• **Pregnancy** increases the risk of venous thromboembolism (VTE) 4- to 5-fold over that in the nonpregnant state. The 2 manifestations of VTE are deep venous thrombosis (DVT) and pulmonary embolus (PE).
Maternal Mortality in the UK

2010-12: 10 per 100,000 maternities

2011-13: 9 per 100,000 maternities

2012-14: 8.5 per 100,000 maternities
BACKGROUND

- Maternal deaths have decreased, but there are still lessons we can learn
- Two thirds of women die from medical and mental health problems and one third from direct complications of pregnancy
- Three quarters of the women who died had medical or mental health problems before they become pregnant
CAUSES OF MATERNAL DEATH

Key messages from the report

Maternal deaths have decreased
from 11 to 10 per 100,000 women giving birth

Causes of mothers’ deaths

Women with pre-existing medical and mental health problems need:
- Pre-pregnancy advice
- Joint specialist and maternity care

Think Sepsis

Almost a quarter of women who died had Sepsis (severe infection).
Women with sepsis need:
- Early diagnosis
- Rapid antibiotics
- Review by senior doctors and midwives

Prompt treatment and action can make the difference between life and death

Prevent Flu

1 in 11 of the women died from Flu

More than half of these women’s deaths could have been prevented by a flu jab.

Flu vaccination will save mothers’ and babies’ lives
# Causes of Death in women < 24 weeks

**UK & Ireland 2009-2014**

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Number of women</th>
<th>Percentage of women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amniotic Fluid Embolism</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Anaesthetic deaths</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Pre-eclampsia and eclampsia</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Sepsis</td>
<td>19</td>
<td>10.0</td>
</tr>
<tr>
<td>Thrombosis and thromboembolism</td>
<td>22</td>
<td>11.5</td>
</tr>
<tr>
<td>Cardiac disease</td>
<td>24</td>
<td>12.6</td>
</tr>
<tr>
<td>Mental health problems</td>
<td>24</td>
<td>12.6</td>
</tr>
<tr>
<td>Early pregnancy-related causes</td>
<td>12</td>
<td>6.3</td>
</tr>
<tr>
<td>Ectopic pregnancy</td>
<td>9</td>
<td>4.8</td>
</tr>
<tr>
<td>Legal termination of pregnancy</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Self-attempted abortion</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>2</td>
<td>1.1</td>
</tr>
<tr>
<td>Neurology</td>
<td>22</td>
<td>11.5</td>
</tr>
<tr>
<td>Indirect deaths</td>
<td>29</td>
<td>15.1</td>
</tr>
<tr>
<td>Unascertained</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Coincidental deaths</td>
<td>33</td>
<td>17.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>191</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Conditions resulting in death

- **12 Deaths discussed here**
  - 9 women died as a result of ectopic pregnancies
  - 2 women died following legal termination of pregnancy
  - 1 woman died following a self-attempted abortion

- **7 Early deaths in other chapters**
  - 1 HELLP secondary to a molar pregnancy
  - 1 Cardiac death post termination
  - 2 Pulmonary Embolism after second trimester miscarriage
  - 3 Sepsis associated with miscarriage
Direct Maternal Deaths 2012-14

- Thrombosis and thromboembolism the leading direct cause of death
  - 0.85 per 100,000 maternities
- Good care makes a difference

Less than 1 woman in every million who gives birth now dies from pre-eclampsia
Maternal Morbidity and Mortality Annual Report Topic Cycle

• **2014**: Surveillance of maternal deaths in the UK 2009-12. Confidential enquiries on sepsis morbidity and deaths, haemorrhage, AFE, anaesthetic, neurological, respiratory, endocrine and other indirect deaths in the UK and Ireland.

• **2015**: UK surveillance 2011-13. Lessons for care from confidential enquiries of maternal deaths due to psychiatric, thrombosis, malignancy, late and coincidental deaths.

• **2016 (This report)**: UK Surveillance 2012-14. Confidential enquiries on pre-eclampsia and eclampsia, cardiac morbidity and mortality, early pregnancy mortality, lessons for critical care.

• **2017**: UK Surveillance 2013-15. Confidential enquiries on sepsis, haemorrhage, AFE, anaesthetic, neurological, respiratory, endocrine and other indirect deaths, morbidity from severe uncontrolled epilepsy and psychiatric morbidity.

• **2018**: UK surveillance 2014-16. Lessons for care from confidential enquiries of maternal deaths due to psychiatric, thrombosis, malignancy, late and coincidental deaths, morbidity from severe haemorrhage.

*Call for topics for 2019 morbidity enquiry open until 31/12/2016*
CO-EXISTING MEDICAL COMPLICATIONS

• Nearly three quarters of women who died had a co-existing medical complication
• There has been no significant change in the rate of indirect maternal death of the last ten years, when the rate of deaths from direct causes has halved
• The rate of indirect maternal deaths (6.87 per 100,000 maternities) is now twice that of direct deaths (3.25 per 100,000 maternities)

Actions are urgently needed to address deaths from indirect causes
### Weight Status in Pregnancy, 2010/11 - 2013/14

#### Percentage (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Underweight</th>
<th>Healthy Weight</th>
<th>Overweight (25.0-29.99)</th>
<th>Obese I (30-34.99)</th>
<th>Obese II (35.0-39.99)</th>
<th>Obese III (&gt;=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/11</td>
<td>2.2</td>
<td>49.9</td>
<td>29.7</td>
<td>11.5</td>
<td>4.6</td>
<td>2.1</td>
</tr>
<tr>
<td>2011/12</td>
<td>2.1</td>
<td>50.1</td>
<td>29.4</td>
<td>11.8</td>
<td>4.5</td>
<td>2.1</td>
</tr>
<tr>
<td>2012/13</td>
<td>2.1</td>
<td>49.2</td>
<td>29.4</td>
<td>12.4</td>
<td>4.6</td>
<td>2.3</td>
</tr>
<tr>
<td>2013/14</td>
<td>2.0</td>
<td>48.9</td>
<td>29.5</td>
<td>12.4</td>
<td>5.0</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Source: Results published in Children's health in Northern Ireland: Public Health Agency 2015.
LEARNING LESSONS TO IMPROVE CARE

• We owe it to those left behind to learn from the death of their mother, partner, daughter or friend and to make changes for the future to prevent other women from dying.
Northern Ireland
Regional Maternity
Hand Held Record

Operational Guidance

Dr Briege M Lagan with
Ms Brenda Devine and
Ms Verena Wallace
Antenatal VTE Risk Assessment – Booking
(Risk assessment to be completed at booking)

Antenatal assessment and management (to be assessed at booking and repeated if admitted)

HIGH RISK
Requires antenatal prophylaxis with LMWH
Refer to trust-nominated thrombosis in pregnancy expert/teams

INTERMEDIATE RISK
Consider antenatal prophylaxis with LMWH

LOW RISK
Mobilisation and avoidance of dehydration

Pre-existing risk factors:

- Obesity (BMI > 30 kg/m²)
- Age > 35
- Preeclampsia
- Preeclampsia
- Immobility, e.g., paraplegia, PGP

Four or more risk factors:
- Prophylaxis from first trimester

Three risk factors:
- Prophylaxis from 28 weeks

Less than three risk factors

Risk assessment for venous thromboembolism (VTE)

Pre-existing risk factors

- Previous VTE (one or a single event related to major surgery)
- Neoplasm VTE related to major surgery
- Known high-risk thrombophilia
- Medical conditions e.g., cancer, heart failure, active SLE, IBD or inflammatory polyarthritis, nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current VTE
- Any surgical procedure or appendixectomy
- OHSS (first trimester) risk

Obstetric risk factors

- Pre-eclampsia in current pregnancy
- AAT/AFP (antenatally only)
- Multiple pregnancy
- Previous history of unprovoked VTE
- Trimester of gestation
- Haemorrhagic diatheses
- Risk factor or relatives or previous delivery
- Preterm labour (> 24 weeks)
- PPH (> 1 litre or transfusion)
- Patient birth: > 32 weeks in current pregnancy
- NIDM in current pregnancy

Risk factors for VTE

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous VTE (one or a single event related to major surgery)</td>
<td>3</td>
</tr>
<tr>
<td>Neoplasm VTE related to major surgery</td>
<td>3</td>
</tr>
<tr>
<td>Known high-risk thrombophilia</td>
<td>3</td>
</tr>
<tr>
<td>Medical conditions e.g., cancer, heart failure, active SLE, IBD or inflammatory polyarthritis, nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current VTE</td>
<td>3</td>
</tr>
<tr>
<td>Any surgical procedure or appendixectomy</td>
<td>3</td>
</tr>
<tr>
<td>OHSS (first trimester) risk</td>
<td>3</td>
</tr>
<tr>
<td>Pre-eclampsia in current pregnancy</td>
<td>3</td>
</tr>
<tr>
<td>AAT/AFP (antenatally only)</td>
<td>3</td>
</tr>
<tr>
<td>Multiple pregnancy</td>
<td>3</td>
</tr>
<tr>
<td>Previous history of unprovoked VTE</td>
<td>3</td>
</tr>
<tr>
<td>Trimester of gestation</td>
<td>3</td>
</tr>
<tr>
<td>Haemorrhagic diatheses</td>
<td>3</td>
</tr>
<tr>
<td>Risk factor or relatives or previous delivery</td>
<td>3</td>
</tr>
<tr>
<td>Preterm labour (&gt; 24 weeks)</td>
<td>3</td>
</tr>
<tr>
<td>PPH (&gt; 1 litre or transfusion)</td>
<td>3</td>
</tr>
<tr>
<td>Patient birth: &gt; 32 weeks in current pregnancy</td>
<td>3</td>
</tr>
<tr>
<td>NIDM in current pregnancy</td>
<td>3</td>
</tr>
</tbody>
</table>

Total score:

- If total score 4 or more, consider thrombophrophylaxis from the first trimester.
- If total score 3, consider thrombophrophylaxis from 28 weeks.
- If total score 2 potentially, consider thrombophrophylaxis for at least 30 days.
- If admitted to hospital antenatally consider thrombophrophylaxis.
- If prolonged admission (> 3 days) or readmission to hospital within the pregnancy consider thrombophrophylaxis.

For patients with an identified bleeding risk, the balance of risks of bleeding and thrombosis should be discussed in consultation with a haematologist with expertise in thrombosis and bleeding in pregnancy.

Pre-prophylaxis doses of LMWH

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Prophylaxis dose of LMWH (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>20 mg OD</td>
</tr>
<tr>
<td>50 – 59</td>
<td>40 mg OD</td>
</tr>
<tr>
<td>60 – 120</td>
<td>60 mg OD</td>
</tr>
<tr>
<td>121 – 170</td>
<td>80 mg OD or (40 mg OD)</td>
</tr>
<tr>
<td>&gt; 170</td>
<td>0.6 mg/kg/day</td>
</tr>
</tbody>
</table>

Signature and Profession

Date

Time

Abbreviations: AAT = antithrombin activity, AF = anti-factor, OHSS = ovarian hyperstimulation syndrome, VTE = venous thromboembolism.
Antenatal VTE Risk Assessment—Hospitalised
(Risk assessment to be completed on EVERY admission)

**Antenatal assessment and management (to be assessed at booking and repeated if admitted)**

- Any previous VTE except a single event related to major surgery
- Hospital admission
- Single previous VTE related to major surgery
- High-risk thrombophilia = no VTE
- Medical comorbidities: e.g. cancer, heart failure, active SLE, BD or inflammatory polyarthritis, nephrotic syndrome, type 1 DM with nephropathy, sickle cell disease, current IVDU
- Any surgical procedure e.g. appendectomy
- OHSS (first trimester only)
- Obesity (BMI > 30 kg/m²)
- Age > 35
- Partly/5
- Smoker
- Cross-remember
- Current pre-eclampsia
- Immobility, e.g. paraplegia, PGP
- Family history of unprovoked or estrogen-provoked VTE in first-degree relative
- Low-risk thrombophilia
- Multiple pregnancy
- IV/IVAKT
- Transient risk factors: Dehydration/hypersensitivity, current systemic infection, long-distance travel

**HIGH RISK**
Requires antenatal prophylaxis with LMWH
Refer to trust-nominated thrombosis in pregnancy expert/team

**INTERMEDIATE RISK**
Consider antenatal prophylaxis with LMWH

**LOWER RISK**
Mobilisation and avoidance of dehydration

**Risk assessment for venous thromboembolism (VTE)**

- Four or more risk factors: prophylaxis from first trimester
- Three risk factors: prophylaxis from 28 weeks
- Fewer than three risk factors

**Risk factors for VTE**

- Pre-existing risk factors
  - Risk
  - Score
- Previous VTE (except a single event related to major surgery)
- LVPE provided by major surgery
- Known high-risk thrombophilia
- Medical comorbidities: e.g. cancer, heart failure, active systemic lupus
- Rheumatoid arthritis, inflammatory polyarthritis or inflammatory bowel disease
- Type 1 DM with nephropathy
- Sickle cell disease
- Current intravenous drug user
- Family history of unprovoked or estrogen-related VTE in first-degree relative
- Known low-risk thrombophilia (no VTE)
- Age (1-35 years)
- Obesity
- Parity ≥ 3
- Smoker
- Gestational age
- Gestational age
- Obstructive risk factors
  - Risk
  - Score
- Pre-eclampsia in current pregnancy
- Elective caesarean section
- Mid-cavity or rotational operative delivery
- PPH (≥ 2 litres of blood)
- Prolonged delivery (> 24 hours)
- Preeclampsia at > 32 weeks in current pregnancy
- Stillbirth in current pregnancy
- Transient risk factors
  - Risk
  - Score
- Any surgical procedure in pregnancy or puerperium except immediate repair of the pelvis, e.g. appendectomy, postpartum sterilisation
- Hyperemesis
- OHSS (first trimester only)
- Current systemic infection
- Immobility, dehydration

**Total Risk Factor Score**

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>AT and FN prophylactic dose of oxandrolone</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50 kg</td>
<td>20 mg OD</td>
</tr>
<tr>
<td>50 – 80 kg</td>
<td>40 mg OD</td>
</tr>
<tr>
<td>81 – 120 kg</td>
<td>60 mg OD</td>
</tr>
<tr>
<td>121 – 170 kg</td>
<td>80 mg OD (or 40 mg SQ)</td>
</tr>
<tr>
<td>&gt;170 kg</td>
<td>0.5 mg/kg/day</td>
</tr>
</tbody>
</table>

**Comment**

**Signature and Profession**

**Date**

**Time**

**Phenylpropanolamine (PPHA)**

- If the known low-risk thrombophilia is in a woman with a family history of VTE in a first-degree relative postpartum thromboprophylaxis should be continued for 6 weeks.
- BMI x 10 = A, BMI x 40 = B

BHST 11.18. Adapted from RSDD, 2013 STG 374
THANK YOU

QUESTIONS?