Spacing, Timing, Planning: Ways to Improve Pregnancy Outcomes

Produced by the Alabama Department of Public Health Video Communications and Distance Learning Division

Objectives

- Comprehend the rationale behind the definition of an optimal interpregnancy interval
- Explain the risks for both the infant and the mother of poorly timed pregnancies

Objectives

- Identify topics for incorporation into family planning discussions that address
  - Common misunderstandings about pregnancy prevention and preparation
  - Preconception health

What Is “Interpregnancy Interval?”

- Variously defined
  - Time from one delivery to next
  - Time from one event (miscarriage) to delivery

What Is “Interpregnancy Interval?”

- Time from delivery/miscarriage to beginning of next pregnancy
  - Calculated by determining time between deliveries and subtracting the estimated length of gestation

Interpregnancy Interval (IPI) for Practical Use

- Period of time between
  - Last delivery or pregnancy loss
  - First day of the menstrual cycle in which conception occurs
**Why Are We Talking About This?**

- Increased perinatal mortality associated with short interpregnancy interval (IPI)
  - Children’s Bureau Reports
  - Hughes, 1922
  - Woodbury, 1925
- Continued problem despite effective methods of prolonging this interval

**Why Do We Need to Intervene?**

- More than 50% of infant mortality due to VLBW
  - Racial disparity
- Best predictor of VLBW delivery is prior history
- Our best way of addressing infant mortality is to attempt to reduce risk factors indicated by prior adverse outcomes
  
  Dunlop et al, Mat Child Health J, 2008

**Why Might Short Interval Matter?**

- Maternal depletion hypothesis
  - More than 1 year required to replete maternal resources essential for successful pregnancy

**Why Might Short Interval Matter?**

- Adequate supply needed for balance between mother and fetus
  - Biologic competition in setting of inadequacy
  - Insufficient ability to support fetal growth and development
- Maternal stress

**Birthweight and Maternal Nutrition**

- Low weight women replete energy stores at expense of offspring
  - Fetal growth sustained only when food supply sufficient for maternal weight gain
  - Fetus is more severely affected in terms of lost weight than mother

**Birthweight and Maternal Nutrition**

- Partitioning of energy supply influenced by initial maternal nutritional status
Two Key Nutrients: Folic Acid & Iron

- Folic acid
  - Declines from mid-pregnancy to 3-6 months postpartum
  - Cell division
  - Milk synthesis
  - 20% of women low folate at 6 months

- Iron
  - Hemoglobin synthesis
  - More than 1 gm for pregnancy requirements
  - Stores low for months and poorly repleted

Effect Of Short IPI Mitigated By Folic Acid Supplementation

- Folic acid use
  - Pre-conception
  - Post-conception
  - None
- Birthweight and risk of IUGR directly related to both IPI and folic acid use

Risk Factor, Surrogate, or Interaction?

- Other predictors of poor infant outcomes
  - Age
  - Race
  - Education
  - Socioeconomic & marital status
  - Number of prior pregnancies
  - Prior pregnancy outcomes

Is The Association Due To Confounders?

- Chicago
- IPI ≤ 3 months
  - PTB rate 38%
- Rate two-fold higher in African American vs. whites at all IPI
### Is The Association Due To Confounders?
- Adjusting for race, prior pregnancy history, education, smoking, and prenatal care, much of association dissipates

### Role Of IPI Modified By Demographic Variables
- Unmarried women had a higher rate of SGA at all IPI
  - IPI <12 months, 60% increase in SGA
- Among women with IPI 12-35 months, conferred protection was lower in unmarried

### Why Might Long Interpregnancy Interval Matter?
- Loss of physiologic adaptations
- Revert to nulligravid state
- Accrual of co-morbidities
  - Hypertension
  - Obesity
  - Diabetes

### Effects on Infant Outcomes
- Premature birth
- Low birthweight
- Small for gestational age
- Congenital anomalies
- Infant death
- Cerebral palsy

### Preterm Birth
- IPI ≤ 8 months 2.3 fold increase in PTB
  - 3.6 fold if < 4 months
- Rate of preterm delivery inversely related to interval
  - Interval <13 weeks, 1.9-fold increase in PTB

### Preterm Birth
- Interval <6 months
  - Increase preterm birth < 34 weeks
  - Adjusted for demographic, pregnancy history
  - OR 3.6; 95% CI 1.4-9.0
Dose-Dependent Relationship Between Preterm Birth and IPI
- < 6 months IPI
  - 48% increase in PTB
- 6-12 months
  - 15% increase

Preterm Birth and IPI: Risk At Both Ends of the Spectrum
- Registry of nearly 300,000 Hispanic American births
  - < 18 months
    - PTB < 32 weeks 26-47% increased risk
    - PTB < 38 weeks 14-20% increased risk

Birthweight and IPI
- Short IPI associated with reduction in mean birth weight overall
  - Norwegian registry
  - 1st and 2nd vs 2nd and 3rd births:
    - average weight lower in subsequent pregnancy
  - Most profound when IPI < 12 months

Interaction of Prior Pregnancy Outcome and IPI
- IPI < 12 months, OR 1.3 for PTB
- If prior PTB, PTB increased 4-fold
  - IPI 18-48 months, lowest risk for recurrence
- If prior term delivery, PTB increased only with IPI < 6 months
Interaction of Prior Pregnancy Outcome and IPI

Impact of IPI on Perinatal Outcomes
- Latin American registry >1,000,000 pregnancies
- Compared to 18-23 months, IPI <6, 6-11, and ≥60 months associated with
  - Perinatal death
  - LBW <2500 gm & VLBW <1500 gm
  - PTB <37 and <32 weeks
  - SGA

Low Birthweight, Maternal Weight, and Short IPI
- Brazil, case-control study IUGR
- Short IPI more common in lower weight women
- Adjusting for maternal weight, short IPI remained associated with IUGR
  - OR 1.38
- Postulated less time to restore nutritional reserves

Impact of IPI on Perinatal Outcomes
- Increasing IPI to 18-59 months would decrease perinatal mortality by 15%
- Post-abortion, IPI < 6 months
  - LBW, PTB, PROM, anemia

Perinatal Death
- Swedish registry
- Interval < 3 months
  - 1.9 fold increase
- Interval >72 months
  - 1.5 fold increase

Short IPI and Congenital Anomalies
- Neural tube defects
  - 2-fold increased risk if livebirth ≤ 6 months
- No appreciable effect if spontaneous abortion
  - Inadequate replenishment of micronutrients, especially folic acid
**Adverse Childhood Outcomes and IPI**

- **Disabling CP**
  - Shorter IPI 16 vs. 23 months
  - Controlling for infection, multiples, and neonatal brain injury, IPI was associated with CP

- **Childhood allergies**
  - IPI > 24 months, 2-fold higher rate of allergies
  - ? Etiology
    - Larger family, cleanliness

**A Cycle of Adversity**

- Women with complicated 1st pregnancy more likely to have an interpregnancy interval < 12 months
  - IUGR, PTB, perinatal death
- IPI < 6 months, associated with
  - PTB < 32 weeks
  - PTB < 36 weeks
  - Perinatal death
    *Smith, Pell, & Dobbie, BMJ, 2003*

**Similar Effects Across Races**

- Magnitude of increase associated with short IPI similar
  - Risk overall twice as high in AA
  - SGA OR 1.6 vs. 1.3; PTB 1.4 vs. 1.2
- Intervals < 7 mos. and > 60 mos.
  - PTB
  - IUGR
  - Perinatal mortality

**IPI Matters Even For Low-Risk Women**

- Cohort with early care, education, non-smokers, age 20-34, prior term AGA deliveries
  - PTB and LBW increased with IPI ≤ 8 or ≥48 months

**Effects Across US Racial/Ethnic Groups**

- IPI ≤6 months
  - 50-80% increase in VLBW
  - 30-90% increase in PTB <32 weeks

- 8% of LBW and PTB related to short IPI in African Americans and Hispanics
- 4% in whites
IPI Matters Even For Low-Risk Women

• Military families with free access to healthcare
  – Short IPI associated with PTB and LBW
  – African Americans <9 mos. OR 2.65
  – White <3 months OR 4.2

Women With Delayed Childbearing

• Adverse outcomes increase with age
  – VLBW (< 1500 gm)
  – PTB
• More likely to have short IPI
  – Especially ≥ 35 yo and ≤ 6 months

Women With Delayed Childbearing

• Interval of 12-17 mos., lowest risks for
  – LBW
  – PTB
  – Fetal death

What Is “Optimal” For Whom?

• Mother?
• Infant?
• Society?

Utah Birth Certificate Study

• 173,000 births
• 16 confounding risk factors
• IPI < 18 months, odds ratio for
  – LBW 1.4
  – PTB 1.4
  – SGA 1.3

Utah Birth Certificate Study

• IPI >120 months, odds ratio for
  – LBW 2.0
  – PTB 1.5
  – SGA 1.8
• IPI 18-23 months, lowest risks
**Utah Birth Certificate Study**

- 435,327 births; included 8 maternal risk factors
- Risk highest at IPI < 3 months, lowest at 18-23 months
- IPI < 6 months, odds ratio for
  - LBW 1.5
  - PTB 1.3
  - SGA 1.3

**Michigan Birth Certificate Study**

- IPI > 120 months, odds ratio for
  - LBW 1.5
  - PTB 1.3
  - SGA 1.3

**Michigan Linked-Birth Data**

- 565,816 births
  - Median IPI= 20 months
- J-shaped association between IPI and LBW even controlling for confounders
- Infants conceived <6 months weighed 200 gm less than those conceived at 18-23 months

**Michigan Linked-Birth Data**

- Overall, 9.4% of LBW is due to suboptimal IPI
It’s Not Just For The Baby…

Why Do We Need To Intervene?
- More than 50% of infant mortality due to VLBW
  - Racial disparity
- Best predictor of VLBW delivery is prior history
- Our best way of addressing infant mortality is to attempt to reduce risk factors indicated by prior adverse outcomes

Maternal Effects of Interpregnancy Interval
- 450,000 women delivering singletons
- Short IPI associated with increase in:
  - Maternal death OR 2.5
  - 3rd trimester bleeding OR 1.7
  - PROM OR 1.7
  - Endometritis OR 1.3
  - Anemia OR 1.3

Maternal Effects of Interpregnancy Interval
- Long IPI (>59 months)
  - Pre-eclampsia, eclampsia OR 1.8

Short IPI and Uterine Rupture
- With prior C/S, OR 3.9 for uterine rupture
- Mean IPI 10 months shorter in women with uterine rupture
- Interval < 6 months
  - Uterine rupture OR 2.66
  - Major morbidity OR 1.95
  - Blood transfusion OR 3.14

Short IPI and Uterine Problems
- Altered, insufficient wound healing
  - Smooth muscle repairs slowly
  - Endometrial healing occurs with proliferation of fibroblasts and connective tissue
  - Scar evolution continues for 6-12 months
Short IPI and Uterine Problems

- Third trimester bleeding
  - Poor remodeling of endometrial blood vessels
  - Uteroplacental underperfusion

Long IPI and Labor Dystocia

- 650,000 births examined
- Labor dystocia increased with IPI
  - > 2 years
  - 4-5 years OR 1.15
  - 6-7 years OR 1.25
  - 8-9 years OR 1.30
  - 10+ years OR 1.50

Long IPI and Labor Dystocia

Long IPI and Maternal Blood Pressure

- Parous women have lower risk of pre-eclampsia
  - Cardiovascular adaptations result in increased vascular compliance in next pregnancy
  - Lower mean arterial pressure inversely correlated with IPI-longer IPI, less MAP decrease

Long IPI and Maternal Blood Pressure

- Parous women have lower risk of pre-eclampsia
  - Effect disappears by 2-3 years
  - Risk of pre-e same as in nullip if IPI >6 yrs

Whom Should We Focus Our Energies On?
**Predictors of Short Interval**
- Twice as likely to have IPI < 12 months
  - Medicaid
  - Age ≤ 20
  - Unmarried
  - Less education
  - Race

**Predictors of Short Interval**
- Age, education, race, marital status, number of prior pregnancies
  - Individual level variables best predictors of IPI

**Predictors of IPI**
- 450,000 women
- Short interval
  - Young age
  - History of miscarriage
  - Fetal/neonatal death
  - Late prenatal care
  - Lower BMI

**Predictors of IPI**
- Long interval
  - Greater BMI
  - Older age
  - Chronic hypertension

**Pregnancy Spacing**
- Tackling the problem and dispelling urban (and not-so-urban) myths

**If I Am Breastfeeding, I Can’t Get Pregnant**
- WRONG!
I Can’t Get Pregnant Until My Periods Start Again

• WRONG AGAIN!

Fertility In the Postpartum Period

• Suppression of ovulation related to frequency and duration of breastfeeding
  – Normal FSH, low LH levels with decreased GnRH pulsations

Fertility In the Postpartum Period

• Non-breastfeeding women
  – LH rises to normal by mean of 3 weeks
  – FSH rise by 4 weeks

Breastfeeding For Birth Control

• Based on lactational amenorrhea
  – High levels of prolactin maintained
  – As estrogen and progesterone decrease, FSH and LH increase
  – Suckling decreases amplitude and frequency of GnRH pulses

Breastfeeding For Birth Control

• Based on lactational amenorrhea
  – No LH surge and no ovulation
  – Follicular development and ovulation occur when suckling decreases

Factors Limiting Effectiveness of Lactational Amenorrhea

• Reduced frequency of breastfeeding
  – Must be at least 6/day
  • Cessation of night feeding
    – Cannot have >6-10 hrs between sessions
  • Separation from infant
Factors Limiting Effectiveness of Lactational Amenorrhea

- Introduction of supplemental feeding
- Effective at most only up until 6 months
- After first bleeding episode, risk of pregnancy increases

Menstrual Bleeding and Breastfeeding

- Vaginal bleeding prior to 56 d of full breast feeding not usually a sign of return to fertility
  - 15% have signs of follicular development although no ovulation until later

Menstrual Bleeding and Breastfeeding

- Menstrual bleeding usually precedes ovulation by 4 weeks
- After 8 weeks, women with bleeding need contraception, especially if supplementing

Return To Fertility

- With exclusive breastfeeding
  - Menstruation 28 wk (15-48 wk)
  - Ovulation 34 wk (14-51 wk)
- Introduction of supplemental feeding correlates with resumption of menses and ovulation
  - 1st ovulation 155 days (67-252)
  - 50% of women have ovulation prior to normal menses resumption

An Opportunity To Improve Outcomes From Multiple Angles

- Family planning and preconception counseling
  - Parts of the whole

Family Planning

- Statement of goals and rationale
- Statement of patient intentions
- Discussion of impact of desires on health outcomes
- Options for contraception
Preconception Counseling Goals: Prevention and Management

• Ensure as healthy status as possible prior to pregnancy
  – Especially if benefit greatest with action before conception or early pregnancy
  – Health promotion for woman and her children

Preconception Counseling Goals: Prevention and Management

• Ensure as healthy status as possible prior to pregnancy
  – Education
  – Screening and intervention to reduce risk

Preconception Counseling Goals: Prevention and Management

• Components
  – Modifiable risk factors
  – Non-modifiable risk factors

Is There Really A Chance To Make A Difference?

• 38\% of women with planned pregnancy had an indication for preconception counseling
• 66\% of those with unplanned pregnancy had an indication for PCC
• >50\% of pregnancies in US unplanned

Why Is It Important To Do It Prior Pregnancy?

• Interpregnancy interval
  – If pregnant, it's too late
• Medical conditions
  – The greatest risk occurs before most women present for prenatal care

Why Is It Important To Do It Prior Pregnancy?

• Medical conditions
  – Post-conception 17d-56d (4-10 wk menstrual age)—organogenesis
• Folic Acid
  – Need repletion prior to neural tube closure
Preconception Interventions

*Evidenced-based improvement in outcomes*

- Folic acid
- Alcohol use
- Smoking
- Maternal PKU
- Diabetes
- Obesity
- Hypothyroidism

- Accutane (Isotretinoins)
- Anti-epileptics
- Oral anticoagulants
- Rubella
- Hepatitis B
- STDs
- HIV/AIDS

Proper PCC

- Allows decisions to be made to attempt or avoid pregnancy
- Influences timing of conception
- Optimizes health status prior to conception

Assessment of Risk Factors

- Screening/management of chronic disease
- Screening/treatment for nutritional/dietary problems
- Screening/modification of risky behaviors
  - Substance abuse

Assessment of Risk Factors

- Screening/modification of risky behaviors
  - Sexually transmitted disease screening
- Screening/treatment for psychiatric, social issues
  - Domestic abuse

Education on Non-Modifiable Risk Factors

- Prior obstetric history
  - Preterm birth
  - Pre-eclampsia
- Genetic history
  - Congenital anomalies
  - Genetic disorders

The Easiest and Fastest Way To Hit The Points Is Through History

- Reproductive history
- Medical history
- Family history
- Nutritional history
- Social history
- Immunization history
- Environmental/occupational history
Preconception Checklist

• March of Dimes website

• Remember
  – Education
  – Health promotion
  – Screening and intervention to reduce risk

Reproductive History

• Prior pregnancies
  – Preterm birth
  – Pre-eclampsia
  – Post-partum depression
  – Gestational diabetes
  – Peripartum cardiomyopathy

Reproductive History

• Prior cesarean delivery
• Infertility
• Short pregnancy interval

Prior Preterm Birth

• Etiology
• Surveillance
  – ? Cervical length
• 17-alpha hydroxyprogesterone caproate - Delaluten
• Vigilance
• Appropriate spacing
• Early prenatal care

Medical History

• Disorders that can adversely affect pregnancy outcome either directly or indirectly due to medications
  – Diabetes
  – Lupus
  – Epilepsy

• Disorders that pregnancy can adversely affect
  – Cardiac disease
Medication Exposure

- Over the counter medications
  - NSAIDS
  - Alternative medications
  - Appetite suppressants

Medication Exposure

- Prescription medications
  - Ace inhibitors
  - Coumadin
  - Anti-epileptics
  - Accutane

Surgical History

- Surgeries that change normal anatomic position or function of pelvic structures
  - Bladder surgeries
- Procedures that may be affected by increasing abdominal pressure or uterine growth
  - Gastric bypass

Nutritional History:

Maternal Diet, Weight & Exercise

- Food fads
- Pica
- Dietary restrictions - PKU
- Caffeine intake
- Vitamin supplements
- Eating disorders
- Access to healthy food

Maternal Weight

- BMI associated with risk of adverse outcomes
  - Hypertension
  - Macrosomia/shoulder dystocia
  - Gestational diabetes
  - Abnormal labor/cesarean section

Maternal Weight

- BMI associated with risk of adverse outcomes
  - Fetal anomalies
  - Spontaneous abortion
  - Thromboembolic disease
- Exercise
  - Type and amount
Folic Acid and Birth Defects

- Neural tube defect prevention
  - ? Heart defects
  - ? Cleft lip/palate
- MOD, 2000 - 82% of women would take folic acid
  - Only 35% had it recommended
- Cleves et al, 2004 - 23% of reproductive age women taking folic acid in gyn clinic

Immunization and Infection History

- Rubella
- Varicella
- Hepatitis B
- Tetanus - every 10 years
- Influenza
- Pneumococcal, as indicated

Immunization and Infection History

- Special Occupation
  - CMV
  - Parvovirus

Occupational, Environmental & Toxin Exposures

- Substance Abuse
  - Tobacco - 15%
  - Alcohol - 15% drink during pregnancy
    - 2-3% problem drinkers
  - Illicit drugs

Occupational, Environmental & Toxin Exposures

- Home
  - Pets
  - Lead
  - Pesticides
  - Hyperthermia

Occupational, Environmental & Toxin Exposures

- Occupational
  - Solvents
  - Radiation
  - Mercury
### Family History
- Prior child or other family member with
  - Congenital anomaly
  - Single gene disorder
  - Mental retardation
- Consanguinity

### Social Support & Domestic Violence
- Increased demands of pregnancy
  - Financial
  - Physical
  - Social
- Birth spacing

### Social Support & Domestic Violence
- Safe environment
  - Potential increase in domestic violence during pregnancy
- Post-partum demands

### Put It In Writing
- Summary of recommendations to patients
  - Folic acid
  - Regular exercise
  - Normal body weight
  - Avoid diet extremes
  - Limit fish intake

### Put It In Writing
- Summary of recommendations to patients
  - Prevent HIV/STDs
  - Avoid alcohol, tobacco, drugs
  - Achieve metabolic control
  - Seek early prenatal care

*Your goal is not to solve all the problems, but instead to identify ones that would benefit from additional resources and evaluation!*
Summary

• An interpregnancy interval of 18-23 months has the lowest risks for
  – Preterm birth
  – Low birthweight/SGA
  – Maternal complications
• Effective contraception is key is pregnancy spacing

Summary

• Use family planning visits as opportunities to identify risk factors for adverse pregnancy outcomes
• The best chance to improve pregnancy outcome is before pregnancy starts
Probability of preterm birth at outcome pregnancy

- Women with term births at index pregnancy
- Women with preterm births at index pregnancy
- Mean probability of preterm birth at outcome pregnancy
- Mean plus two standard deviations of probability of preterm birth at outcome pregnancy

Interpregnancy interval (m)
SLIDE 49

- Low birth weight
- Preterm birth
- Small size for gestational age

Prevalence (%) on the y-axis and Interpregnancy Interval (mo) on the x-axis.
### PRECONCEPTION SCREENING AND COUNSELING CHECKLIST

**NAME**

**DATE:** /  

**BIRTHPLACE**

**AGE**

**ARE YOU PLANNING TO GET PREGNANT IN THE NEXT SIX MONTHS?**  _Yes_  

**IF YOUR ANSWER TO A QUESTION IS YES, PUT A CHECK MARK ON THE LINE IN FRONT OF THE QUESTION. FILL IN OTHER INFORMATION THAT APPLIES TO YOU**

### DIET & EXERCISE

- **What do you consider a healthy weight for you?**
- **Do you eat three meals a day?**
- **Do you follow a special diet (vegetarian, diabetic, other)?**
- **Which do you drink (coffee, tea, soda, milk, water, other soda/pop, other)?**
- **Do you eat raw or undercooked food (meat, other)?**
- **Do you take fish oil?**
- **Do you take other vitamins daily (multivitamin, vitamin A, other)?**
- **Do you take dietary supplements (black cohosh, ginseng, royal jelly, other)?**
- **Do you have current/past problems with eating disorders?**
- **Do you exercise? Type/amount**

**Notes:**

### MEDICATION/DRUGS

- **Are you taking prescribed drugs (Aspirin, valproic acid, blood thinners)? List them:**
- **Are you taking non-prescribed drugs? List them:**
- **Are you using birth control pills?**
- **Do you use injectable contraceptives or shots for birth control?**
- **Do you use any herbal remedies or alternative medicine?**

**Notes:**

### WOMEN'S HEALTH

- **Do you have any problems with your menstrual cycle?**
  - What were the outcomes? Did you have difficulty getting pregnant? How many times have you been pregnant? Have you ever been treated for infertility? Have you had surgery on your ovaries, uterus, cervix, or fallopian tubes? Did you mother take the hormone DES during pregnancy? Have you ever had an HPV, genital warts, or chlamydia? Have you ever been treated for a sexually transmitted infection (genital herpes, gonorrhea, syphilis, HIV/AIDS, other)? List.

**Notes:**

### HOME ENVIRONMENT

- **Do you feel supported by your partner at home?**
- **Do you feel safe at home?**
- **Do you have pets (cats, dogs, exotic animals)?**
- **Do you have any contact with soil, cat litter, or sandboxes?**
- **Do you have a place for a baby to sleep?**
- **Do you need any baby items?**

**Notes:**

### LIFESTYLE

- **Do you smoke cigarettes or use other tobacco products?**
- **How many cigarettes/packs a day?**
- **Are you exposed to second-hand smoke?**
- **Do you drink alcohol?**
- **How often?**
- **How much?**
- **Do you use recreational drugs (cocaine, heroin, ecstasy, meth/amphetamines)?**
  - List.
- **Do you see a dentist regularly?**
- **What kind of work do you do?**
  - List.
- **Do you work or live near possible hazards (chemicals, x-rays or other radiation, lead)?**
  - List.
- **Do you use saunas or hot tubs?**

**Notes:**

### MEDICAL/FAMILY HISTORY

- **Do you have or have you ever had:**
  - Epilepsy
  - Diabetes
  - Asthma
  - High blood pressure
  - Heart disease
  - Arthritis
  - Kidney or bladder disorders
  - Thyroid disorders
  - Chickenpox
  - Hepatitis B
  - Digestive problems
  - Depression or other mental health problems
  - Skin problems
  - Solarodermia
  - Other conditions

Have you ever been vaccinated for:
  - Measles, mumps, rubella
  - Hepatitis B
  - Chickenpox

**Notes:**

### GENETICS

- **Does your family have a history of or your partner's family:**
  - Hemophilia
  - Other bleeding disorders
  - Tay-Sachs disease
  - Blood disorders (sickle cell, thalassemia, other)
  - Muscular dystrophy
  - Down syndrome: Mental retardation
  - Cystic fibrosis
  - Other defects: (diabetes, heart, kidney)

**Your ethnic background is:**

**Your partner's ethnic background is:**

**Notes:**

### OTHER

**IS THERE ANYTHING ELSE YOU'D LIKE TO KNOW?**

**ARE THERE ANY QUESTIONS YOU'D LIKE TO ASK ME?**