City of Milwaukee Infant Mortality Summit 2011
Reducing Preterm Births: Clinical Interventions

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Introduction

• 2007 Milwaukee 7\textsuperscript{th} worst for infant mortality among 53 US cities

• Disparity between infant mortality for AA and whites one of the worst in the nation

• The focus of the summit is reducing prematurity a significant contributor to infant mortality

• Emphasis is on the physicians and nurses role in reducing prematurity
Objectives

• Understand the contribution of prematurity to infant mortality
• Understand the cost of prematurity to society, the family and the preterm child
• Understand ways prematurity can be reduced
• Be able to incorporate these methods into clinical practice
USA Infant Mortality

2008 leading causes:

- Complications of prematurity: 44.9%
- Congenital abnormalities 30.1%
- Sudden infant death syndrome and accidental suffocation: 11.8%
- Infections: 4%
- Other 9.2%

MHD, based on CDC data
Milwaukee

Cause of Infant Death: 2005-2008

- Complications of prematurity: 53.7%
- Congenital abnormalities: 19.0%
- SIDS, overlay or accidental suffocation: 18.0%
- Infections: 4.4%
- Homicide: 4.4%
- Other: 2.4%
Preterm Birth (PTB)

- Birth before 37 weeks gestational age
- 21% rise since 1990, peaked at 12.6% in 2006
- 2008 -12.3% of births in the US (550,000 births)
- 80% spontaneous, 20% iatrogenic
- Low birth weight (LBW) < 2500 gm
- Very low birth weight (VLBW) < 1500 gm
- Extremely low birth weight (ELBW) < 1000 gm
Preterm Birth by Race/Ethnicity

US, 2006-2008 Average

All race categories exclude Hispanics. Preterm is less than 37 completed weeks gestation.
Preterm Birth

US and Wisconsin, 1998-2008

Preterm is less than 37 completed weeks gestation.
Preterm Birth Milwaukee

% of Pre-term Births in Milwaukee

2005: 11.3%
2006: 10.9%
2007: 10.5%
2008: 10.2%
2009: 10.8%
2010: 10.1%
Cost of Preterm Birth

US, 2005

US Cost of Preterm Birth

Cost $51,600 per preterm birth:

Medical care $33,200
Maternal delivery $3,800
Early intervention services $1,200
Special education $2,200
Lost productivity $11,200

Annual cost 26 billion dollars
Cost of Preterm Birth

- Family - worry, grief, guilt, disruption, lost productivity
- Premature infant/child:
  - Respiratory distress/BPD, Asthma
  - Neurodevelopmental impairment (CP)
  - Learning disability
  - Recurrent illnesses
  - SIDS
  - Poor growth
  - Vision and hearing impairment
  - Adult health - insulin resistance, HTN,
  - Decreased reproductive capacity, increased PTB
Milwaukee Preterm Birth

2005 – 2008

• 4851 premature births
• Cost $250,311,600
Risk Factors for Preterm Birth

<table>
<thead>
<tr>
<th>Risk Factors – Slide 1 of 2</th>
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<tbody>
<tr>
<td>Prior preterm birth</td>
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<tr>
<td>African-American race</td>
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<tr>
<td>Age&lt;18 or &gt;40 years</td>
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<tr>
<td>Low socioeconomic status</td>
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<tr>
<td>Cervical injury or anomaly</td>
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<tr>
<td>Uterine anomaly or fibroid</td>
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<tr>
<td>Short cervix or Premature cervical dilatation (&lt;2 cm)</td>
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<td>Over distended uterus (multiple pregnancy, polyhydramnios)</td>
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<tr>
<td>Vaginal Bleeding</td>
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<tr>
<td>Periodontal Disease</td>
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<td>Excessive uterine activity?</td>
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</tbody>
</table>
# Risk Factors for Preterm Birth

## Risk Factors – Slide 2 of 2

<table>
<thead>
<tr>
<th>Risk Factor</th>
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<tr>
<td>Cigarette Smoking</td>
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<tr>
<td>Substance Abuse</td>
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<tr>
<td>Absent/Late Prenatal Care</td>
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<tr>
<td>Short Interpregnancy Intervals</td>
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<tr>
<td>Anemia</td>
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<tr>
<td>Poor nutrition, low prepregnancy weight</td>
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<tr>
<td>Bacteriuria/urinary tract infection</td>
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<tr>
<td>Genital/systemic infection</td>
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<td>Strenuous work</td>
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<td>High personal stress</td>
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ACOG Progesterone

• Progesterone should be offered to women with a singleton pregnancy and history of spontaneous PTB
• Progesterone can be considered for women with cervix <15 mm
• Routine cervical length not recommended
PREGNANT Trial

- International multicenter randomized placebo controlled, double blinded study
- 32,091 women screened with vaginal US, 733 (2.3%) cervix 10-20 mm
- 465 asymptomatic women with short cervix 10-20 mm enrolled 19-23 6/7 weeks
- Vaginal progesterone bioadhesive gel 90 mg (n=235) vs placebo (n=223) daily until 36 6/7 weeks
- Reduced PTB < 33 weeks by 45%

Hassan Ultrasound  Obstet Gynecol 2011
PRETERM BIRTH AND INFECTION

- Urinary tract infection is associated with an increased risk of preterm birth
- All pregnant women should be screened for asymptomatic bacteriuria and treated
- Women with history of frequent UTI should be placed on suppression - nitrofurantoin 100 mg HS
- Repeat urine culture each trimester
- Systemic infection also increases PTB
Preterm Birth and Cigarette Smoking

Women who smoke or are exposed to second hand smoke are at greater risk for:

- Spontaneous loss
- Preterm birth < 32 wks
- Low birth weight
- Premature rupture of membranes
- Placenta previa
- Abruptio placenta
- Stillbirth
- Sudden Infant Death Syndrome
Preterm Birth and Cigarette Smoking

- Cigarette smoking and drug use are often the only potentially modifiable risk factors for PTB
- 1.3 – 2.5 x risk of PTB especially < 32 wks
- Smoking cessation in the first trimester lowers rate of PTB to non smokers
- Pregnancy offers an opportunity for medical intervention
- Concerns over danger to the fetus serve as a motivator
Cigarette Smoking and Preterm Birth

• Provide pregnancy tailored counseling
• Brief interventions:
  Information about smoking related risks
  Frequent f/u to assess progress
  Pregnancy specific or other manual
  Sessions with a health educator
  Video on risks and cessation
Cigarette Smoking and Preterm Birth

Cognitive behavior therapy

- Maternal feedback on fetal health status
- Measurement of smoking by-products
- Rewards/incentives
- Pharmacotherapy
- Hypnosis
- Significantly fewer PTB (RR 0.86 95% CI 0.74-0.98)
- Higher birth weight

Lumley Cochrane Database 2009
Management Pre-pregnancy

- Identify risk factors for PTB
- Counsel pt. and recommend modifications
- Optimize medical conditions
- Smoking/drug cessation
- Nutritional counseling/exercise
- Stress reduction
- Delay pregnancy
- Seek early prenatal care
Management First Trimester

- Screen for risk of PTB
- Address modifiable factors
- Smoking/drug cessation
- Screen for infection and treat
- Optimize medical therapy
- Nutritional counseling
- Stress reduction
- Discuss progesterone supplementation if eligible
Management Second Trimester

- Screen for risk of PTB
- Address modifiable factors
- Smoking/drug cessation
- Screen for infection and treat
- Optimize medical therapy
- Nutritional counseling
- Stress reduction
- Consider cervical length
- Start progesterone at 16 – 20 wks
Management Third Trimester

• Screen for risk of PTB
• Address modifiable factors
• Smoking/drug cessation
• Screen for infection and treat
• Optimize medical therapy
• Nutritional counseling
• Stress reduction
• Continue progesterone till 37 weeks
• Delay elective delivery till 39 weeks
Management Third Trimester

- If evidence of preterm labor tocolytic therapy
- Magnesium sulfate offers neuroprotection
- Avoid betamametic tocolytics
- Nifedipine is also an option
- Betamethasone therapy
- Bed rest not proven effective but we all do it!
Management Postpartum

- Counsel re risk of PTB next pregnancy
- Provide adequate contraception
- Encourage breastfeeding
- Encourage weight loss, good nutrition
- Encourage continued smoking/drug cessation
- Support stress reduction
- Encourage preconception care and early prenatal care next pregnancy
The Result - A Healthy Term Baby!