrapment by not adding of bumper padding, pillows, stuffed toys, fluffed blankets etc.
- Prevent overlay by not having baby sleep with mother but in a crib
- Put babies to sleep on their backs
- Educating the public and MCH professionals about bereavement support for client referral.
- Smoking cessation

Barriers to achieving desired maternal-child-disease prevention outcomes for all citizens of Illinois include access to comprehensive Perinatal services, including preconception/inter-conception care, and social services. These barriers can be removed with an integrated approach to identification and prevention of medical and psycho-social risks that begins pre-conceptionally, and extends throughout pregnancy and the postpartum periods. Important goals of perinatal care are, improving early entrance to prenatal services, and parent-newborn-family relationships. This involves integrating concepts of family-centered care into every aspect of perinatal care beginning with the first prenatal visit. This includes a review of the parents' attitudes toward the pregnancy, family life, child care practices, environmental stressors, support systems and interest in childbirth

education classes. This continues throughout the perinatal period in both ambulatory and hospital settings. Active participation of prospective parents in decision -making during pregnancy, labor, delivery, and the postpartum period is strongly encouraged.

Finally, case management is a component of the care provided to pregnant women. This is an effective mechanism for determining client needs, developing a plan of care, and providing referral and follow-up services when elements of risk presents. A detailed description of case management can be found in the *Maternal Child Health Services Code* (77 Ill. Admin. Code 630.220)