



# GREEN MATERNITY CHALLENGE

## SUSQI PROJECT REPORT

### Postnatal Hypertension made simple and sustainable

**Start date of Project:** 22/10/24

**Date of Report:** 31/1/25

#### Team Members:

Project lead: Dr Thomas Liney, Specialty trainee in  
Obstetrics & Gynaecology

Project lead: Miss Kerry Munro, Consultant  
Obstetrician and maternal medicine specialist

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Dr Hannah Browne, Junior Clinical Fellow in  
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#### Background:

**Problem statement:** Heterogeneity in prescribing and managing hypertension in the postnatal population at the Queen Charlotte's & Chelsea Hospital postnatal ward.

As a team we chose to focus on postnatal hypertension as it is a leading cause of postnatal readmission with far-reaching environmental, equity and financial impacts. Poor management of postnatal hypertension leads to prolonged hospital stays for blood pressure control, wasted medication due to poor compliance and unnecessary polypharmacy, increased travel for follow-up care and emergency re-admissions. This also has a knock-on effect on patient flow and care provided antenatally and intrapartum, due to a lack of bed availability.

Focusing on postnatal hypertension as a cause of prolonged admission is important as inpatient stays have a much higher carbon footprint compared with community care, due to their contribution to building energy costs, food, water, and waste management. As 22% of the NHS carbon footprint reported to be from procurement of pharmaceuticals and better medicines management can reduce carbon emissions by avoiding readmissions for adverse reactions and unnecessary prescribing, we felt it was important to focus on an area where prescribing can be optimised and rationalised.

Furthermore, poorly controlled blood pressure in the postnatal period increases patients' lifetime risk of cardiovascular disease, which could ultimately lead to patients needing many more appointments, medications, admissions and interventions in the future. Thus contributing to future environmental and economic burden through travel to and from appointments, polypharmacy, and future hospital stays.

Postnatal hypertension is a recognised inequity issue. Hauspurg et al. have shown in an American cohort black women had a persistently higher blood pressure postpartum that took longer to normalise when compared to white women in this cohort. A 2017 systematic review by Cairns et al. found limited evidence for a particular model of care/blood pressure threshold or blood pressure agent, recognising the lack of research in this overlooked area.

Better management of postnatal hypertension would help tackle the target areas 'complex pregnancies' and 'valuing people's time' through streamlining care and reducing complications, it would also target 'listening to women' through empowering patient-centred care and focusing on community-based care, and 'Access and experience for people who experience worse maternity outcomes' by focusing on an issue that disproportionately affects black women.

Queen Charlotte's and Chelsea hospital has an average of 5000 deliveries per year with a capacity of up to 40 patients on the postnatal ward. As a tertiary centre and obstetric medicine referral centre, we used the wealth of expertise available in obstetric medicine to inform our project. This helped when reviewing guidelines and gathering MDT expertise. As a tertiary centre we have a higher proportion of women affected by blood pressure issues in pregnancy, as well as a high proportion of women with risk factors for postpartum hypertension. As such we felt our patient population was likely to benefit a lot from changes to hypertension management.

Dr Liney and Dr Browne are resident doctors who are directly providing care on the postnatal ward and were able to engage well with other frontline members of the MDT, including midwives and pharmacists. This was beneficial when collecting data and implementing solutions that will be feasible and acceptable to frontline staff and patients. Miss Taylor-Clarke is the 'link consultant' and well placed to ensure that the impact on service users is central to the ongoing quality project. Miss Munro is a specialist in obstetric medicine and was able to offer specialist advice on hypertension.

### Specific Aims:

The aim of this project was to improve the management of postnatal hypertension through streamlining care. Through improving the postnatal hypertension protocol and reducing prescribing heterogeneity we aimed to reduce any unnecessary inpatient stays, prevent readmissions, reduce medication waste and thus make it overall more environmentally, economically and socially sustainable.



## Method and measurement:

### Step 1: Initial audit

A retrospective audit of patients prescribed postpartum antihypertensives at Queen Charlotte's and Chelsea Hospital between August – September 2024 (61 days) was carried out. Patient notes were reviewed from electronic records on Cerner for:

- key demographics: age, BMI, ethnicity, parity
- postpartum length of stay,
- distance travelled to hospital (based on distance between patient address and the hospital),
- antihypertensive agent prescribed,
- number of blood tests performed as part of 'PET screens',
- unexpected returns and readmissions to hospital

This data was analysed in an excel spreadsheet and the results, examined later in detail, demonstrated a wide variation in prescribing practice, length of stay, with unexpected returns and readmissions to hospital.

### Step 2: Resident doctor survey

Resident doctors were anonymously surveyed using google forms to determine their confidence in managing postpartum hypertension (See Appendices). Questions included:

- Do you find the current trust guideline on postnatal HTN useful?
- Do you find senior advice on managing postnatal HTN is consistent?
- Do you provide women with information on their follow-up care and future risk profile at discharge?
- What do you think are the main issues with the current management of postnatal HTN at QCCH?
- What improvements do you think could be made to current management of postnatal HTN at QCCH?

The results of feedback were collated, and some data converted into pie charts. The results demonstrated resident doctors felt unconfident in managing hypertension and 45% found the current hypertension guideline unhelpful with 55% stating that it was only 'sometimes' helpful. All resident doctors stated that they found senior advice 'inconsistent'.

### Step 3: Patient and General Practitioner feedback

Patients were sensitively approached for comments on their care. Some patients emailed to express their thoughts on postnatal hypertension. Quotations from these patients have been anonymously included in the appendices. The team also met with a General Practitioner to discuss postnatal hypertension.

For example, one patient states *"I was struggling to sleep with all the babies crying and that I am sure was making my blood pressure worse which then meant I had to stay longer"*.

### Step 4: Mini literature review & MDT discussion

We carried out a review of the available literature to better understand the latest evidence around postpartum hypertension management and to better understand the impact of poor management. This included a search of PubMed, a review of NICE, RCOG, local and the International Society for

the Study of Hypertension in Pregnancy guidelines. The results of the literature review and initial audit (Step 1) were presented at an MDT on 29/11/24.

In our review of the literature we identified two large retrospective cohort studies, by Mitro et al. and Do et al., demonstrating fewer readmissions to hospital in those patients prescribed nifedipine when compared to labetalol in the postpartum period. Furthermore, a randomised clinical trial by Yoselevsky et al. found that more patients required a second anti-hypertensive agent if prescribed enalapril rather than nifedipine. Enalapril has been shown to reduce blood pressure more effectively in long term use, however in practice many patients may struggle to attend hospital or general practices for follow-up blood tests, required when starting enalapril. As such, the MDT decided that using enalapril as the first line routinely may increase not only the carbon footprint associated with prescribing but inequity in care access and could pose safety concerns if patients were not followed up carefully. Enalapril is still included in the guideline and used when it is felt to be safe and appropriate.

The current trust guideline was reviewed due to resident doctor feedback that it was unhelpful and confusing, with concerns over lack of clarity on what medication to prescribe and how long patients should remain in hospital for postpartum.

#### **Step 5: Introduction of new flowchart and poster**

Due to the concerns raised about the current hospital trust guideline, the new flowchart and poster (see appendices) were implemented. These clarified length of stay, when patients needed blood tests, discharge criteria and certainty around first line medication choice and how to switch between antihypertensives. These could easily be incorporated by other hospital trusts. Both were made as images that could be easily stored on resident doctor's phones, for ease of access. The initial proposed flowchart and poster were displayed for discussion at the obstetric medicine weekly meeting, which is attended by clinicians from all over North-West London and residents from Queen Charlotte's and Chelsea hospital. Residents were then sent an email from Miss Munro, maternal medicine specialist, to clarify its introduction and encourage resident doctors to download the flowchart onto their phone. All obstetric consultants were informed of the change in flowchart at the meeting and via email.

#### **Step 6: Re-audit & Re-survey**

A re-audit was carried out from 14<sup>th</sup> December 2024- 10<sup>th</sup> January 2025 (27 days). Patient notes were reviewed in the same way as in Step 1. Resident doctors were also re-surveyed on their experience using the new guideline, including the same questions as in Step 2. Furthermore, informal patient and general practitioner experiences were recorded to help inform changes to care.

#### **Step 7: Carbon and cost calculations**

A hybrid carbon footprinting methodology was used in order to determine the environmental impact of the project. The carbon footprint calculations included units of healthcare activity, patient and visitor travel, sets of blood tests performed and medication prescribed.



To estimate the carbon footprint of the postnatal and readmissions inpatient stay, the emissions factor of a low intensity bed day (Sustainable Healthcare Coalition 2015) was applied to the length of stay. For the outpatient appointment an emissions factor of 1/24th of a low intensity bed day was assumed.

The greenhouse gas (GHG) emissions associated with patient and visitor travel were calculated based on the average distance between patient's address and the hospital. One visitor return journey per inpatient day and one patient return journey per readmission and outpatient appointment was assumed, with all visitors and patients travelling by car. The emissions factor for an averaged sized car with unknown fuel from the UK Government's database for company reporting was applied.

The carbon footprint of blood tests was estimated based on the number of blood tests completed in the postnatal period, using the emissions factors for phlebotomy, vials and blood tests from Spoyalo et al. The GHG emissions embedded in medication were estimated based on the cost of the medication.

### **Challenges**

Following discussion with patients and amongst the MDT it was felt that the information given to patients and to GPs on discharge was inadequate and often fell short of national guidance, particularly with regards to warning patients about the future risks associated with hypertension in pregnancy. Based on this we have started to develop patient information and to enhance the information given to GPs on discharge letters.

Some of the challenges of the project timeline have been that we have been unable to complete the process of reviewing, approving and translating this information. We received some feedback from patients, included in the appendices and informally via General Practitioners, however we recognised that in the postpartum period it can be challenging to contact patients and discuss their inpatient stay, primarily because of childcare responsibilities. We worked around this by gaining informal feedback where possible, and speaking to GPs about feedback they had received from patients.

### **Team effort**

We engaged with the multidisciplinary obstetric medicine team; including obstetric medicine physicians, maternal medicine specialists, obstetric medicine midwives, women's health pharmacists and resident doctors. We engaged with this group of healthcare professionals as they were key to discussing changes to hypertensive medications and considering the wider impacts of our medication choices. We engaged through meetings and presenting at the obstetric medicine forum for North-West London in November 2024. The women's health pharmacist was able to help with costing medications, the lead for obstetrics was able to help with pricing inpatient stays/cost of blood tests, resident doctors were approached to complete anonymous surveys both before and after the guideline change. We also engaged with a General Practitioner and clinical lead for maternity, children and young people in North-West London, who was able to help identify key changes we could make to how postnatal hypertension is 'coded' for in general practice to trigger



annual cardiovascular risk reviews. Patients are central to our project and we engaged with them informally through collecting either written or verbal feedback.

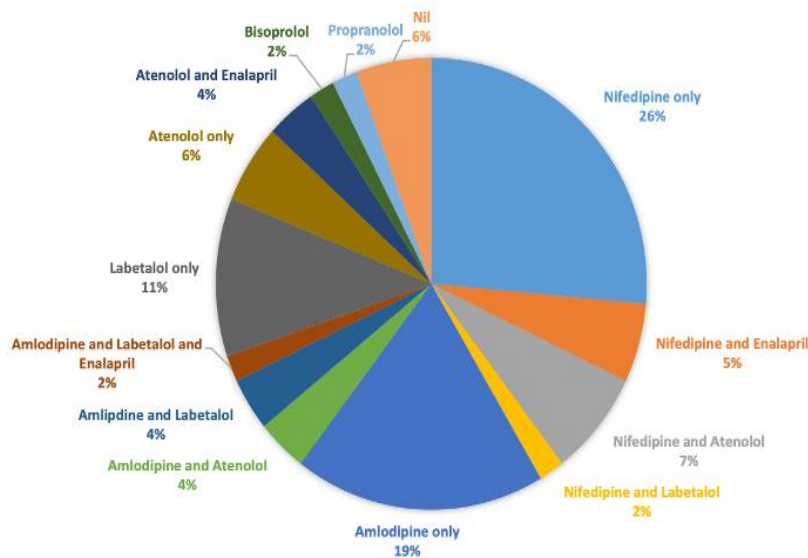
This project required time to audit data, review literature, create presentations, present at meetings, meet as a team and to perform data analysis. Our interventions were low cost and did not require any specific resources beyond time and the use of technology (including Microsoft excel, word and PowerPoint). We had no financial investment in this project.

**Results:**

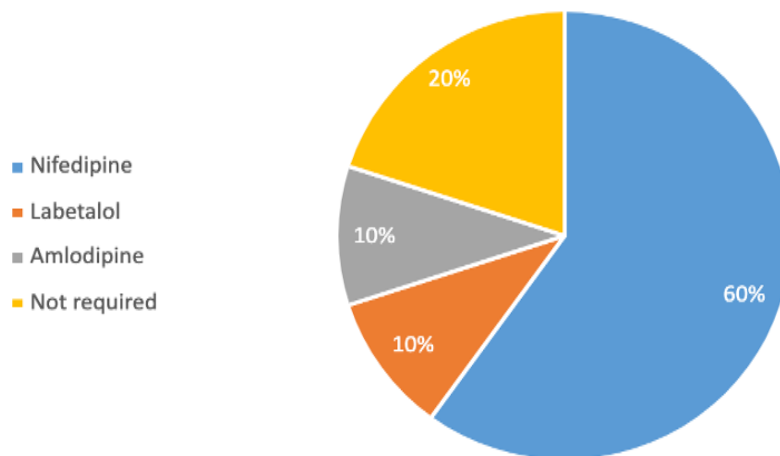
**Patient outcomes:**

In the post-intervention group no patients were discharged on more than one anti-hypertensive, compared to 28% in the pre-intervention group, and there were no unplanned reviews or readmissions compared to 10 in the pre-intervention group.

Pre-intervention anti-hypertensive prescriptions



Post-intervention anti-hypertensive prescriptions



Patients now receive more consistent advice about switching medication in the postnatal period, with post-intervention data demonstrating a trend towards shorter admission stays for patients. The pre-intervention heterogeneity in prescribing practice is demonstrated by the wide range of medication combinations that were prescribed in the pre-intervention groups. This is a contrast with the post-intervention group, in which 60% of patients received only nifedipine. This reduction in polypharmacy has contributed to less medication waste, a reduction in cost and reduces the side effects from taking multiple medications. This also reduces concerns about the safety profile of polypharmacy in breastfeeding. Furthermore, the reduction in unplanned visits and readmissions to hospital will improve patient experience and mean that women spend less time in the newly postpartum period coming to and from hospital, which can be unsettling.

Patients have also had to endure fewer blood tests and had a median stay that was 2 days shorter than in the pre-intervention group as shown in Table 1:

	Pre- intervention	Post-intervention
Length of postnatal stay	Mean 4.6 days (Median 4)	Mean 2.9 days (Median 2)
Number of postnatal blood tests for PET screening	Mean 5.2 sets of bloods	Mean 3 sets of bloods

This means patients are being discharged sooner back to community care and the support of their families. This has increased the efficiency of the postnatal stay, made the use of resident’s time for efficient and patient care more holistic and patient centred by applying a wider lens to the problem of postnatal hypertension. Shorter inpatient stays are reflective of better blood pressure control immediately postpartum, demonstrating an improvement in safe care. This will have a knock-on effect on patient flow and help to make the overall patient journey more efficient and reduce associated risks of long inpatient stays.

Patient quotation:

*“On the postnatal ward we were seen by a number of doctors and nurses to manage my hypertension and there didn’t seem to be any consistency. From the beginning the electronic BP machine was found to be incorrectly measuring my BP. We would explain this every time a nurse came to measure this but many of them would still use this and then have to repeat it manually. Due to the changeover of staff, when my BP was inevitably high, and often overnight, the staff who were not aware of my history would often seem to panic and mention we would have to be moved back up to HDU in the middle of the night. Then during the day I was told I needed to stay another 24 hours until my blood pressure was controlled. After a few days we were then regularly overseen by Ms Munro and her team, from then on we felt there was more consistency in care and we quickly came to a routine of medication in order to be able to leave. “*

Anonymous, 2025



Resident doctor quotations:

*“Simple to follow, empowers early discharge”*

*“Clear, concise, easy to follow”*

*“Easy graphics, easy to understand and simple.”*

Patients have continued to have care in line with NICE and RCOG, and clinicians have reported feeling more confident in offering advice about postnatal hypertension as a result of implementing the new guideline. Furthermore, we are working to bridge the gap between hospital and community care through working with local GP networks in order to ensure pregnancy related hypertension is considered when GPs evaluate a patient’s long term cardiovascular risk factors.

We will be continuing to collect data in order to reflect the true impact from the change in guideline and have plans to expand our understanding of patient outcomes through patient surveys on patient information leaflets. Through continuing to audit the quality improvement project data, we will be able to review any patients who had prolonged stays for blood pressure control in order to try and identify why this happened.

*Population outcomes:*

Through improving the care given to women postnatally we are hoping to not only improve their immediate health and postnatal experience but also improve long term risk of high blood pressure and cardiovascular disease.

Due to the low number of women in the post-intervention group, it is difficult to say if the intervention we have introduced thus far has changed population outcomes. However, the future of this quality improvement project will be focused on improving the population outcomes for women with high blood pressure in pregnancy and postpartum. We have arranged and are liaising with general practitioners to come up with a simple and effective way of ensuring these women are followed up. Furthermore, we are re-writing patient advice that includes information on the implications of high blood pressure on future health, which will be translated into multiple languages. We are also working with general practitioners to improve the information provided on discharge summaries, to ensure that general practitioners are also aware of the long-term implications of high blood pressure.

*Environmental sustainability:*

The carbon footprint per woman before the intervention was 205 kgCO<sub>2</sub>e. After the intervention the carbon footprint decreased to 88 kgCO<sub>2</sub>e, resulting in savings of 117 kgCO<sub>2</sub>e per patient. The reduction in inpatient days led to the highest reduction of GHG emissions, as shown in Table 2.

We extrapolated these savings to 500 women, which accounts for 10% of the number of deliveries at Queen Charlotte’s and Chelsea hospital, reflective of the average number of women affected by hypertensive disorders. This means that there could be savings of 58,645 kgCO<sub>2</sub>e, equivalent to 172,795 miles driven.





Table 2: Summary of carbon emission savings per patient:

Activity data	GHG (kgCO <sub>2</sub> e) before	GHG (kgCO <sub>2</sub> e) after
Number of women	53	14
Bed days (admission)	9,240.02	1,061.20
Bed days (re-admission)	170.55	
OPA for blood pressure review (energy & water)	12.07	
<i>Total units of healthcare activity</i>	<i>9,422.64</i>	<i>1,061.20</i>
Patient travel (return journey)	44.79	
Visitor travel (return journey)	1,112.20	123.53
<i>Total travel</i>	<i>1,156.99</i>	<i>123.53</i>
Blood tests (phlebotomy, vial, FBC, U+E, LFT)	199.53	23.11
Medications	72.86	16.68
<b>Total carbon footprint (kgCO<sub>2</sub>e)</b>	<b>10,852.02</b>	<b>1,224.52</b>
<b>Carbon footprint per person (kgCO<sub>2</sub>e)</b>	<b>204.76</b>	<b>87.47</b>
<b>Savings</b>		<b>117.29</b>

*Economic sustainability:*

Costs for medications were provided by the pharmacist at Imperial College NHS Trust. The cost of each tablet was determined from the cost of a pack of medication, for example from the cost of a pack of 28 nifedipine 20mg tablets. Following this the cost of a 14-day discharge prescription was calculated, as patients are discharged with a 14 day supply, which is then reviewed by the GP. Prior to the intervention the average cost of a 14-day prescription per patient was £2.79 and following the intervention the average cost of a 14 day prescription per patient was £2.46. Over a year long period, for 500 women, this could lead to savings of £165 on discharge hypertension prescriptions alone. This is from a simple change in prescribing practice.

Costs for blood tests were accessed from the North West London Pathology website and one 'set' of blood tests that would be completed postnatally for a PET screen would cost £13 per patient. As we were able to reduce the mean number of blood tests by 2.2 per patient there was an average saving of £28.60 per patient from medication costs alone. Over a year-long period, based on an estimated 500 women, this could lead to savings of around £14,300 from reducing the number of blood tests alone.

As maternity is on a block contract, it is not possible to directly determine the cost of one inpatient bed. However, due to shorter inpatient stays, there will be a cost saving from food, waste and energy costs.



### *Social sustainability:*

Informal reports from patients impacted by the project cited poor sleep in hospital, feeling more isolated as far from family members and with some women attributing the longer hospital stay to poorer bonding with their baby. Repeated blood tests were also cited as painful.

*“I was just so desperate to get home, everyone was doing their best, but I was struggling to sleep with all the babies crying and that I am sure was making my blood pressure worse which then meant I had to stay longer. “*

Anonymous, 2024

By improving the overall management of postnatal hypertension and aiming to discharge women sooner after birth, we hope to show that this improves these reported effects of prolonged postnatal hospital stays.

Of resident doctors surveyed 100% found the new guideline ‘useful’ and there was an 82% increase in those feeling ‘confident’ in managing postpartum hypertension. Survey results from resident doctors demonstrate the impact of changing the management of postnatal hypertension management; resulting in doctors feeling more confident, finding the guideline more useful and more doctors reporting that they felt confident giving advice to women postnatally. This will have a positive impact on the care being provided.

From informal discussions with General Practitioners, we have highlighted cases of poor communication on discharge from hospital which could have prevented poor outcomes. We have listened to what General Practitioners find useful and are in the process of implementing changes to discharge summaries to reflect these conversations. This will help ensure patients do not feel unsupported after discharge and that GPs are more aware of the care each patient has received in hospital, as well as the specialist advice given. Ultimately this improved communication will help keep patient care in the community, reducing unexpected and unnecessary travel to and from hospital and will help avoid unnecessary changes to medication that has been started. Upcoming meetings will help plan changes to GP ‘coding’ so that postnatal and pregnancy related hypertension appear as automatic triggers for yearly blood pressure and cardiovascular risk reviews, which will help to pick up future healthcare problems more quickly leading to better future health and wellbeing for patients, prolonging disability unaffected years and contribution to society and the economy.

### **Discussion:**

Overall, 53 women were included in the pre-intervention group and 14 women were included in the post-intervention group, due to differences in study timeframe. The mean length of postpartum stay was 2.6 days shorter, with a mean of 2.92 fewer sets of blood tests performed per patient in the post-intervention group. In the post-intervention group no patients were discharged on more than one anti-hypertensive, compared to 28% in the pre-intervention group, and there were no unplanned reviews or readmissions compared to 10 in the pre-intervention group. A carbon footprint saving of 117 kgCO<sub>2</sub>e per patient was calculated, equivalent to the emissions from 3 inpatient days. Of resident doctors surveyed 100% found the new guideline ‘useful’ and there was



an 82% increase in those feeling 'confident' in managing postpartum hypertension. Furthermore, patient testimonies demonstrated that prolonged postpartum stays and readmissions negatively impacted sleep and led to feelings of isolation, with consistency leading to more positive feelings.

Cost savings from the project could have a huge impact when extrapolated over a year-long time frame. Significant cost savings will come from shorter inpatient stays but we have also calculated potential savings of nearly £14,500 from reductions in blood tests and changes in prescribing practice. Both of which could easily be replicated and rolled out across other hospital sites, leading to potentially large savings for the NHS.

The main limitation to our project was the disparity in size between pre and post intervention groups, driven by study time pressures. Due to time pressure, we only had capacity for one intervention, which has made it difficult to demonstrate improvements in all areas and especially population outcomes. Logistically all team members have had to balance completing this project alongside clinical commitments and due to changes in workforce over the study period, one of the project leads was working on the project from a different hospital Trust. As the intervention period took place over the Christmas holiday period this also meant that team members' time was even more pressurised. In terms of policy barriers, we had to wait for approval from the obstetric MDT prior to distributing the new flowchart and poster and will require human resources approval for any patient information we release. We carefully reviewed the new flowchart, allowed a period of review and amended areas after feedback. This was critical to avoiding misinterpretation and mitigating risk. Logistical barriers were overcome through regular communication over WhatsApp and Microsoft Teams meetings.

In terms of including patient feedback, we acknowledged that the postpartum period is often a challenging time for women and completing surveys or responding to phone calls may not be realistic. So, we used informal feedback, often given verbally, which is not quantifiable and is less reliably collated.

This project has demonstrated the potential for making small and simple changes, and has laid the groundwork for further work to expand and improve the management of postpartum hypertension at Queen Charlotte's and Chelsea hospital. By demonstrating the impact that this small intervention has had we hope we can shed light on improving care in the "fourth trimester".

This project is relevant to all postnatal units in the United Kingdom and further data may help encourage other units to consider how to improve postnatal hypertension care. By trying to bridge the gap between hospital and community care we hope to start a much needed conversation about how this gap in communication must be examined and strengthened, which is applicable to all areas of medicine.

### Conclusions:

This work has shed light on an overlooked area of maternity care, in which improvements can have long-lasting impacts for patients and the NHS. This work has demonstrated the positive impact of small and inexpensive changes, showing that clinical changes can improve patient care but also have



positive environmental and economic impacts. The project has been a very useful building block to make further changes upon and the green challenge has given our time the push it needed to do this and the platform to raise awareness of the issues around postnatal hypertension.

The key elements to successful learning in this project have been the including a wide range of stakeholders, creating deadlines for data collection and introducing interventions, and involving frontline staff in making changes.

There were challenges ensuring all team members were available at the same time due to clinical commitments and over the winter holiday period there was limited opportunity to assess and make changes. A key learning point from this was that we needed to be flexible and sometimes communicate over WhatsApp/email if we could not find a suitable time to all meet, to avoid any unnecessary delays in waiting for meetings to occur.

The project will continue as an ongoing quality improvement project at QCCH. The immediate next steps of the project will be to continue to collect data to have a larger sample size, so that the impact of the intervention can be properly assessed. This will then be presented at the local quality improvement meeting. Next steps are underway to improve and standardise postnatal information shared with general practitioners and patient information leaflets are being developed. This is being reviewed by senior clinicians and then will be sent to Human Resources for approval. We have presented initial findings at the Imperial obstetric medicine meeting and at a postgraduate forum, focused on sustainability, in order to share our immediate learning and generate local discussion around the project. To share our learning more widely, we have submitted an abstract to present some of our preliminary data at the RCOG world congress 2025 and will share our findings at the upcoming Green Maternity Conference, 2025. Furthermore, postnatal hypertension is on the agenda of the next Clinical Commissioning Group meeting for North-West London, in order to improve the transfer of care for women between the hospital and community.



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Appendices

Appendix 1: Poster to aid medication changes postpartum

# POSTNATAL HYPERTENSION



## NIFEDIPINE (± ENALAPRIL)

### STARTING AND UPTITRATING ANTIHYPERTENSIVES

1st Line	Nifedipine	10mg BD → 20mg BD → 30mg BD → 40mg BD
2nd Line	Enalapril	5mg OD → 10mg OD → 10mg BD
3rd line	Atenolol	50mg OD

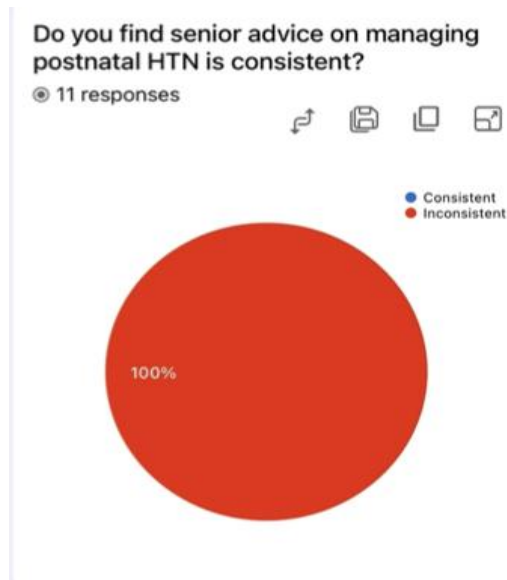
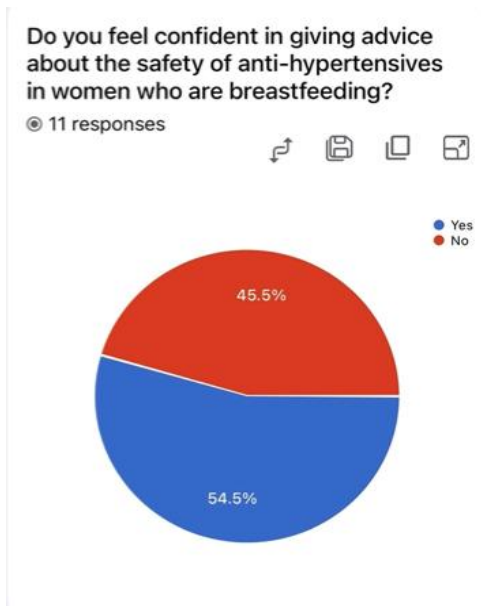
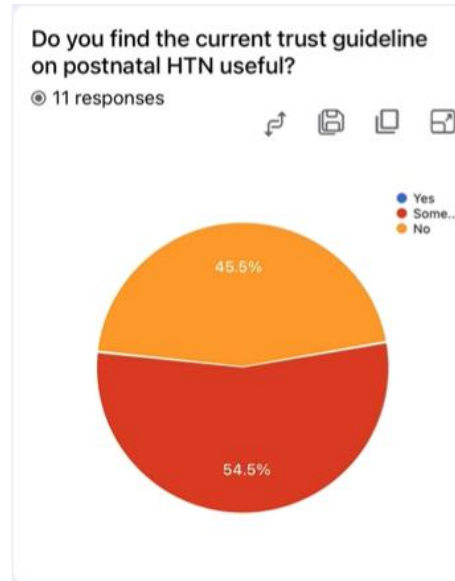
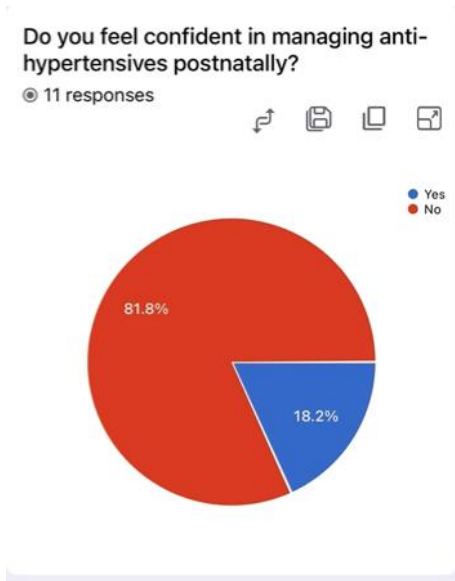
Uptitrate to maximum dose of Nifedipine before adding in Enalapril.  
If starting Enalapril ensure K and U&E are checked prior to starting and 1-2 weeks after initiation

### SWITCHING ANTIHYPERTENSIVES

Labetalol	Nifedipine	Methyldopa	Nifedipine
100mg BD/TDS →	10mg BD	250mg TDS →	10mg BD
200mg BD/TDS →	20mg BD	500mg TDS →	20mg BD
300mg BD/TDS →	30mg BD	750mg TDS →	30mg BD
400mg BD/TDS →	40mg BD	1000mg TDS →	40mg BD

If on multiple agents - stop Methyldopa first.  
Consider adding in Enalapril if already on maximum dose Nifedipine and wean down labetalol

## Appendix 2: Results of pre-intervention resident doctor survey

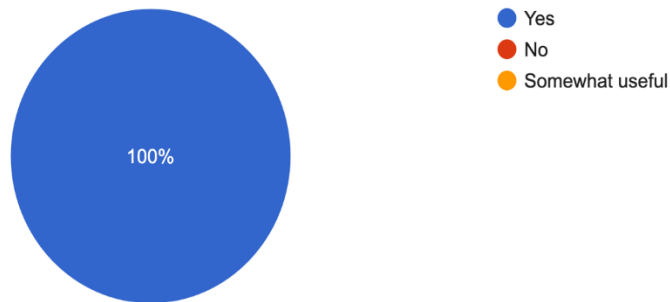


- The guideline doesn't have first line or second line treatment options. It is difficult to know which anti-hypertensive agent to trial next. It is also unclear who needs to be seen by Obs med.
- Lack of clinician awareness of long term cardiovascular risk that can be mitigated with better hypertensive control for months after delivery. We do not communicate with patients well. We do not provide evidence based care.
- Not being switched to nifedipine until late in inpatient stay
- Many women with no clear diagnosis making their management challenging, different people using different medications, uncertainty around how long people should remain as inpatients for
- Consistency in antihypertensive protocol
- Mainly inconsistency on stopping and commencing new AHT, inpatient titration of these, influence of blood tests on monitoring
- Ever one has different ways of managing. Sometimes no rationale given. "That's how I do it", need an exact guideline on which medications we change to what and why. And if we can just leave the pre pregnancy meds as is.
- The medication protocol and change in medication after delivery

### Appendix 3: Results of post-intervention resident doctor survey

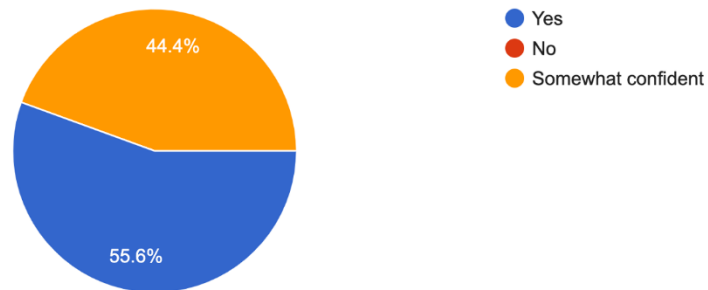
Do you find the new trust guideline on postnatal HTN useful?

9 responses



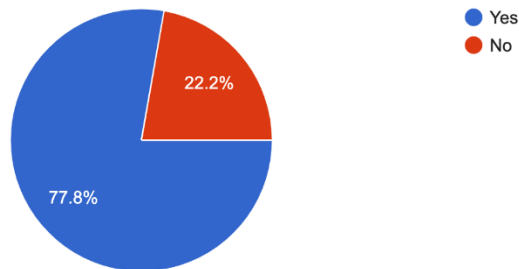
Do you feel confident in managing anti-hypertensives postnatally?

9 responses



Do you feel confident in giving advice about the safety of anti-hypertensives in women who are breastfeeding?

9 responses



### Please explain what you like about the new postnatal HTN guideline?

- Simple to follow, empowers early discharge
- Clear, concise, easy to follow
- Easy graphics, easy to understand and simple.
- Straightforward with clear guidelines re swapping anti hypertensives
- Clear guidance and clear instructions
- I find the flow chart design of the guideline particularly easy to follow
- Easy to follow
- Clear guidance about postnatal anti hypertensive protocol



## Appendix 4: Postpartum hypertension flowchart

