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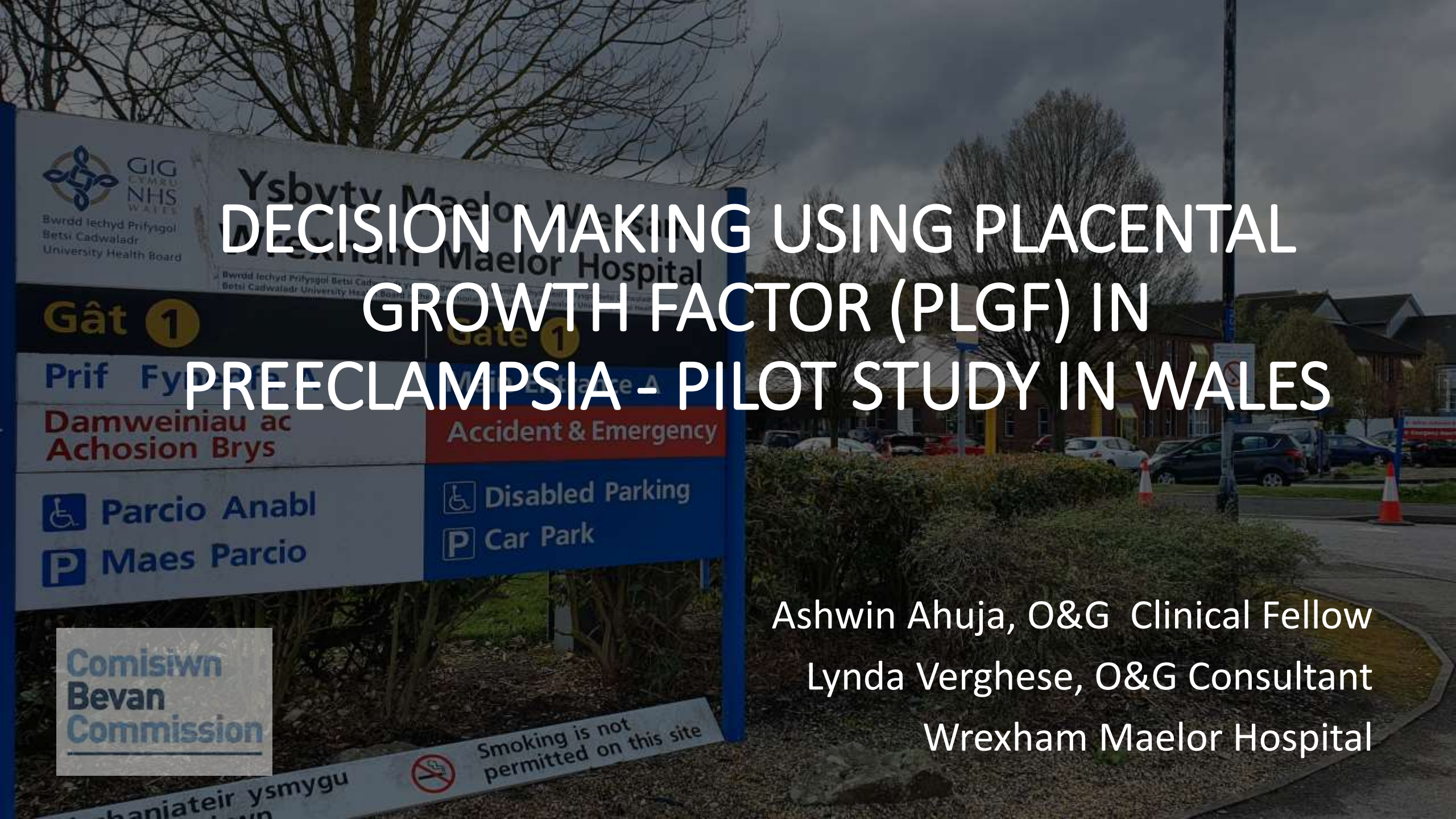

DECISION MAKING USING PLACENTAL GROWTH FACTOR (PLGF) IN PREECLAMPSIA - PILOT STUDY IN WALES

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- Pilot project
- Test the clinical utility of PLGF point of care blood test in the management of preeclampsia.
- NICE validated tool (20 and 34^{+6} weeks)
- This project aspires to positively contribute to the following initiatives:
  1. National Maternity Reviews “Better Births”: Improving Outcome of Maternity Services in England (Feb 2016) ✓
  2. The Five-Year Forward View for Mental Health: Perinatal Mental Health (Feb 2016). ✓
  3. Maternal and neonatal health safety collaborative (Feb 2016) ✓
  4. Maternity Steering Network All Wales ✓

What is PLGF

What is PLGF – Placental Growth Factor

6 to 18 weeks :
Remodelling of the uterine spiral arteries

Responsible angiogenic growth factors

a. VEGF
b. Placental growth factor

PLGF is a chemical secreted by the placenta (afterbirth). It is the level of this chemical which helps risk stratify women to appropriately direct surveillance and care provided and optimize the pregnancy outcome.

Sensitivity of commonly used tests for diagnosis of PET

≥20w <35w GA	% Sens	% Spec	% PPV	% NPV	OR
PlGF <100 pg/mL	96.1	55.9	44.0	97.5	30.87
Dipstick ≥2+	66.7	81.0	52.6	88.4	8.50
Uric acid*	43.6	88.0	60.0	79.1	5.66
SBP ≥170 mmHg	26.7	86.3	60.0	79.1	2.22
DBP ≥110 mmHg	17.3	85.8	30.2	74.5	1.27
ALT ≥32 IU/L	11.3	88.7	28.6	7.14	1.00

PELICAN study

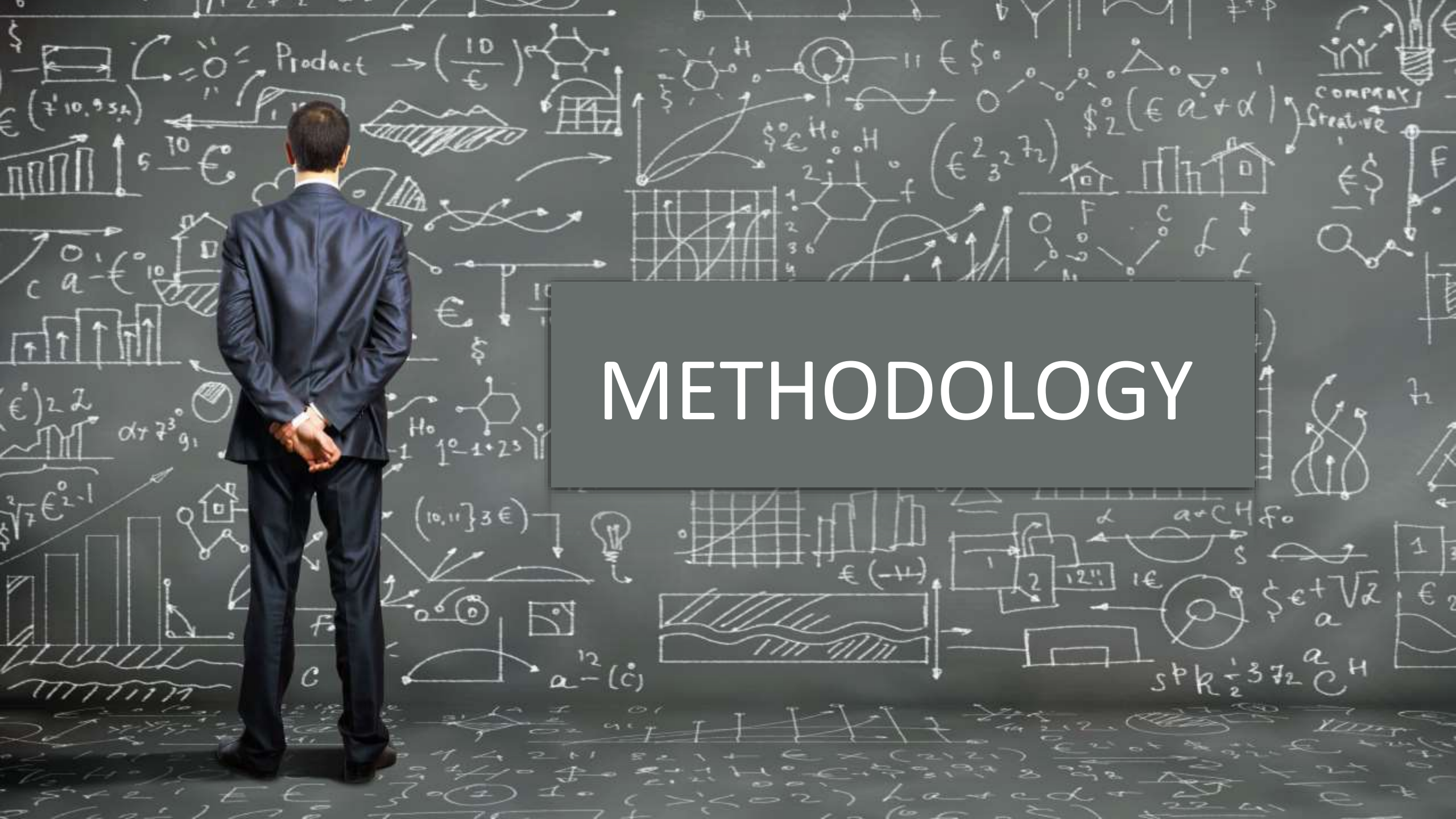
- A cut-off of 100 pg./mL was used to predict a diagnosis of pre-eclampsia delivering within 14 days
- Sensitivity 96.1% (73 of 76)
- Specificity 55.9% (118 of 211)
- NPV of 97.5% (118 out of 121)
- Women with PlGF ≥100 pg/mL did not have pre-eclampsia needing delivery in 14 days.

PLGF protocol

INDICATIONS

Presentation **between 20 – 34^{+6} weeks**

- Isolated new hypertension (>140/90 mmHg)
- Borderline proteinuria (30-50mg/mmol)
- Worsening chronic hypertension /proteinuria in preexisting renal disease/diabetes
- Adjunct to cases with preeclampsia to decide who is likely to need delivery within next two weeks.

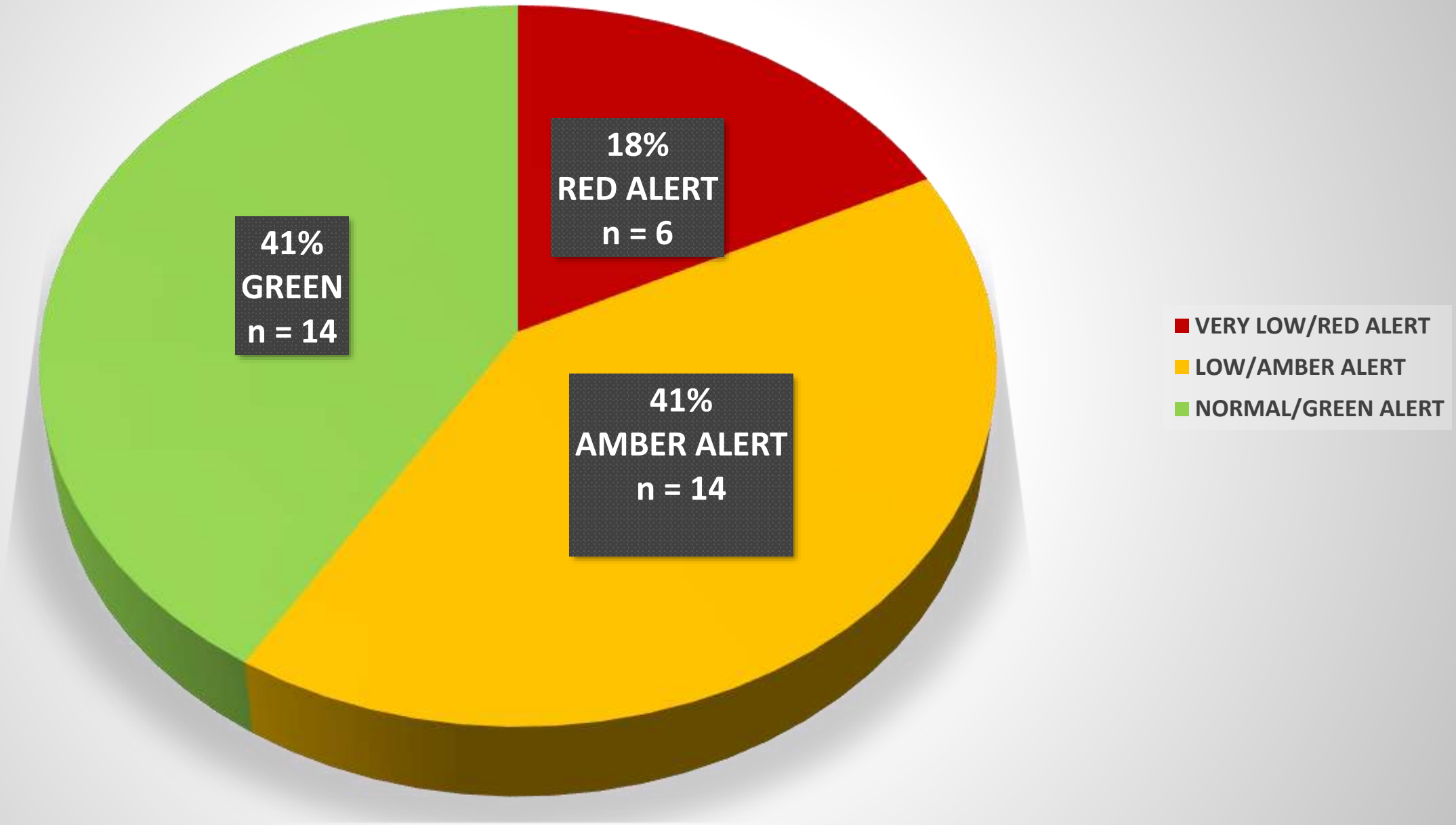

METHODOLOGY

- Retrospective and Prospective audit
- 36 cases identified
- Reviewed 34 cases

RISK STRATIFICATION

PlGF ≥100 NORMAL	PlGF 12-99 LOW	PlGF <12 VERY LOW

OUTCOMES OF THE PLGF TRIAGE TESTING



Sub-analysis of the VERY LOW PLGF Group

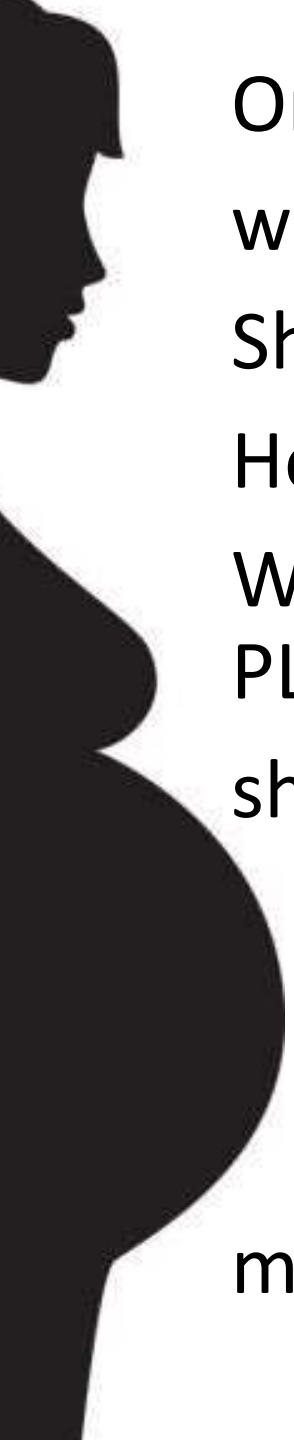
- 6 out of the 34 women had a very low PLGF (<12 pg/ml)
- The commonest indication to do the test was as an adjunct to pre-eclampsia or due to worsening chronic HTN.
- All 6 cases in the red group were admitted, developed severe preeclampsia (2 of which developed HELLP) within the same week, were stabilized, given prophylactic steroids in view of prematurity and were delivered .
- This test helped identify all the high risk patients correctly and helped optimize the maternal and fetal outcomes.

Gestation presented	Clinical course	Gestation delivered
G3P1 at 31 wks	GROWTH 3rd centile HELLP syndrome	IUT to Liverpool , EMCS at 31 wks.
Primi at 32 wks.	Growth normal Severe PET , MgSO4	Delivered at 32 weeks with baby weight of 1.9kg
G2P1 at 27wks, essential HTN,BM1=50	Growth 3rd centile, PET superimposed on chronic HTN	IUT at 31 wks. –North west and delivered
G4P3 at 33 wks	HELLP syndrome, severe PET	Delivered at 33 wks Bt wt 1.8 kg
G2P0 at 27+6 weeks	Partial Nephrectomy, Anxiety Depression	IUT to YGC, delivered by EMCS
G2P0 at 29+6 weeks	Factor V Leiden Heterozygous	IUT to YGC, delivered by EMCS

Management

- PLGF <12 (Red) – Highly suggestive of placental dysfunction needing early delivery
- PLGF 12- 99 (Amber) – Increased outpatient surveillance up to maximum of 37- 38 wks.
- PLGF ≥ 100 (Green) – Normal and reassuring, can carry on till term if possible.

And why this is important is because…..



One of our patients who was a **third time pregnant mom**,

was at **24 weeks and developed severe COVID 19**.

She had to be **cared for in the Intensive Care** after being **intubated**.

However, her **PLGF was in the green i.e. low-risk group.**

We allowed her to continue with the pregnancy – reassured by her PLGF status – and

she **recovered**, was **extubated** and **came out of the ICU**; had a **normal uncomplicated vaginal delivery at 39 weeks**.

Had it not been for the PLGF, she would have had to be delivered at 24 weeks by a Caesarean and the live with the morbidities of extreme preterm delivery.


DISCLAIMER
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****INTERPRETATION OF PLGF RESULT****
****LOW OR VERY LOW PLGF RESULT IS NOT AN INDICATION FOR DELIVERY IN ITSELF****

PLGF ALONG WITH THE COMPLETE CLINICAL PICTURE SHOULD BE USED TO DETERMINE THE ULTIMATE MANAGEMENT OF THE PRE-ECLAMPSIA

STOCKNSHARES / GETTY IMAGES

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Financial impact on BCUHB

- Every 24 hr bed day costs taxpayers £ 518
- 2700 deliveries at Wrexham Maelor Hospital – roughly 81 cases of PET/annum
- In 6 months – we had 36 cases – analysed 34
- In this project , 10/34 cases were admitted and 24 cases managed on outpatient surveillance.

- Bed day costs saved = 24x518x3 = £ 37,296 (saved in last 6 months)
- Cost of PLGF testing = 88X34 = £ 2,992

  Total Net Savings £ 34,304
- In addition, SCBU cost/day saved = £ 1,118/day to look after iatrogenic preterm in intensive care
- Medicolegal costs saved in terms of litigation for stillbirth /eclampsia /stroke
- Impact on midwifery and HCA staffing and turnover in labour ward ensuring smooth transition of patient from the induction bay to the labour ward.

Environmental Impact

- Interestingly, Oxford Sustainable Coalition has pointed out that each patient avoiding hospitalization by the use of this PlGF triage testing – the greenhouse gas emissions saved equating to 35 T on CO2 across the Oxford University Trust.

    ~ 3 million car miles Saved

    ~ 37 cu. mts less water was used therefore saved.

https://www.oxfordahsn.org/our-work/strategic-and-industry-partnerships/the-innovation-exchange/spread-and-adoption-of-supported-innovations/pre-eclampsia/case-study-widely-adopted-pre-eclampsia-test-has-additional-environmental-benefits/

Obstacles & Challenges

CHALLENGES	HOW WE OVERCAME IT


IMPACT
PLAN
EVALUATION
COST
RISK
RESOURCES
SCOPE
ANALYSIS
MONITOR
IDENTIFICATION
PROJECT
MANAGEMENT
ORGANIZATION
SALES
DATA
COMPLEX
ASSESSMENT
RETENTION
PERFORMANCE
IMPACT
OPPORTUNITY
ANALYSIS ASSESSMENT AUDIT BUSINESS COMPLIANCE
MANAGEMENT PLAN PROCESS PROJECT QUALITY
RETENTION PERFORMANCE SOLUTION IMPORTANT

PLGF Triage testing proved to be of **excellent diagnostic value** in the local cohort of patients with suspected pre-eclampsia.

Prevented maternal complications like eclampsia / stroke / DIC / death and **foetal complications**: stillbirths, prevented iatrogenic preterm deliveries

Provided reassurance for outpatient surveillance and **alleviated maternal anxiety** and allowed patients in this sub-group to safely go home – implications on her and her family's mental and physical health (especially in the pandemic), associated childcare costs and travel costs.

Total net Bed Cost savings from the outpatient management of the 68% of the cases identified in the study period saved the hospital about £ 34,304 in 6 months alone.

SCBU cost/day saved about £ 1,118/day to look after preterm babies in intensive care.

Saved medicolegal costs saved in terms of litigation for stillbirth/eclampsia/stroke.

Impact on **midwifery and HCA staffing** and turnover in labour ward ensuring smooth transition of patient from the induction bay to the labour ward.

Interestingly, each patient that avoids hospitalization due to the PLGF triage test reduces the greenhouse gas emissions equating to 35 T on CO_2 making the project's entire footprint to be near carbon neutral and in fact be greatly beneficial to the environment.

Our Vision for the future

- Roll out PlGF Triage Testing to the 2 sister sites at BCUHB with support from Quidel and Clinical Biochemistry
- Re-audit on all 3 sites when practically possible in the foreseeable future.
- We are working with Action on Pre-eclampsia Charity (APEC) to raise awareness on Pre-eclampsia and PLGF with particular focus in Wales.

- We were enrolled in the PARROT-2 trial and look forward to the outcome of this study to see if we should repeat PLGF testing

- Last but not the least,

'PlGF Triage Testing in the management of suspected pre-eclampsia' is our BEVAN EXEMPLAR PROJECT for pioneering its use in Wales.


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HERMLE
HERMLE Z 206 A
INNOVA
INNOVA

Thank you for a patient hearing

Comisiwn Bevan Commission

Our Attitude of Gratitude

Dept of Biochemistry , WXM

Dr Yee Ping Teoh, Consultant Clinical Pathologist and Clinical Lead For Biochemistry , WXM
Marge Everall POCT Manager
Ann Marie Parry, POCT Site Lead
Geoffrey Armstrong ,Clinical Biochemist
Gareth Davies , Clinical Biochemist

Quidel

Eoin Morgan -Sales Manager
Dawn Hannah - Clinical Trainer

BCUHB Health Board for business case approval

Dino Tedaldi ,Business and Performance Lead
Maria Atkin, General Manager and Business Lead
Nichola Bray , Financial Advisor
Fiona Giraud – Director of Women's Services

Last but not the least

All the Midwives, Registrars and Consultants at Wrexham Maelor for implementing it in clinical practice.