Prediction of stillbirth

King’s College Hospital and Medway Maritime Hospital, UK
Stillbirths in Europe 2014

Stilbirths per 1,000 births

France, Latvia, Romania, England, Ireland, Scotland, Malta, Northern Ireland, Hungary, Lithuania, Slovenia, Slovakia, Poland, Netherlands, Luxembourg, Sweden, Estonia, Spain, Austria, Portugal, Italy, Norway, Germany, Denmark, Cyprus, Switzerland, Finland

4.7
Preventing stillbirths in UK

Our ambition is to reduce the rate of stillbirths and infant deaths by 50% by 2030. Jeremy Hunt 2015

- Reducing smoking in pregnancy
- Raising awareness of reduced movements
- Risk assessment for growth restriction
- Effective monitoring in labour

Saving Babies’ Lives
A care bundle for reducing stillbirths

Matt Hancock 2018
The Fetal Medicine Foundation

Preventing stillbirths in UK

Saving Babies’ Lives
A care bundle for reducing stillbirths

- Reducing smoking in pregnancy
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- Risk assessment for growth restriction
- Effective monitoring in labour

Effect of smoke-free legislation on perinatal and child health: systematic review & meta-analysis.
Been et al., Lancet 2014
Saving Babies’ Lives
A care bundle for reducing stillbirths

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Outcome

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Intervention (n=227,816)</th>
<th>Control (n=157,654)</th>
<th>Effect/10,000 pregnancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stillbirth &gt;28 w</td>
<td>0.25%</td>
<td>0.26%</td>
<td>P=0.89</td>
</tr>
<tr>
<td>Stillbirth &gt;37 w</td>
<td>0.11%</td>
<td>0.12%</td>
<td>p=0.46</td>
</tr>
<tr>
<td>Cesarean section</td>
<td>28.3%</td>
<td>25.5%</td>
<td>162 ↑ p&lt;0.0001</td>
</tr>
<tr>
<td>Induction of labor &gt; 39 w</td>
<td>39.8%</td>
<td>33.6%</td>
<td>165 ↑ p&lt;0.0001</td>
</tr>
<tr>
<td>NICU &gt; 48 hrs</td>
<td>6.7%</td>
<td>6.2%</td>
<td>68 ↑ p&lt;0.0001</td>
</tr>
</tbody>
</table>

Awareness of fetal movements and care package to reduce fetal mortality (AFFIRM): a stepped wedge, cluster-randomised trial. Norman et al., Lancet 2018

Preventing stillbirths in UK
The Fetal Medicine Foundation

Preventing stillbirths in UK

Saving Babies’ Lives
A care bundle for reducing stillbirths

• Reducing smoking in pregnancy
• Raising awareness of reduced movements
• Risk assessment for growth restriction
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Lindhart et al., The implications of introducing the symphyseal-fundal height-measurement. A prospective randomized controlled trial. BJOG 1990; 97: 675-680.

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Preventing stillbirths in UK

Ultrasound scans every 2 w from 26 w until delivery: EFW and UA Doppler

RISK FACTORS
- Age >40 years
- Smoking
- Drug misuse
- Previous SGA (<10th)
- Previous stillbirth
- Chronic hypertension
- Diabetes mellitus
- Renal impairment
- Antiphospholipid syndrome
- Large fibroids
- BMI >35 kg/m²
- PAPP-A <0.415 MoM
- Fetal echogenic bowel
- Preeclampsia or PIH
- Unexplained hemorrhage

NO RISK FACTORS
- SFH <10th percentile
- SFH showing static growth

Saving Babies’ Lives
A care bundle for reducing stillbirths

- Reducing smoking in pregnancy
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- Effective monitoring in labour
Preventing stillbirths: an alternative strategy
Why do babies die?

Genetic defects
- Trisomy 13/18/21
- Turner / Triploidy

Congenital anomalies
- Brain / heart
- Kidneys / GIT

Extreme preterm
- Spontaneous
- Iatrogenic

Fetal hypoxia
- Acute hypoxia
- Chronic hypoxia

Preventing stillbirths: An alternative strategy
**Screening policy for prevention of prematurity:**
- **Low risk:** 20-22 weeks = Routine cervical length
- **High-risk:** Preterm Birth Clinic (14-22 weeks)

**Study population (n=17,438)**
MMH Jan 2014 to Dec 2017

**Emergency cerclage n=44 (0.3%)**
Rescue n = 26 (59%)
US indicated 18 (41%)

**Table:**

<table>
<thead>
<tr>
<th>Complications</th>
<th>Normal population</th>
<th>Cerclage group</th>
<th>Relative risk (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscarriage</td>
<td>1.3%</td>
<td>2.3%</td>
<td>1.8 (0.3, 9.4)</td>
</tr>
<tr>
<td>Stillbirth</td>
<td>0.3%</td>
<td>0%</td>
<td>0.1 (0.0, 30.3)</td>
</tr>
<tr>
<td>PTB &lt; 28 w</td>
<td>0.4%</td>
<td>2.3%</td>
<td>6.1 (1.1, 32.4)</td>
</tr>
<tr>
<td>PTB &lt; 34 w</td>
<td>1.8%</td>
<td>25.6%</td>
<td>14.2 (8.2, 22.6)</td>
</tr>
</tbody>
</table>
Preventing stillbirths
Role of rescue cerclage

RCTs / cohort studies: Expectant vs Cerclage

10 studies (n=757)

- Expectant Mx (n=272)
- Rescue cerclage (n=485)

<table>
<thead>
<tr>
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<th>Expectant</th>
<th>Cerclage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscarriage</td>
<td>33%</td>
<td>23%</td>
</tr>
<tr>
<td>PTB &lt; 28 w</td>
<td>37%</td>
<td>8%</td>
</tr>
<tr>
<td>PTB &lt; 34 w</td>
<td>82%</td>
<td>50%</td>
</tr>
<tr>
<td>Neonatal survival</td>
<td>43%</td>
<td>71%</td>
</tr>
<tr>
<td>GA at birth</td>
<td>25 w</td>
<td>31 w</td>
</tr>
<tr>
<td>Birth weight</td>
<td>829 g</td>
<td>1715 g</td>
</tr>
</tbody>
</table>

How do fetuses die of hypoxia?

**Acute hypoxia**
- e.g. Vasa praevia

**Chronic hypoxia**
- Impaired placentation
Preventing stillbirths
Screening for vasa previa

Vasa previa

Near internal os of Cx
Running free in membranes
Unsupported by placenta

Umbilical vessels

Amniotic cavity
Cervix
Umbilical vessels
Preventing stillbirths
Screening for vasa previa

VASA PRAEVIA

Type 1 vasa praevia
Velamentous cord insertion

Type 2 vasa praevia
Succenturiate lobe of placenta
Screening policy for vasa previa:
- 11-13 w: Look for cord insertion
- 22-22 w: Cervix length & Doppler

Study population (n=28,804) MMH May 2011 to Dec 2016
Vasa previa n=13 (1 in 2,000)

Umbilical vessels

Risk factors for vasa previa
- IVF conception
- Placenta previa
- Succenturiate lobe
- Velamentous cord
- Multiple pregnancy

Pregnancy outcome
- Stillbirth: 0%
- Elective CS: 69%
- Emergency CS: 31%
- Preterm <34 w: 46%
- Median GA at birth: 34.2 w
- Median BW: 2150 g

Number needed to screen
30 pregnancies to detect 1 case
Preventing stillbirths
Screening for impaired placentation

Study population:
- KCH, MMH 2006 - 2016
- Singleton pregnancy
- Dating by CRL at 11-13w
- Normal neonate

Total  n = 116,758
Stillbirth n = 484 (0.4%)

Stillbirth:
- < 32 w: 41%
- 32-36 w: 19%
- ≥ 37 w: 40%

Stillbirth:
- SGA +/- PE
- < 32 w: 80%
- 32-36 w: 51%
- ≥ 37 w: 27%

Gestational age (w)
Birth weight (g)

FMF BW chart
The Fetal Medicine Foundation

Preventing stillbirths
Stratification of risk for SGA

Assessment at 20 w (EFW, MAP, UtA-PI, PLGF)

High risk (>1 in 50)
10% of total

Moderate risk (>1 in 150)
25% of total

Low risk (1-151 - 1 in 500)
35% of total

Very low risk (<1 in 500)
30% of total

SGA<32w
80% <3rd
75% <10th

Follow-up 26-28 w

SGA<36w
90% <3rd
85% <10th

Assessment at 32 w (EFW, MAP, UtA-PI, CRP)

High risk (>1 in 100)
10% of total

Low risk <1 in 100)
90% of total

88% <3rd
76% <10th

Follow-up 34 w

SGA>36w
6% <3rd
10% <10th

Assessment at 36 w

No follow-up

SGA>36w
6% <3rd
10% <10th
Prediction of fetal distress leading to cesarean section
Screening for SGA fetuses
Selection of EFW cut-off

Preventing stillbirths
Assessment at 36 weeks

Index of Multiple Deprivation
Least deprived  Medium  Most deprived

England
Medway

Stilbirths / 1,000 live births

32w scan


Less deprivation
Greater deprivation

32w scan
## Preventing stillbirths: an alternative strategy

| 12 w: | diagnosis of fetal abnormalities  
prediction and prevention of PE  
vasa previa  
risk for SGA |
|-------|------------------------------------------------|
| 20 w: | diagnosis of fetal abnormalities  
assessment of risk for PE / SGA  
assessment of risk for preterm birth |
| 36 w: | assessment of fetal growth and oxygenation |

Thank you