

Upscaling the outpatient hypertension pathway for women at high risk of developing hypertension in pregnancy



**Angie Willis Hazel Ward manager and Midwife
GWH**

Health Innovation West Clinical advisor

2023-2024 Chief Sustainability Clinical Fellow

**MSc Professional development, SCPHN Health
visiting PGCERT, Midwifery BSc**

@Theecomidwife on TT/IG/FB



Agenda

- Background to the project
- Net zero, what is the problem
- Pregnancy implications of climate change
- Hypertensive disease and screening in pregnancy
- Current evaluation of the service
- Upscaling the project

Trigger warning

This presentation will discuss Miscarriage, stillbirth and pre-term birth. For more support please access the following support services:

Tommy's: [Saving babies' lives - Charity for Babies | Tommy's \(tommys.org\)](https://www.tommys.org)

Bliss: [For babies born premature or sick | Bliss](https://www.bliss.org.uk/)

The Miscarriage association: [Miscarriage - The Miscarriage Association](https://www.miscarriageassociation.org.uk/)

SANDS: [Sands | Saving babies' lives. Supporting bereaved families.](https://www.sands.org.uk/)

The Worst Girl Gang ever: [The Worst Girl Gang Ever - Support for Miscarriage + Baby Loss](https://www.theworstgirlgangever.org/)



Mosquitoes carrying dengue fever could be common in England by the 2040s, govt experts warn

Health experts say Asian tiger mosquitoes carrying dengue fever could become established in England because of climate change. The disease could be passed on in London by 2060.

Monday 11 December 2023 07:15, UK

Climate change impacts on less developed countries – I don't understand how it will impact us?

Climate & Energy | Climate Change

England had 4,500 heat-related deaths during record-breaking 2022, official data show

Reuters

September 22, 2023 12:03 PM GMT+1 · Updated 3 months ago



[1/4] People cover themselves from the sun at Millennium Bridge during a heatwave, in London, Britain, July 18, 2022. REUTERS/Maja Smiakowska/File photo [Acquire Licensing Rights](#)



Salisbury Plain fires on MoD land send smoke across Wiltshire

12 July 2022



DORSET AND WILTSHIRE FIRE AND RESCUE

The smell from the fire has been drifting for miles north across Wiltshire

Residents in parts of Wiltshire have been advised to stay indoors and shut their windows due to smoke from the Salisbury Plain fires.

Storm Babet: The flood alerts issued for Swindon and Wiltshire

20th October 2023

EMERGENCY WEATHER

Air quality in Bath improves following introduction of clean air zone

WEST COUNTRY | BATH | CLEAN AIR ZONE | ENVIRONMENT | Thursday 24 August 2023 at 3:17pm



The clean air zone was introduced in 2021 by the council, but not everyone was in favour of the scheme.

The clean air zone was introduced in 2021 by the council, but not everyone was in favour of the scheme.

Air quality in Bath has improved since the introduction of the clean air zone in 2021, according to a new study.

Councillors have said the research's findings are 'heartening' but that there is still 'much more to do to drive down pollution' in the city.

Analysis published by Bath & North East Somerset Council reveals there has been a 26% drop in the annual mean nitrogen dioxide levels within the Clean Air Zone (CAZ) between 2019 and 2022. This represents an average reduction of 8.5 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

In urban areas outside of the zone, the study found there has been a slightly larger drop in annual mean NO_2 concentrations, with a fall of 27%.

It also found there are now nine fewer sites exceeding the legal limit of $40 \mu\text{g}/\text{m}^3$ falling from 10 sites in 2019 to one site in 2022.

The 2022 Annual CAZ Report also indicated an additional reduction of 6% in annual mean NO_2 concentrations in 2022 compared to the previous years 2021, and a reduction of 7% within the CAZ boundary.

BANES: 'Air pollution is a significant risk to people's health'

Councillor Sarah Warren, deputy Leader and cabinet member for Climate Emergency and Sustainable Travel, said: "It's heartening to see the clear indications in this report that the clean air zone is working to improve air quality across the area, not just within the zone.

"Air pollution is a significant risk to people's health, which is why the Government directed us to implement the CAZ."

But the study also highlighted that other factors, such as the partial closure of Cleveland Bridge between October 2021 to October 2022, and the impact of COVID-19, may have had a role in potentially improving air quality and reducing traffic.

NHS Carbon footprint




If healthcare was a country it would be the fifth largest emitter on the planet



NHS is the biggest public sector contributor of carbon emissions



1 in 20 car journeys on the road are because of the NHS




Why are pregnant women vulnerable to climate change?

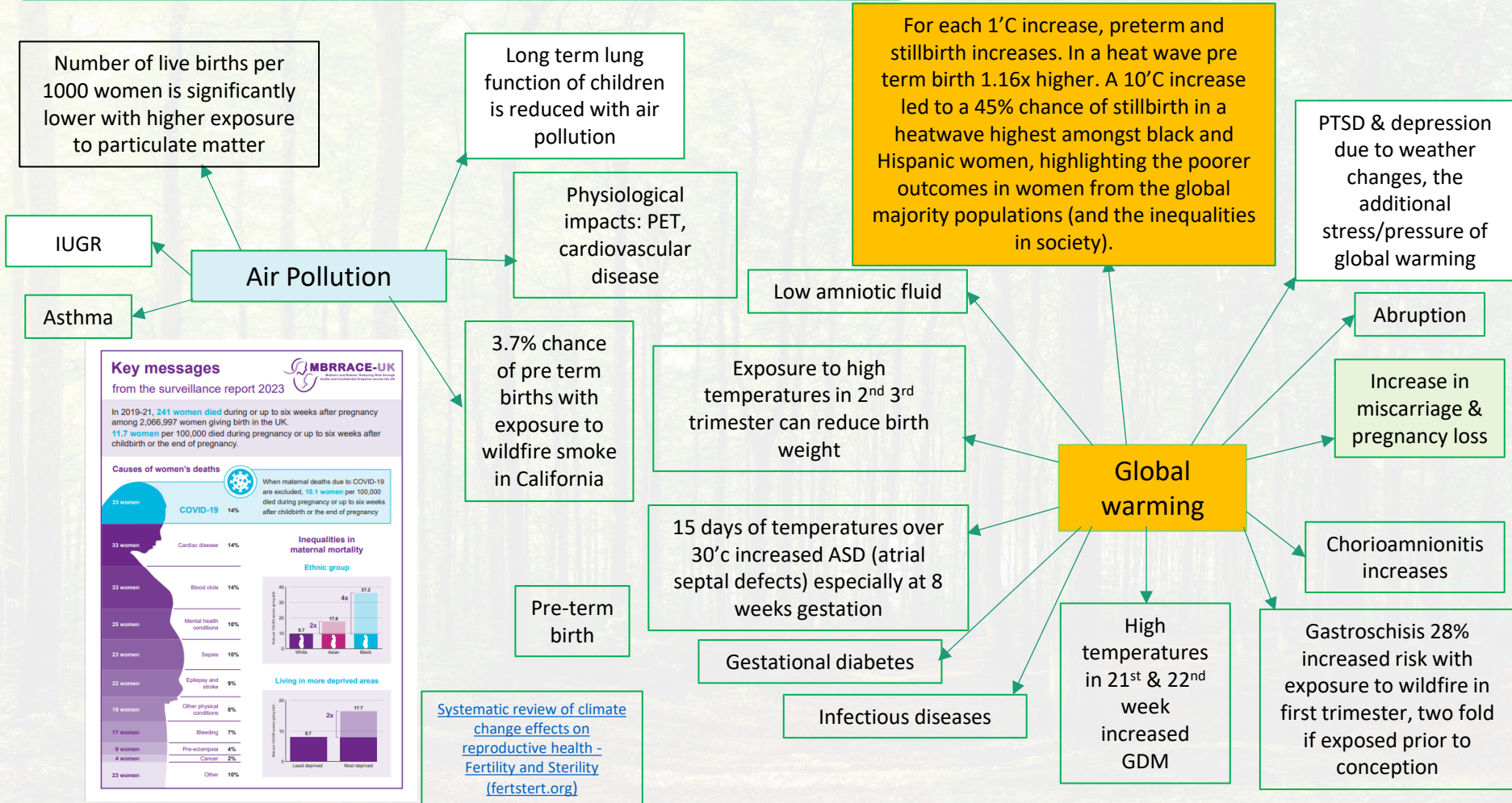
From cradle to grave every person has different abilities to adapt and manage the impacts of climate change. Biologically, genetically and environmentally.

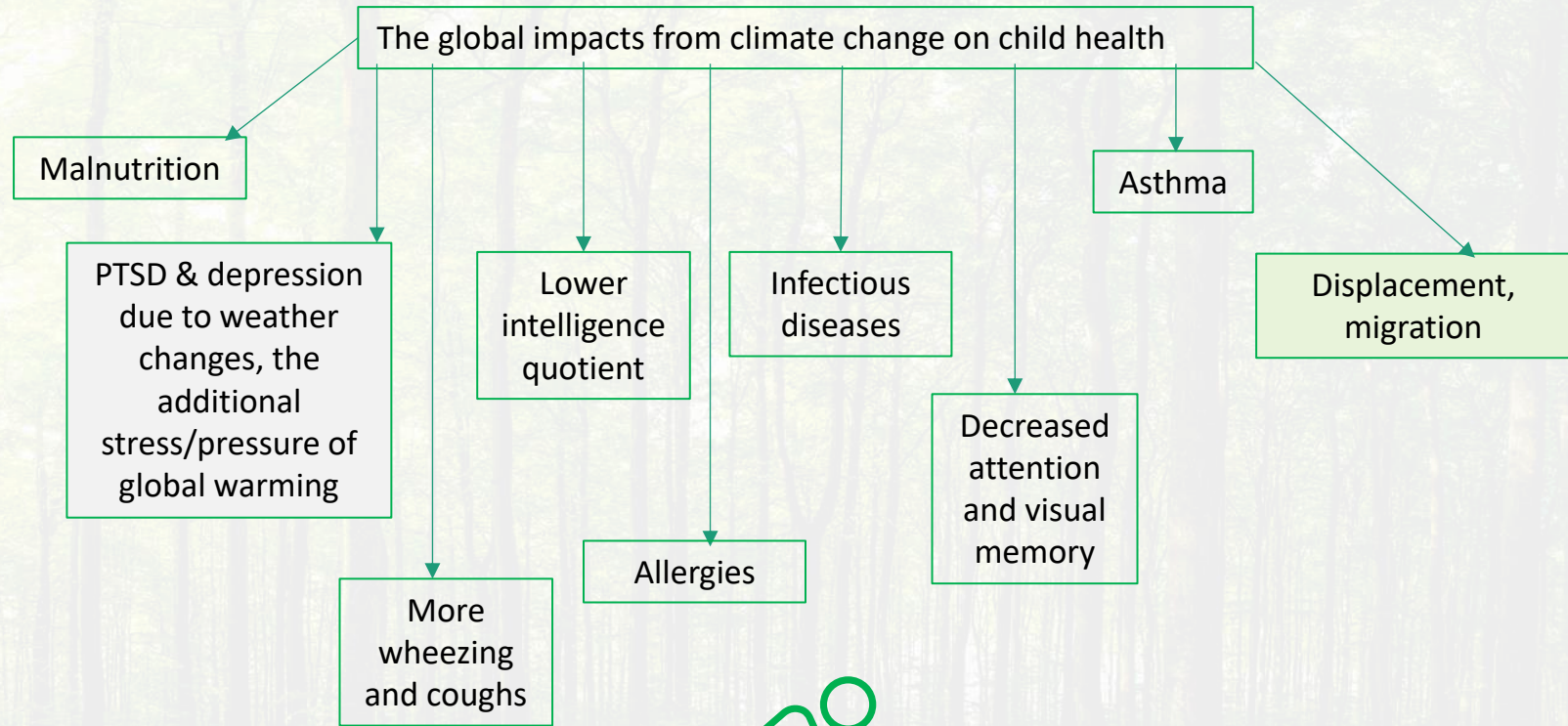
Pregnant women undergo many physiological changes which puts them at greater risk for changes to air pollution, adverse weather events and increases in temperatures.

Those who are economically and socially disadvantaged are significantly more at risk of health and pregnancy complications.



What are the impacts of climate change in pregnancy?





Why is climate change relevant to maternity services?

Climate change is going to:

- Impact negatively on the health and wellbeing of populations who are in the most deprived areas
- Increase the amount of health complications during pregnancy which can impact on maternal and neonatal outcomes
- Decrease spontaneous conceptions & increase fertility treatment requests
- Increase admissions for maternity services (which increases carbon footprint further)
- Impact on staffing particularly in adverse weather events in being able to work, travel to work
- Impact on mental health of both staff & pregnant women and families



**We're doomed
There's nothing we can do
It doesn't matter**

**Avoid
Deny
Anger towards
self and others**

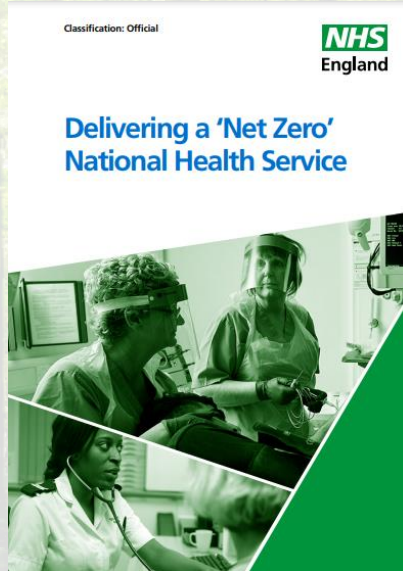
**Anxiety &
despair
Helplessness
Complacency**

**Something needs to be
done
I can make a difference
We can help**

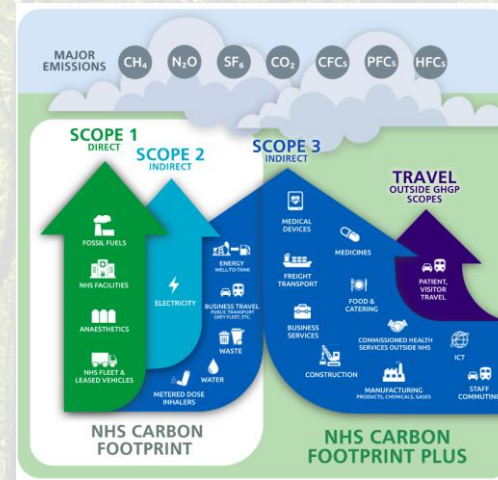
**Take action
Act towards value
Encourage others**

**Empowered
Hopeful
Purpose**

National agenda for the NHS



Delivering a net zero NHS report



Health and social care act 2022 has committed the NHS to being Net zero by 2040 for all direct emissions and 2045 for all indirect emissions.



UK Health Alliance
on Climate Change



Five priorities to sustain our health, health and care services, and environment

The climate and nature crisis is a public health emergency that needs an urgent response. Our manifesto for the next general election presents five priorities for the new government to sustain our health, health and care services, and environment. We ask that parties incorporate these commitments into their manifestos.

1 End fossil-fuel dependency

2 Ensure a healthy environment

3 Transform the food system

4 Meet international

5 Transform health and care services

The UK Health Alliance is a network-based health organisations with a shared vision for a healthier world. Our members membership represents about one million health professionals. Collectively, we advocate for just responses to the climate and ecological crisis, promote the health benefits that flow from those responses, and empower health organisations and individuals to make changes to response to the crisis.

Find out more: <https://ukhealthalliance.org>

Contact us: info@ukhealthalliance.org

Hypertension in pregnancy

Hypertension = Raised
Blood pressure

8-10% of women during
pregnancy will develop
hypertensive diseases
during pregnancy

More women are
entering pregnancy
with pre-existing
chronic hypertension

Key messages

from the surveillance report 2023



In 2019-21, **241 women died** during or up to six weeks after pregnancy among 2,066,997 women giving birth in the UK.

11.7 women per 100,000 died during pregnancy or up to six weeks after childbirth or the end of pregnancy.

Causes of women's deaths



COVID-19 14%

When maternal deaths due to COVID-19 are excluded, **10.1 women** per 100,000 died during pregnancy or up to six weeks after childbirth or the end of pregnancy

33 women

33 women

Cardiac disease 14%

33 women

Blood clots 14%

25 women

Mental health conditions 10%

23 women

Sepsis 10%

22 women

Epilepsy and stroke 9%

19 women

Other physical conditions 8%

9 women

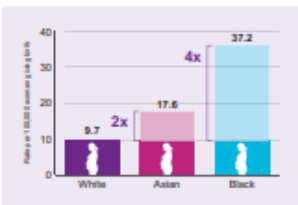
Pre-eclampsia 4%

23 women

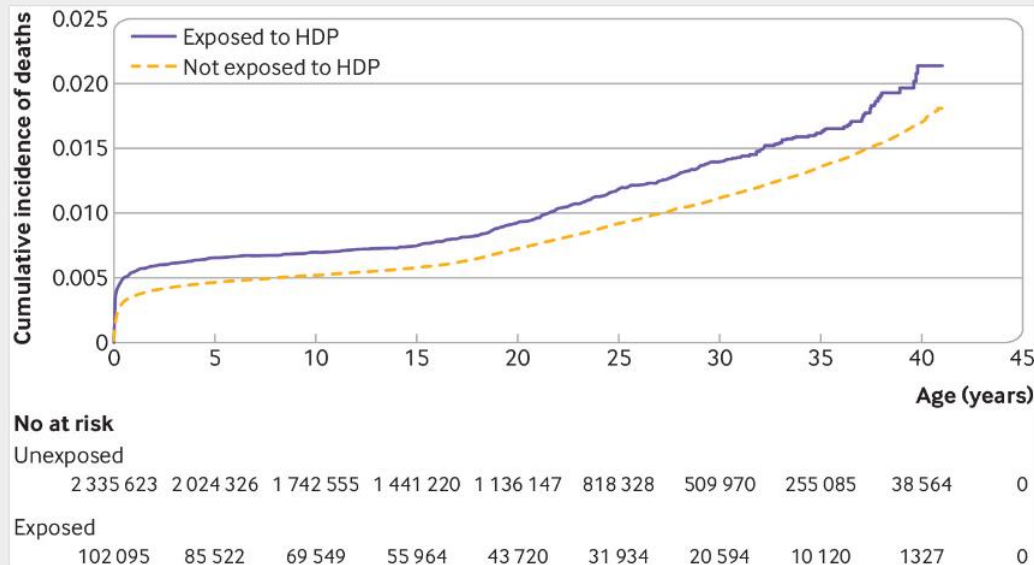
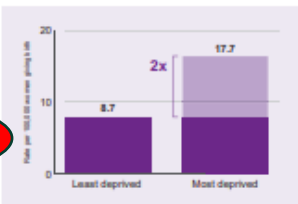
Other 10%

Inequalities in maternal mortality

Ethnic group



Living in more deprived areas



Bromfield, S.G., Ma, Q., DeVries, A. *et al.* The association between hypertensive disorders during pregnancy and maternal and neonatal outcomes: a retrospective claims analysis. *BMC Pregnancy Childbirth* **23**, 514 (2023). <https://doi.org/10.1186/s12884-023-05818-9>

Reasons for increased monitoring

- Previous pregnancy induced hypertension
- Chronic hypertension
- Increased risk of raised hypertension due to antenatal screening assessments,
- Previous pre-eclampsia
- White coat hypertension
- Pregnancy induced hypertension either medicated or non-medicated
- Raised PCR (Protein Creatinine Ratio)
- Previous HELLP (Hemolysis elevated liver enzymes, low platelets).

NICE guideline Hypertension in pregnancy NG133

Table 1 Management of pregnancy with gestational hypertension

Management	Hypertension:	Severe hypertension:
Admission to hospital	Do not routinely admit to hospital	Admit, but if BP falls below 160/110 mmHg, then manage as for hypertension
Antihypertensive pharmacological treatment	Offer pharmacological treatment if BP remains above 140/90 mmHg	Offer pharmacological treatment to all women
Target blood pressure once on antihypertensive treatment	Aim for BP of 135/85 mmHg or less	Aim for BP of 135/85 mmHg or less
Blood pressure measurement	Once or twice a week (depending on BP) until BP is 135/85 mmHg or less	Every 15 to 30 minutes until BP is less than 160/110 mmHg
Dipstick proteinuria testing	Once or twice a week (with BP measurement)	Daily while admitted
Blood tests	Measure full blood count, liver function and renal function at presentation and then weekly	Measure full blood count, liver function and renal function at presentation and then weekly

Antenatal appointments

1.3.13 In women with chronic hypertension, schedule additional antenatal appointments based on the individual needs of the woman and her baby. This may include:

- weekly appointments if hypertension is poorly controlled
- appointments every 2 to 4 weeks if hypertension is well-controlled. [2010, amended 2019]

Prevalence of hypertensive disorder in a future pregnancy	Any hypertension in pregnancy	Pre-eclampsia	Gestational hypertension
Any hypertension	Approximately 21% (1 in 5 women)	Approximately 20% (1 in 5 women)	Approximately 22% (1 in 5 women)
Pre-eclampsia	Approximately 14% (1 in 7 women)	Up to approximately 16% (1 in 6 women) If birth was at 28 to 34 weeks: approximately 33% (1 in 3 women) If birth was at 34 to 37 weeks: approximately 23% (1 in 4 women)	Approximately 7% (1 in 14 women)
Gestational hypertension	Approximately 9% (1 in 11 women)	Approximately 6% to 12% (up to 1 in 8 women)	Approximately 11% to 15% (up to 1 in 7 women)
Chronic hypertension	Not applicable	Approximately 2% (up to 1 in 50 women)	Approximately 3% (up to 1 in 34 women)

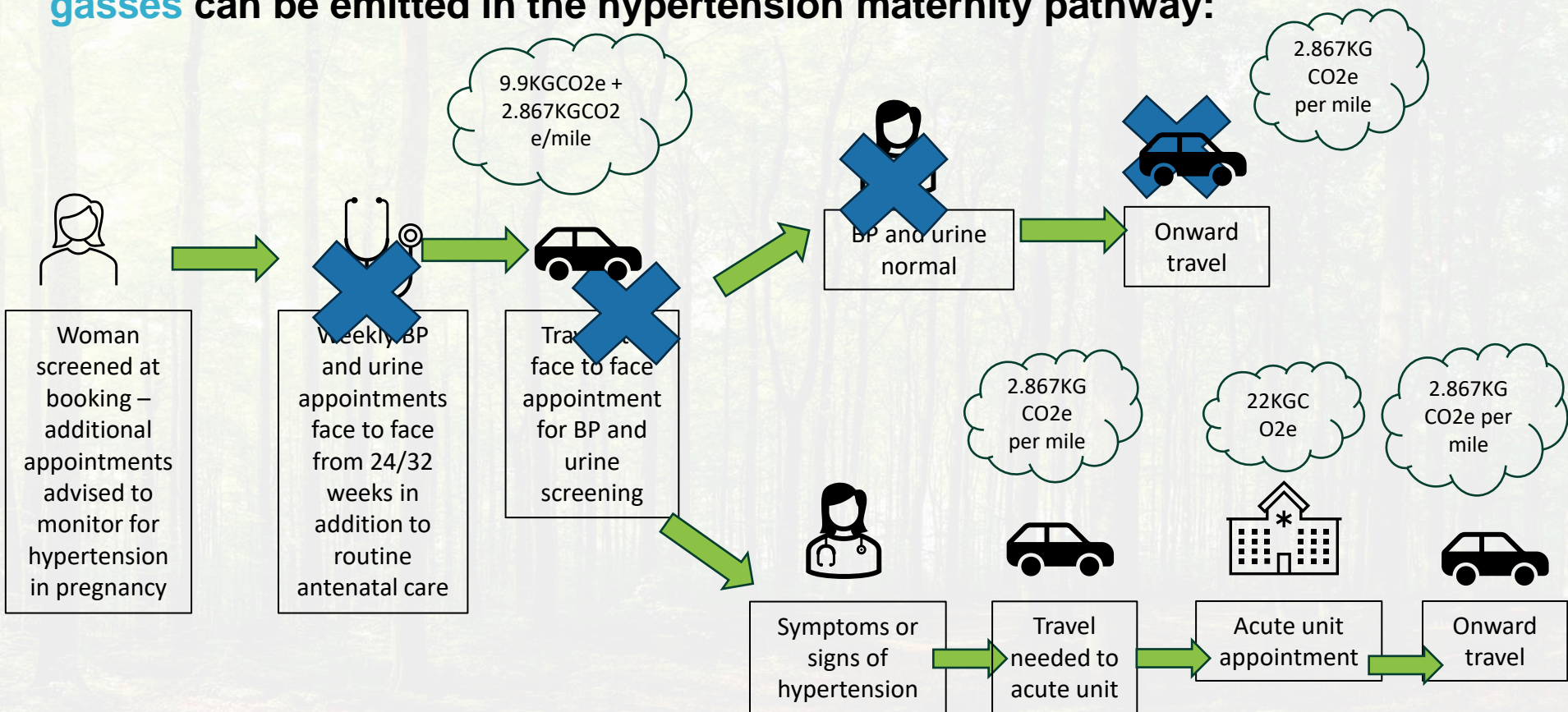
What is the Carbon Footprint of Maternity services?

Activity	Kg CO2e	Local Substitution (KgCO2e)
In-patient bed day (low intensity/general	37.9	
In Patient bed day (high intensity/ICU)	89.5	
Outpatient midwifery or obstetric video consultation	0.06	
Home visit (travel to/from acute site)	5.3	*Local mileage
Staff travel to/from GP surgery	1.26	*Local mileage
Patient travel to/from hospital	4.4	*Local mileage
Patient travel to/from community hospital (Freestanding maternity unit)	3.35	*Local mileage
Emergency department visit	13.8	
Ambulance journey to hospital	56	
Outpatient (acute unit) attendance	22	
Midwifery appointment in a GP setting	9.9	
Homeworking (office equipment)	0.032 per FTE working hour	
Homeworking (heating)	0.31 per FTE working hour	
Home energy	7.4 per 24hr	

Tech devices	
Laptop embodied carbon	266 per laptop
Smartphone embodied carbon	64.5 per smartphone
Tablet embodied carbon	110 per tablet

PPE	KgCO2e
Gown	0.905
Apron	0.065

A carbon mapping to demonstrate how much **greenhouse gasses** can be emitted in the hypertension maternity pathway:



Impact to date of GoFlo in Swindon GWH

- Originally a Health innovation project in 2017 with the intention of reducing appointments in practice, increase choice and service provision for women whilst reducing costs.
- Has expanded to include more women/birthing people with medical/pregnancy indications
- Been in place for 7 years

PMC full text:

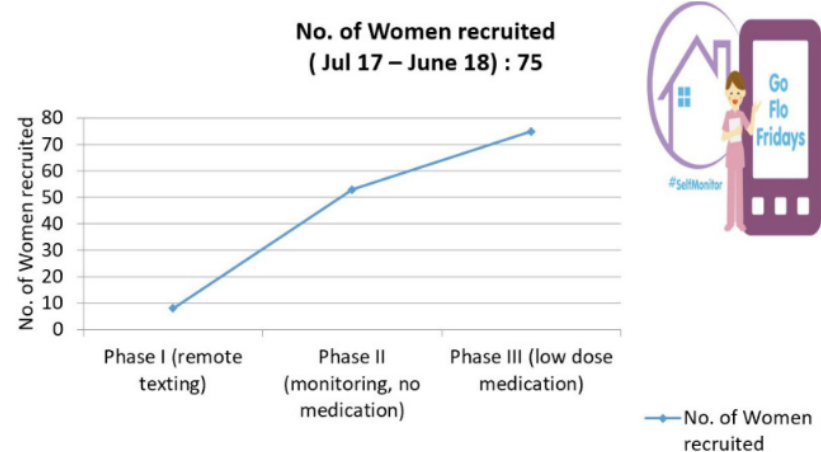
[BMJ Open Qual. 2020; 9\(4\): e000895.](#)

Published online 2020 Nov 3. doi: [10.1136/bmjog-2019-000895](#)

► Copyright/License [Request permission to reuse](#)

<< Prev Figure 2 Next >>

Figure 2



Flo (Florence) uptake/ no of patient signed up to different phases.



Overall aim: Prevention, safety, early diagnosis and treatment

Organisational benefits

Finances

2020 published evaluation showed it saved £56,070 a year to the service

Fewer appointments required = increased service productivity

Early recognition & treatment = lower long term care/ less intensive care required saving more money for healthcare services

Workforce

Acute secondary care

177 fewer hours of day assessment unit appointments needed

Community midwife benefits

624 hours less for community midwife appointments

The service uses 85 clinical hours a year for enrollment, with 85-170 hours annually for the weekly monitoring in contrast

Women and birthing people's benefits

Social benefits

Not needing to find additional time out of social/family life to attend face to face appointments

Empowerment over own medical & pregnancy care, increasing self advocacy

Financial benefits:

Less time for off work required

Not requiring childcare to attend – BP & urinalysis done at home

Not needing to pay out for travel & parking charges

Reduces inequalities, improving service provision & choice

Environment

Reduces travel and face to face appointment carbon footprint working towards the NHS net zero agenda



Patient feedback

Table 2

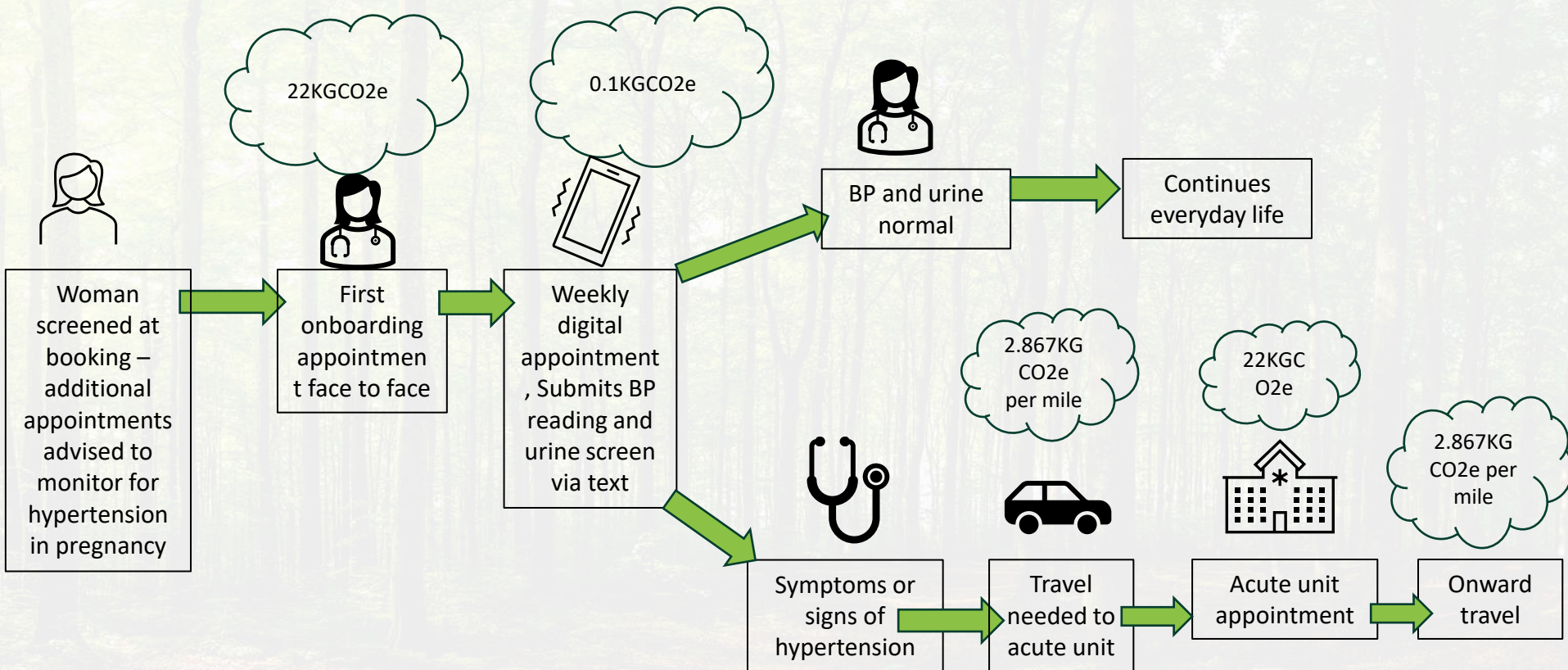
Patient feedback comments

Patients	Quotes
Patient A	'The 'Go Flo' has worked really well for me. Being 45 mins away has saved me unnecessary trips to the hospital. Any queries I've had have been promptly dealt with'.
Patient B	'Being able to monitor my BP at home was fantastic. The support provided was so valuable'.
Patient C	'Absolutely fantastic idea! Really easy to use and so much more practical to monitor myself at home with a toddler'.

[Open in a separate window](#)

BP, blood pressure.

A carbon mapping to demonstrate how much **greenhouse gasses** can be emitted in the hypertension maternity pathway:

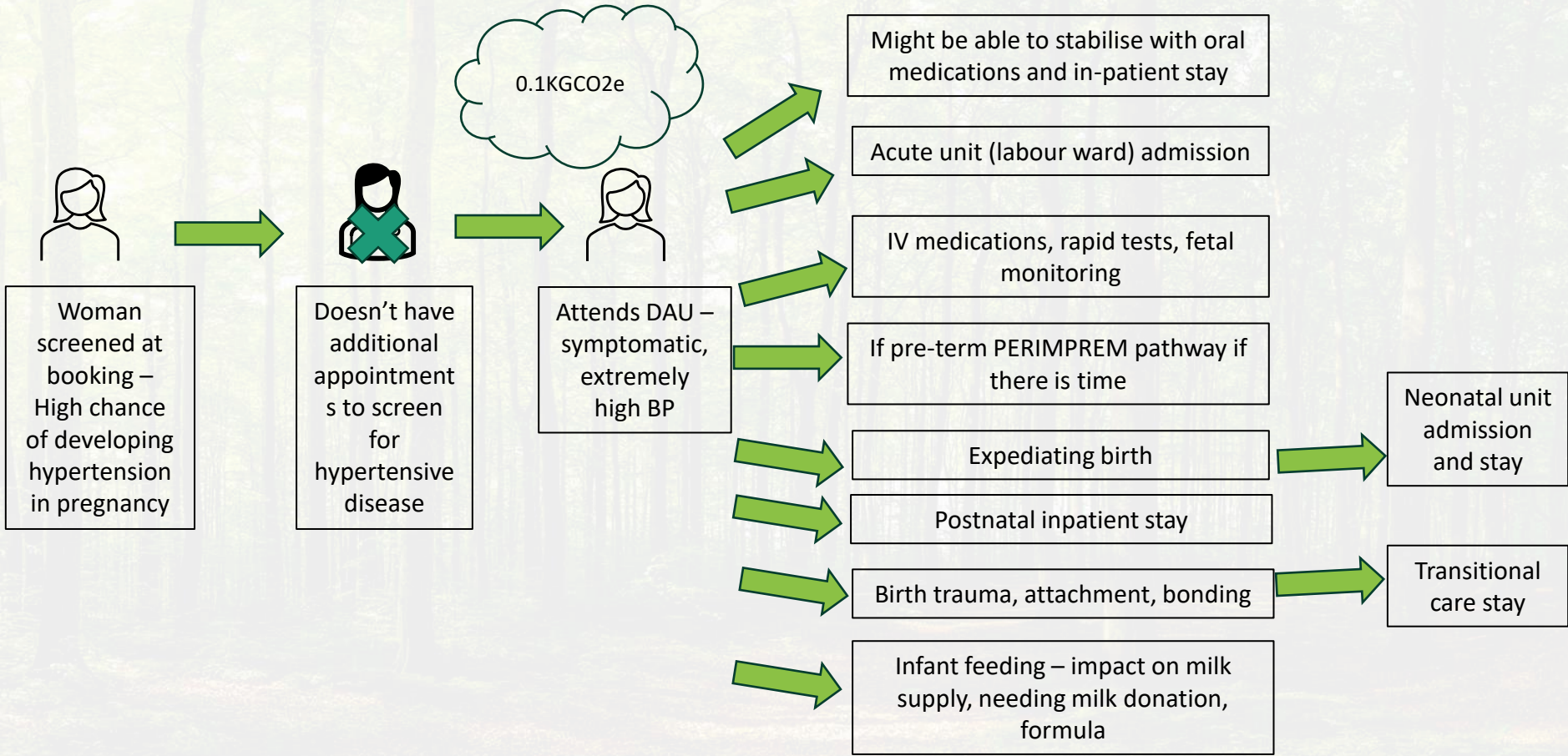




How does Go Flo work in reality? Midwife perspective

- Friday clinic led by Go Flo Midwife
- Midwife lead check the system throughout the morning to see the results
- Onboarding half hour slots in the unit throughout the morning of half an hour at a time for new women/birthing people coming through
- Follow up any positive screen readings which haven't already self referred
- Call the women who haven't submitted at 12 and follow them up.
- Built into DAU so rest of the shift is in the assessment unit/triage

A carbon mapping to demonstrate how much **greenhouse gasses** can be emitted in the hypertension maternity pathway:



Health Inequalities

By providing an outpatient hypertension service the aim is to reduce health inequalities

Women who are black or of global majority ethnicity are at higher chance of developing hypertensive disease in pregnancy

Digital blood pressure monitors designed for pregnancy aim to reduce health inequalities

Black Maternity MATTERS

- Inspired by Black Mothers Matter's vision that one day Black mothers will no longer be disproportionately in danger during pregnancy and the first year after birth.
- A ground-breaking collaboration, supporting perinatal staff to reduce the inequitable outcomes faced by mothers, families and babies racialised as Black in our perinatal systems.
- Transforming perinatal systems to ensure safer, equitable care for all.
- Unique 6 month immersion in Anti Racist practice and theory and membership to the BMM Collaborative
- **Recruiting now in West of England starting October 2024**



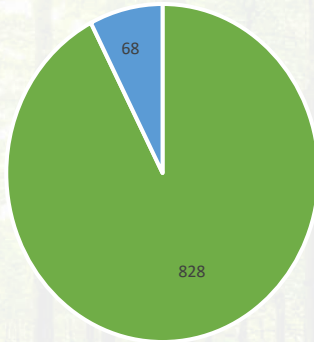
Find Out More & Keep in Touch



www.blackmaternitymatters.co.uk

[insta@blackmaternitymattersuk](https://www.instagram.com/blackmaternitymattersuk)

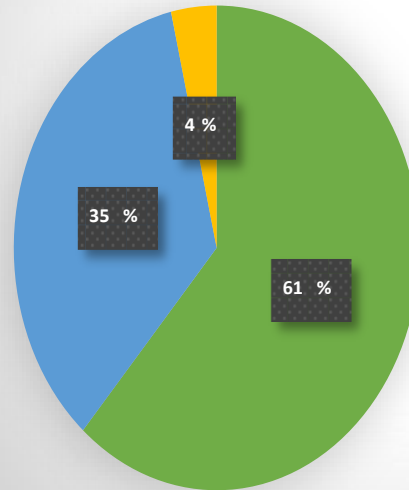
Total number of assessments with
normal or abnormal observations



■ Number of appointments with normal observations

■ Number of appointments with abnormal observations referred into
assessment unit

How many women needed treatment for hypertension in pregnancy?



■ Number of women
monitored but did not
require medication

■ Commenced on
medication, continued on
OHP

■ Commenced medication,
birth expediated same
week

The carbon footprint of the outpatient hypertension pathway (OHP) compared to face to face pathway (FTFP)

OHP = 4,846kgCO₂e a year

That's the equivalent of a return flight in premium economy London-Hong Kong AND a flight from London to Glasgow

22,208.6kgCO₂e
difference

FTFP = 27,109kgCO₂e a year

That's the equivalent of FIVE return flights in premium economy London- Hong Kong AND driving from London to Glasgow



The triple bottom line of this project in ONE acute trust

1248 appointments a year



312 clinical hours/15 minutes
624 clinical hours/30 minutes



177 hours of acute unit assessment
for women are medicated for
hypertensive disease in pregnancy



Upscaling the project

So you might ask, is this really worth it?

This is on
six maternity

Across all six hospitals
specific pathway based on
year the carbon footprint would
123,377.78kgCO₂e less a year

Within this pathway evaluated
combining it with existing



1733 clinical hours

£140,175 saved every year
3,120 fewer appointments
needed
305 fewer secondary care
appointments

carbon footprint to building **3 brand
new houses and mortar 4 bedroom detached
homes** (No environmental adaptations).

carbon emissions by either
appointment digital

6933 appointments



Evidence into Practice 2024

Outpatient hypertension pathway for women and birthing people at high risk of developing hypertension in pregnancy, which has been developed by Great Western Hospitals NHS Foundation Trust.

Hypertension during pregnancy affects around 8% to 10% of all pregnant women and can be associated with complications for both the woman and the baby. Women who are black or of global majority ethnicity are at higher chance of developing hypertensive disease in pregnancy.

This innovative service provides enhanced care to women at high risk of hypertension during pregnancy, keeping them healthy and well at

Patient benefits include reducing the financial cost and physical impact of travelling into hospital for frequent appointments and reducing health inequalities for those who are at a higher risk of developing hypertension.

System benefits include a reduction in face-to-face appointments, clinical hours and acute unit appointments which also support our Net Zero ambitions.

Angela Willis, Midwife and Sustainability Clinical Fellow Alumni 23/24 at Great Western Hospitals NHS Foundation Trust and **Eleanor Powell**, Senior Project Manager at Health Innovation West of England will be in touch with all maternity units in the West of England regarding this project in the next few weeks.

If your maternity unit is outside of the West of England and you would like to find out more, please contact Eleanor.powell@nhs.net

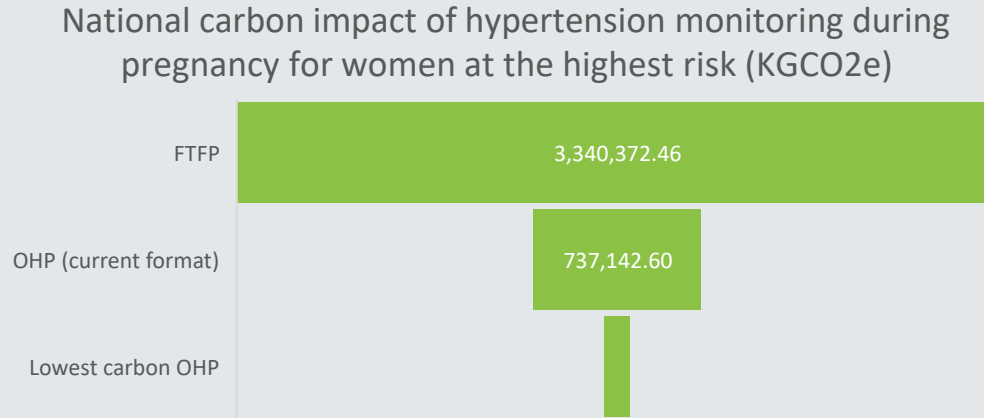


**Health Innovation
West of England**

If all maternity units in England adopted this programme:

Reduce the CO₂e impact by
3,340,372.46KGCO₂e a year

183,294 fewer face to face
appointments needed



Postnatal potential to expand to outpatient monitoring

Postnatal investigation, monitoring and treatment

1.4.10 In women with gestational hypertension who have given birth, measure blood pressure:

- daily for the first 2 days after birth
 - at least once between day 3 and day 5 after birth
 - as clinically indicated if antihypertensive treatment is changed after birth.
- [2010]


Your influence

What do you have influence or power over?

What do you enjoy?

What can you stop using, reduce using or swap to a more environmentally friendly option?

Make one small change a month and embed



‘A journey of a thousand miles begins with one small footprint. Sustainability needs to be at the heart of all organisations and for individuals to take personal responsibility to reduce our impact on the earth collectively.’
