# Quality Improvement for Postpartum Hypertension Discharge Counseling

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## Abstract

This quality improvement project created a standardized discharge workflow for postpartum hypertension. **Context**: The project took place at a collaborative physician and midwifery practice at a community hospital in Oregon. **Interventions**: The discharge workflow was divided into two parts. First, non-HDP patients received information at discharge on general warning signs for postpartum hypertension. Second, HDP patients received information on warning signs and when to call a provider, accurate home blood pressure monitoring, accessing a blood pressure cuff after discharge, and instructions for a 72-hr clinic blood pressure check. These interventions were documented in the EMR discharge summary and AVS. **Methods**: The implementation of the project took place over four months, from September through December 2023. The timeline included a month of baseline data collection, followed by three PDSA cycles, each lasting one month. Data was collected from the EMR to assess intervention utilization. **Results**: By December 31st, 2023, 61.5% of non-HDP patients had some form of warning signs education documented in their discharge summary. Only 11.5% of this was attributed to the use of the general warning signs Smart Phrase created by this project. Second, by December 31st, 2023, 80% of HDP patients had comprehensive teaching documented in their discharged summary and 50% had a patient-friendly version of the same teaching included in their AVS. **Barriers**: The barriers to implamentation included breakdowns in communication between providers at handoff and over the holidays, breakdowns in communication to per diem providers, and variation in discharge summary templates. **Conclusions**: This project identified a percentage of HDP patients at the practice that was more than double the national average. Future projects should focus on overcoming internal barriers to discharge standardization so that patients can receive evidence-based recommendations and appropriate follow-up care.

**Problem Description**

Postpartum hypertension is an understudied disease process with significant impacts on maternal morbidity and mortality. It is defined as new-onset mild range hypertension 48 hours to 6 weeks after delivery with any severe features, or severe range hypertension in the absence of any severe features (Hauspurg and Jeyabalan, 2022). Like antepartum hypertension, postpartum hypertension increases the risk of severe complications like eclampsia, stroke, pulmonary edema, HELLP syndrome, and even death (Katsi et al., 2020). It is included under the umbrella term hypertensive disorders of pregnancy (HDP), which independently account for 6.3% of all pregnancy related deaths in the United States (Centers for Disease Control and Prevention (CDC), 2023) and 44% of deaths that occur in the first 6 days postpartum (Cameron et al., 2022). Additionally, HDP double the long-term risk of stroke, coronary artery disease, and peripheral artery disease, with evidence suggesting an increased disease risk in as few as eight years after a hypertension diagnosis (Iriye et al., 2017). Similarly, the incidence of subsequent hypertension later in life is tripled and the rate of diabetes has been shown to double in patients with a history of preeclampsia or gestational hypertension (Iriye et al., 2017).

These numbers disproportionately affect people of color, with non-Hispanic Black patients being 2.5 times more likely to develop new onset postpartum hypertension than their white counterparts (Parker et al., 2023). Black patients also experience higher rates of postpartum readmission due to HDP as well as increased short- and long-term complications of HDP (Suresh et al., 2022). The CDC reports 1 in 5 delivery hospitalizations of Black women are attributed to HDP and 1 in 6 delivery hospitalizations of American Indian and Alaska Native women are attributed to HDP (2022). These disparities are attributed to differences in access to quality healthcare, racial bias in screening and diagnosis, and structural barriers that inhibit

Black and Brown birthing parents from accessing care postpartum (CDC, 2022, Suresh et al., 2022).

Although treatment for HDP with antihypertensive agents, magnesium, and diuresis is well understood, delays in timely recognition and diagnosis leads to a higher morbidity associated with postpartum hypertension than hypertension with an antepartum onset (Hauspurg and Jeyabalan, 2022). Additionally, there is a gap in communication of a HDP diagnosis and its subsequent health implications between providers and patients, leading to patients being discharged with inadequate postpartum teaching (Coolman et al., 2010). This is exacerbated by the finding that counseling on the long-term effects of HDP are not routinely integrated into clinical practice despite the recommendations of multiple societies (Triebwasser et al., 2021). Together, this highlights the need for standardized diagnostic protocols and bolstered postpartum teaching and surveillance. The practice environment highlighted in this proposal has hypertension numbers that are higher than the national average, with providers that recognize the need for increased discharge teaching to combat the inadequate postpartum surveillance they are seeing in the practice and in the nation at large.

**Available Knowledge**

Increasing rates of postpartum hypertension in the United States (American College of Obstetricians and Gynecologists (ACOG), 2020) suggest it is a disease process with multiple contributing factors and opportunities for health care improvement. The literature review conducted for this project explored the prevalence of the problem, risk factors, barriers to timely diagnosis and treatment, and gaps in care practices related to professional recommendations. It was conducted using the PubMed database with the following key words: postpartum preeclampsia; postpartum hypertension; hypertensive disorders of pregnancy; postpartum

counseling; quality improvement (QI); and discharge teaching. Articles were selected that were written in English, were written in the previous five years, pertained to populations in the United States, and had relevance to the clinical question. The discussion of the literature is as follows.

**Available Knowledge:** Prevalence

Conclusive evidence showing the overall prevalence of postpartum hypertension is widely disputed amongst researchers. Evidence suggests that the prevalence ranges between 0.3% to 27.5% of all pregnancies in the United States (Hauspurg and Jeyabalan, 2022). The wide variation may be attributed to milder disease processes going unnoticed after delivery, or because patients present to urgent care centers, emergency rooms, or primary care clinics which may be less familiar with the disease and the potential for adverse outcomes (Hauspurg and Jeyabalan, 2022). National data on the overall prevalence of HDP is more easily measurable, with the CDC reporting 16% of all hospital deliveries having some type of hypertensive disorder (2022). Similarly, conclusive evidence on the postpartum hypertension rate in Oregon is limited. What is known is that HDP affects 7.7% of pregnancies in Oregon (Butwick et al., 2020) and 17.3% of readmissions in the first 12 months postpartum are attributed to HDP (Kaufman et al., 2023).

**Available Knowledge:** Risk Factors

On a national scale, patients who are ≥35 years old, Black, obese, have a history of hypertension in a previous pregnancy, or had antenatal hypertension, are at increased risk of developing postpartum hypertension. Additionally, factors in the intrapartum period, such as cesarean delivery and administration of IV fluids have been shown to increase a patient's risk (Hauspurg and Jeyabalan, 2022). Surprisingly, approximately 60% of patients with new-onset postpartum hypertension have no antecedent diagnosis of a HDP (Hauspurg and Jeyabalan, 2022,

Wen et al., 2019). This may be why 70% of deaths related to preeclampsia occur after birth (Lovgren et al., 2022).

Because it is unclear if the etiology of postpartum hypertension is a distinct disease process or the same pathophysiologic pathway as antepartum hypertension, it is impossible to further differentiate between the two diagnoses. Some research suggests that for patients presenting for readmission with postpartum hypertension without a previous diagnosis, the disease is not actually new onset but attributed to a diagnostic failure before discharge (Smithson et al., 2021). Smithson et al., 2021, shows that readmissions in patients with no documented history of HDP, were associated with maternal age ≥40 years old, antenatal prescription of low-dose aspirin, Black race, and a body mass index of ≥30 kg/m2. These risk factors align with the overall risk factors for postpartum hypertension, indicating that underdiagnosis in the antepartum and g period may be a contributing factor for patients who are then readmitted for hypertension postpartum. This is further evidenced by the fact that half of pregnancies with known hypertension in the antepartum period may have persistent hypertension postpartum (Goel et al., 2015).

Together, these findings suggest two failures in the management of postpartum patients with HDP. First, there is underdiagnosis of HDP and the subsequent communication of the diagnosis to the patient. Second, there is a lack of standardized discharge teaching and recommendations for follow-up care for patients with risk factors or with a definitive HDP diagnosis.

**Available Knowledge:** Professional Recommendations

Although it is not readily apparent if hospital readmission is completely preventable, multiple societies have suggested areas for improvement. The Society for Maternal-Fetal

Medicine (SMSM) propose that for patients with chronic hypertension, gestational hypertension, or hypertension during hospitalization, exemplary discharge teaching, appropriate medication management, and close postpartum follow-up may reduce their risk of readmission (Iriye et al., 2017). ACOG recommends that patients with severe hypertension during hospitalization be seen within three days of discharge to help identify exacerbations of hypertension that are common in the first few days postpartum. ACOG also recommends education on the long-term cardiovascular risks associated with HDP, including postpartum hypertension, and endorses low-dose aspirin for hypertension prevention in future pregnancies. They highlight that this counseling should occur in the postpartum period after a pregnancy affected by HDP (McKinney et al., 2018). Both SMFM and ACOG additionally recommend transitioning care to a continuity provider prior to discharge (Iriye et al., 2017, McKinney et al., 2018).

Although these recommendations are not new, ongoing high rates of readmission for patients with and without a previous HDP diagnosis, indicate that many patients continue to fall through the cracks. The findings from a retrospective longitudinal study, Skurnik et al., 2018, found that postpartum patients were significantly less likely to be counseled on HDP than on contraceptives or glucose tolerance testing after gestational diabetes. They found that patients with a hypertensive diagnosis were often unaware of the link between hypertension and the risk for cardiovascular disease later in life and had received minimal to no teaching about lifestyle modifications to reduce their long-term risks (Skurnik et al., 2018). Similarly, the results from Triebwasser et al., 2018, found that postpartum counseling after HDP is infrequent and rarely includes education on future cardiometabolic risk or management recommendations for future pregnancies.

Together, the research presented in this literature review outlined multiple avenues for quality improvement (QI) projects that aim to increase the diagnosis, counseling, and surveillance of postpartum hypertension. The evidence-based intervention utilized in this DNP project centered on standardized postpartum counseling for HDP patients and those at risk.

**Rationale**

This project used the Institute for Healthcare Improvement Model for Improvement (IHI MFI) framework to reach its aims. The IHI MFI is a quality improvement framework that asks three questions: “What are we trying to accomplish?” “How will we know that a change is an improvement?” and “What changes can we make that will result in improvement?” (Tyler & Glasgow, 2021). It uses small, rapid tests of change called plan-do-study-act (PDSA) cycles that assess the feasibility and effectiveness of change ideas (Tyler & Glasgow, 2021). This model supported the success of the project by allowing a scoping goal like standardized postpartum hypertension counseling to be broken down into achievable steps that could be modified along the way to support a measurable outcome.

The literature revealed that QI efforts aimed at increasing adherence to evidence-based guidelines and enhanced standardization between providers can improve HDP outcomes. Additionally, the literature showed a lack of standardized discharge teaching for postpartum hypertension and the risk for readmission. This was found to be true for all patients, especially those with an antepartum/intrapartum diagnosis of HDP (CMQCC, 2021; Skurnik et al., 2016; Suresh et al., 2021). By initiating a protocol for standardized discharge counseling, this project aimed to fill the gap in care. In doing so, it hoped to reduce the short- and long-term risks associated with postpartum hypertension. This goal aligned with the ACNM position statement

on quality improvement, which states that midwives are responsible for modifying the process of care provision to improve outcomes (ACNM, 2005).

**Specific Aims**

The global aim of this project was to reduce preventable morbidity and mortality associated with postpartum hypertension by implementing standardized discharge counseling. There were two specific aims of this project. First, by December 31st, 2023, 75% of non-HDP patients would have documented teaching about postpartum hypertension warning signs in their discharge summary. Second, by December 31st, 2023, 75% of charts that contained a patient diagnosis of HDP would have documented teaching in the discharge summary on warning signs and when to call, accurate home blood pressure monitoring, accessing a blood pressure cuff after discharge, and instructions for a 72-hr clinic blood pressure check. This was to be evidenced by the utilization of a new discharge summary Smart Phrase and the inclusion of the same information in a patient-friendly after-visit summary (AVS).

**Context**

This QI project was implemented at a collaborative physician and midwifery practice in Oregon. The practice was affiliated with a university and was set in a mid-sized community hospital in a suburban area. As a collaborative practice, the antenatal, intrapartum, and postpartum care was provided by midwives and physicians, with the caseload distribution determined by patient condition and acuity, and provider availability and expertise. The midwives accounted for 5.0 clinical and inpatient FTEs and the physicians accounted for 4.9 FTEs. Because of the university affiliation, the practice was both an academic and clinical practice, with regular student involvement in patient care. The inpatient unit consisted of 14 beds that provided space for labor, delivery, recovery, and postpartum patients, as well as 2 triage

rooms and 1 operating room. It was connected to a level two neonatal intensive care unit (NICU). Between the midwives and physicians, there was an average of 360 births annually, with an overall cesarean rate of 33.7%. In the year prior to this project's implementation, the practices patient population was 77% white, 5.8% Asian, 2.6% Black, 1.4% American Indian/Alaska Native, 0.5% other Pacific Islander, 0.08% Native Hawaiian, 9.7% declined to disclose, and 0.4% unknown. The ethnic identity was 26.3% Hispanic, 63.5% non-Hispanic, 3.7% declined to disclose, and 0.3% unknown. The majority of patients utilized Medicaid coverage, with managed care and private insurance plans as the second and third most common insurance types.

The discharge teaching varied by provider and nurse, as evidenced by testimonials of staff nurses interviewed prior to the implementation of this project. All patients discharged postpartum from the practice received a 50+ page packet with evidence-based postpartum and newborn education. The packet included general postpartum warning signs from the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) in English and Spanish as well as hypertension specific warning signs in English. Whether these handouts were reviewed with patients prior to discharge varied greatly, and whether patients utilized any of the resources was unknown. For patients with a HDP diagnosis prior to discharge, further education also varied between providers. Staff nurses reported that less than 50% of providers include information on appropriate home blood pressure monitoring and when to call in a patient's AVS. Furthermore, it was up to providers to schedule the 72-hour blood pressure check for patients with HDP, but it was unclear to many providers on how to do this. Finally, the acquisition of home blood pressure cuffs was complicated by insurance reimbursement and the availability of blood pressure cuffs at the patient's pharmacy. Because of this, nurses reported it being hard for patients to get cuffs if

they didn't already have them, especially if they were discharged on the weekends when pharmacies were closed. Together, these discrepancies underscore multiple breakdowns in communication as well as the need for standardization.

**Interventions**

This QI project was studied using pertinent chart review data collected from the electronic medical record (EMR). Baseline data was collected during the month before the intervention for all patients discharged postpartum from the unit. Patients were deidentified and information was collected from the problem list, discharge summary, and AVS. Patients were then stratified into two groups: those with a diagnosis of HDP at discharge and those without. For patients without a HDP diagnosis, chart review only included documented teaching in the discharge summary. For patients with a HDP diagnosis at discharge, chart review included teaching documented in the discharge summary as well as information included in the patient's AVS. This data helped determine which patients received information on warning signs for postpartum hypertension as discharge and if patients with a HDP diagnosis received additional teaching.

After the collection of baseline data, the project began at the collaborative practice meeting for midwives and physicians. At the meeting, providers were introduced to the QI project with a PowerPoint presentation highlighting the new standardized workflow for all patients and the specific workflow for patients with HDP. The recommendation was for non-HDP patients to receive education on general warning signs for postpartum hypertension at discharge and that this teaching be documented in the discharge summary with the use of a specific Smart Phrase. The recommendation was for the Smart Phrase to be added to whichever discharge summary template the provider used. For patients with a diagnosis of HDP prior to

discharge, the recommendation was for discharge teaching to include education on warning signs and when to call, accurate home blood pressure monitoring, accessing a blood pressure cuff after discharge, and instructions for a 72-hr clinic blood pressure check. The recommendation was for this teaching to be documented in whichever discharge summary template the provider used with a separate HDP-specific Smart Phrase. The final recommendation was for patients with a HDP diagnosis prior to discharge to receive the same discharge teaching reiterated in their AVS. This was made possible by patient-friendly AVS created for this project that providers could include with a third AVS-specific Smart Phrase. After the meeting, a voiceover recording of the PowerPoint presentation was sent to providers along with a workflow diagram that included the new Smart Phrases. Printouts of the workflow diagram were posted in the midwifery office and at the physicians' desk. Visualization of the workflow diagram and AVS are included in appendix A and B.

**Study of the Interventions**

Three PDSA cycles were conducted over the course of the project, each lasting 4 weeks, culminating in a period of chart review, stakeholder interviews, and modifications for the next cycle. Chart review followed the same process of data collection from the EMR as the baseline data set. First, it looked at the percentage of non-HDP charts using the general hypertension warning signs Smart Phrase. Second, it looked at the percentage of HDP charts using the HDP-specific Smart Phrase in the discharge summary and the HDP-specific AVS. Stakeholder interviews occurred at the monthly collaborative practice meeting with physicians and midwives, where providers were invited to offer feedback and suggestions for improvement. Additional feedback was provided via email. Together, the quantitative data from chart review and qualitive data from stakeholder interviews informed the revisions that were made during each successive

cycle. Cumulative results that were compiled at the end of the projects implementation were used to inform recommendations going forward.

**Measures**

This project used a family of measures to determine improvement. First, it looked at outcome measures, i.e., the percentage of discharged patients who received the standardized discharge teaching outlined by this project. This was assessed by looking at the percentage of non-HDP charts using the general hypertension warning signs Smart Phrase, and the percentage of HDP-charts using the HDP-specific Smart Phrase in the discharge summary and the HDP-specific AVS. This data is presented using a line chart with four data points to look at change over time from the baseline data set through three PDSA cycles.

Secondly, the project looked at process measures, i.e., the steps in the system that performed as planned and the steps that needed improvement. A portion of this data was qualitative, based on provider interviews at the monthly collaborative practice meetings. The other portion was collected during chart review. In additional to utilization of the project's Smart Phrases, note was taken on alternate teaching that providers documented and alternate information that was included in the AVS.

Finally, the project considered balancing measures, i.e., measures not directly related to the aim, which were used to assess whether the changes designed to improve one part of the system introduced problems or benefits elsewhere in the system. Information for this measure was collected during chart review and provider interviews to determine the project's impact on the process and patient experience.

**Analysis**

Inferences were drawn from line chart data to assess change over time. Analysis of this data was objective, using percentage as the primary statistical measure. Percentage data described how the distribution of intervention utilization across each PDSA cycle compared to the baseline data. Qualitative data from stakeholder interviews and additional chart review was analyzed using narrative and content analysis to draw conclusions and identify recurrent themes.

**Ethical Considerations**

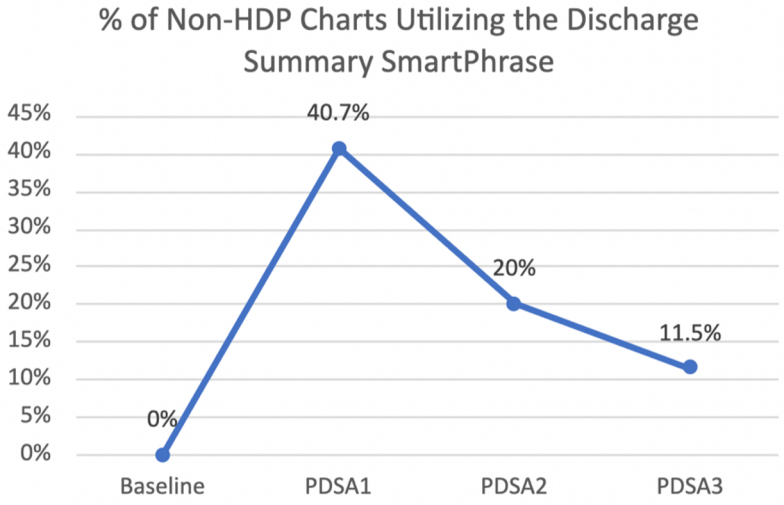
Ethical considerations for stakeholders, such as physicians, midwives, and hospital staff, included the potential for added staff workload while implementing a change initiative. Research has shown that active engagement from stakeholders is key when tailoring best practices to specific populations and translating research into clinical practice (Goodman & Sanders Thompson, 2017). This was accounted for by demonstrating the efficiency of a standardized workflow at the start of the project and incorporating feedback along the way.

Ethical considerations for patients included the use of protected health information (PHI) generated from the medical record and the protection of patient confidentiality. To account for this, all information was de-identified and authorization was obtained from the Institutional Review Board (IRB) to confirm that this project was not human subjects research prior to the project's implementation. The author had no conflicts of interest or financial relationships to disclose.

**Results**

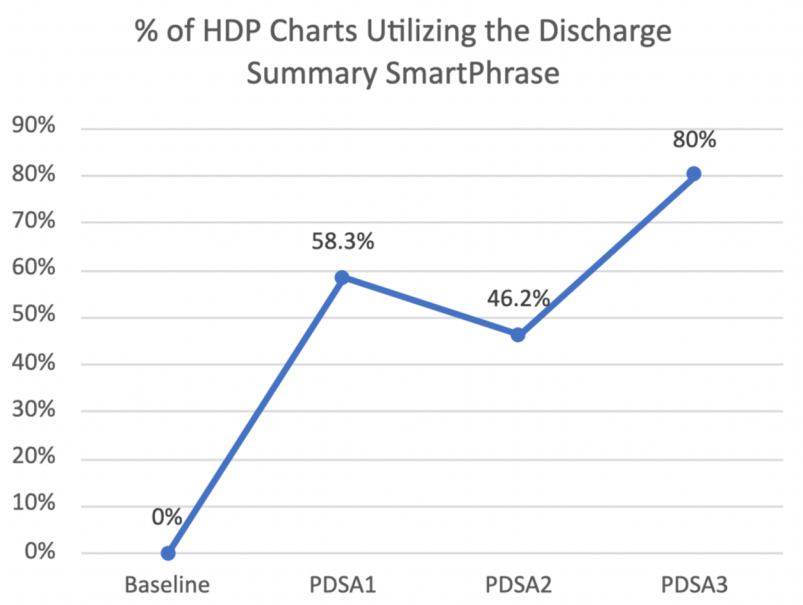
A total of 154 patients were discharged postpartum from the unit from September through December 2023. Of those patients, 53 has a HDP diagnosis at the time of discharge. As expected, prior to the project's implementation, the baseline data showed 0% utilization of the non-HDP general warning signs Smart Phrase. This percentage rose during the first PDSA cycle, with a

peak of 40.7%, which dropped to 20% and 11.5% during the second and third PDSA cycles respectively.



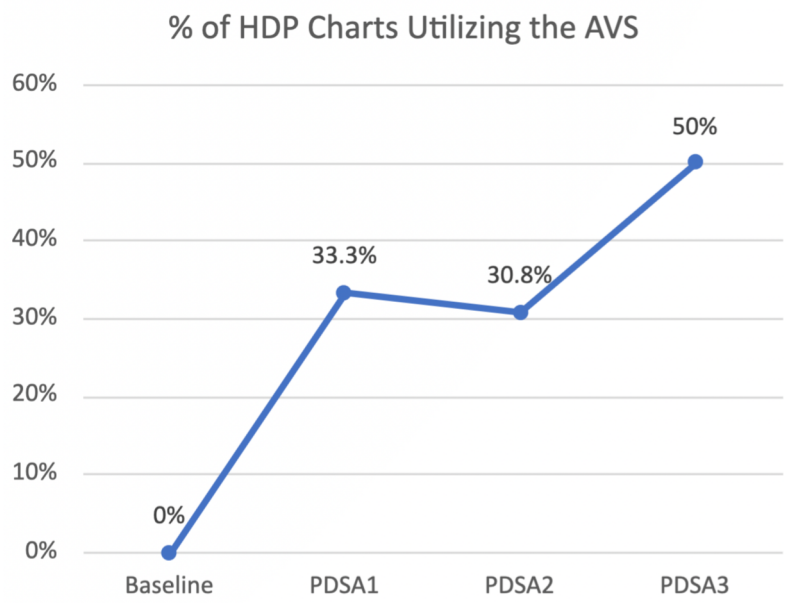

When the general warning signs Smart Phrase wasn't used, 39% of the time alternate teaching was documented in the discharge summary. This primarily occurred through the use of a discharge summary template that a minority of the midwives used which included warning signs for postpartum hypertension in the standardized discharge teaching, along with warning signs for thrombosis, excess bleeding, infection, and postpartum depression.

For patients with a HDP diagnosis before discharge, the utilization of the HDP-specific Smart Phrase in the discharge summary, increased from 0% in the baseline data to 58.3% in the first PDSA cycle. A drop to 46.2% utilization occurred in the second PDSA cycle which then rose to 80% utilization by the third PDSA cycle.




When the HDP-specific Smart Phrase wasn't utilized, 37.5% of the time, some form of alternate teaching was documented in the discharge summary. This varied by provider and was usually typed in manually with varying recommendations on warning signs and when to call, accurate home blood pressure monitoring, accessing a blood pressure cuff after discharge, and instructions for the 72-hr blood pressure check. Of the 37.5% of charts that had alternate teaching documented, most of the teaching only included one or two of the above variables, but rarely included them all. Inversely, this shows that 62.5% of HDP patients who didn't have the HDP-specific Smart Phrase utilized in their discharge summary, were discharged with no documentation of alternate teaching.

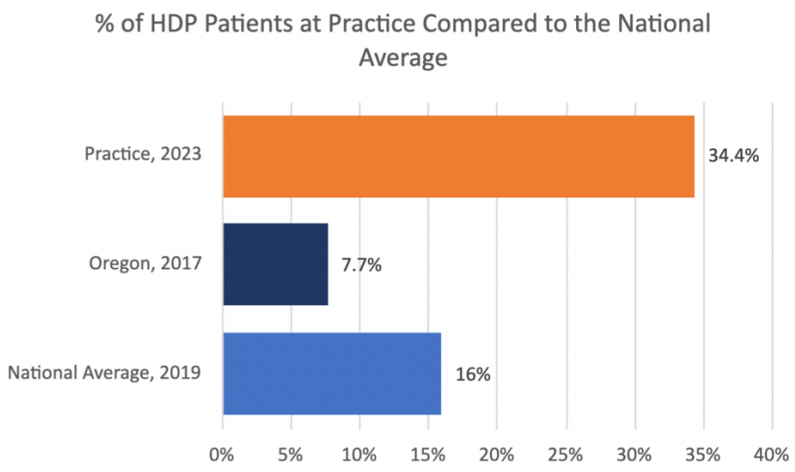
Similarly, for patients with a HDP diagnosis before discharge, the percentage of charts utilizing the HDP-specific AVS increased from 0% in the baseline data to 33.3% in the first PDSA cycle. The AVS utilization followed a similar trend to the discharge summary, with a drop in the second PDSA cycle to 30.8%. This rose again in the third PDSA cycle to 50%.




When the HDP-specific AVS wasn't utilized, 42.1% of the time some form of alternate teaching was included in the AVS. Some providers included an ACOG handout on urgent maternal warning signs while others used an AVS template that listed HDP-specific warning signs like headache, vision changes, and right upper quadrant pain, under a broader list of general warning signs for patients to look out for. Additionally, many providers included written instructions for a 72-hour blood pressure check, but many did not. Of the patients who didn't receive the HDP-specific AVS, 57.9% were discharged home with no additional information included in their AVS.

**Summary**

The first major finding of this project is a percentage of HDP patients at the practice that is more than double the national average. From September to December, 2023, 34.4% of patients who were discharged postpartum from the practice had a HDP diagnosis, compared to 16% of all patients nationally in 2019, and 7.7% of patients in Oregon in 2017.




This dramatic finding further emphasizes the need for standardized discharge teaching at the practice.

The specific aims of the project had varying levels of success. The first, to have 75% of non-HDP patients have documented teaching on postpartum hypertension warning signs in their discharge summary by December 31st, 2023, was not achieved. In December, 61.5% of non-HDP patients had some form of warning signs education documented in their discharge summary, either with the non-HDP Smart Phrase or with alternate teaching. The majority of the alternate teaching that was documented was part of a standardized discharge template that already included postpartum hypertension warning signs, indicating that the added step of using a Smart Phrase is a barrier to implementation.

The second specific aim, to have 75% of charts with a HDP diagnosis to have documented teaching in the discharge summary on warning signs and when to call, accurate home blood pressure monitoring, accessing a blood pressure cuff after discharge, and instructions for a 72-hr clinic blood pressure check, was achieved. This was measured by 80% utilization of the HDP-specific Smart Phrase in the month of December. Alternate documentation in the discharge summary was not included in this percentage because it varied by provider and

often didn't include all of the components outlined in the specific aim. Finally, the use of the HDP-specific AVS rose to 50% by the last PDSA cycles. Together with patients who received alternate teaching in their AVS, meant that 70% of patients went home with some form of HDP-specific information.

While this data paints a picture of success, it also highlights the patients still being missed. For example, in December 2023, 20% of patients who had a HDP diagnosis at discharge had inadequate teaching documented in their discharge summary, and 30% had no additional information included in their AVS. Similarly, 38.5% of non-HDP patients had no documentation of general warning signs education in their discharge summary.

Together, the results from the interventions helped establish baseline data for the practice, helped begin a standardized approach to discharge counseling, and highlighted multiple avenues for improvement.

**Interpretation**

The variation in implementation between PDSA cycles that impeded the project from meeting all of its aims falls into the categories of people, process, and context barriers. The people barriers were the most impactful for this project and presented primarily as difficulty influencing per diem providers to use the modified workflow. The project was adopted fairly well by the 9 full-time midwives and physicians that operate the practice, but with over 110 per diem providers between the two practices, communicating to everyone was hard to account for in the design. The drop in intervention utilization that was noted in the second PDSA cycle was responded to with an email to full-time providers reminding them about the project. Additionally, an email list was obtained for per-diem midwives who were emailed directly to inform them about the project in case they had not been previously aware. A final email was sent to student

midwives to remind them about the project and encourage them to utilize the interventions. This push was successful in stopping the downward trend in intervention utilization for HDP patients but was unable to impact the drop in utilization of the general warning signs Smart Phrase for non-HDP patients. A comprehensive email list was not able to be obtained. The project highlighted a lack of strong routines of connections between providers, specifically between physicians and midwives in the practice. This was evidenced by how hard it was to coordinate communication about the project between providers, many providers not showing up to the monthly collaborative practice meetings, and variation in communication at handoff.

The process barriers identified by the project began with variation between providers with which discharge summary template to use. Within the collaborative practice, four templates were used the majority of the time, only one of which included warning signs for postpartum hypertension in the discharge teaching. When the intervention Smart Phrase or AVS for this project wasn't used, the majority of the 'alternate teaching' that was documented was part of a standardized template, not something that was written in by a provider. Secondly, there was a lack of agreement between providers on the diagnostic criteria for hypertension being two sustained blood pressure greater than four hours apart. Some providers didn't count an elevated pressure that happened at a prenatal visit or while pushing, while others had questions about which protocol to use. One provider noted that the recommendation at an affiliated clinical site within the organization was to recheck within a few hours instead of 15-20 minutes like at the practice where the project took place. Another provider thought that patients from an affiliated clinical site who ended up delivering at the practice should have a separate discharge protocol.

Finally, the overarching context barrier noted by the project was a lack of routine inpatient quality improvement initiatives as a new practice. As one of the first collaborative QI

projects, and the first one focusing on hypertension, it was difficult to coordinate between providers to overcome the process and people barriers noted above. This was exacerbated by the timing of the project, which had two PDSA cycles fall on holiday months. Cancellations of the monthly collaborative practice meetings in November and December, meant it was difficult to connect with providers face-to-face during the second half of the project. It also meant there was an uptake in per diem provider coverage over the Thanksgiving and Christmas holidays. Together these barriers highlight key areas for improvement for the next phase of the project and for the practice at large.

**Limitations**

A confounding variable that may have impacted the validity of the work was the potential for mismatch between what providers charted in the discharge summary and what was actually reviewed with patients at bedside. There was no examination of whether patients received detailed discharge teaching because of providers using the intervention Smart Phrases or AVS. Efforts were made to minimize this potential by discussing it with providers at the second collaborative practice meeting. It was emphasized that although the addition of a Smart Phrase created an extra step for providers, it also helped build the muscle memory that could support a shift in practice.

Additionally, with hypertensive numbers that are double the national average, the recommendations for future iterations of this project are tailored to the specific needs of the practice environment where the project took place and are not necessarily applicable to other locations. What is possibly generalizable, are the overarching process and people barriers highlighted above, which point to important possibilities on why it is difficult to establish a uniform organizational approach towards people with postpartum hypertension.

**Next Steps**

The findings from this project highlight the need for a standardized discharge summary template that includes warning signs for postpartum hypertension for non-HDP patients as well as standardization in the discharge summary and AVS for HDP patients. Because communication at hand-off isn't a reliable means of establishing communication about QI initiatives between providers, standardized templates can support a unified workflow without the additional burden on providers to add a Smart Phrase. This needs to be implemented in conjunction with efforts to bolster discharge teaching to reflect altered discharge templates. On an institutional scale, next steps must also emphasize strong connection routines between midwives and physicians to establish shared values and unify QI efforts.

It is important to note that this project focused on discharge counseling as a strategy to improve postpartum surveillance for HDP patients and to support the practice environment's alignment with professional recommendations. It did not standardize follow-up care after discharge. Future QI projects could focus on supporting the practice to align with the SMFM and ACOG recommendations to transition HDP patients to a continuity provider prior to discharge, to educate patients about the long-term cardiovascular risks associated with HDP, and to recommend low-dose aspirin in future pregnancies (Iriye et al., 2017, McKinney et al., 2018).

Similarly, this project found that only 50% of HDP patients showed up for their 72-hr blood pressure check in the third PDSA cycle. Although more data is needed on the barriers patients face in attending postpartum visits, this finding shows that half of all patients in December 2023 didn't receive the recommended follow-up surveillance that they needed. Other studies have corroborated this finding, with one showing that only 44% of HDP patients return for their office blood pressure check (Hirshberg et al., 2018). This points to the need for

improvement efforts that focus on reducing barriers to follow-up care and meeting patients where they are at.

Together, this information was returned to the practice. Going forward, the practice may benefit from a QI committee that reviews practice policies in relation to benchmarking performance to incentivize collaborative efforts towards multiple QI opportunities.

**Conclusion**

This project provided a useful baseline for understanding the specific practice environment in which the project took place. As one of the first inpatient quality improvement projects at the collaborative practice, it provided concrete evidence on the scope of the problem and the need for investments in improvement initiatives. It also highlighted practice barriers that impacted a coordinated response to the interventions. These findings can support a more tailored approach to QI efforts going forward.

On a broader scale, this project responds to a national gap in postpartum surveillance for hypertension. By designing comprehensive, easy-to-use interventions, it paves the path for other projects to build upon. Future projects, at this practice and in the nation at large, should focus on overcoming internal barriers to discharge standardization so that postpartum patients can receive evidence-based recommendations that can literally save lives.

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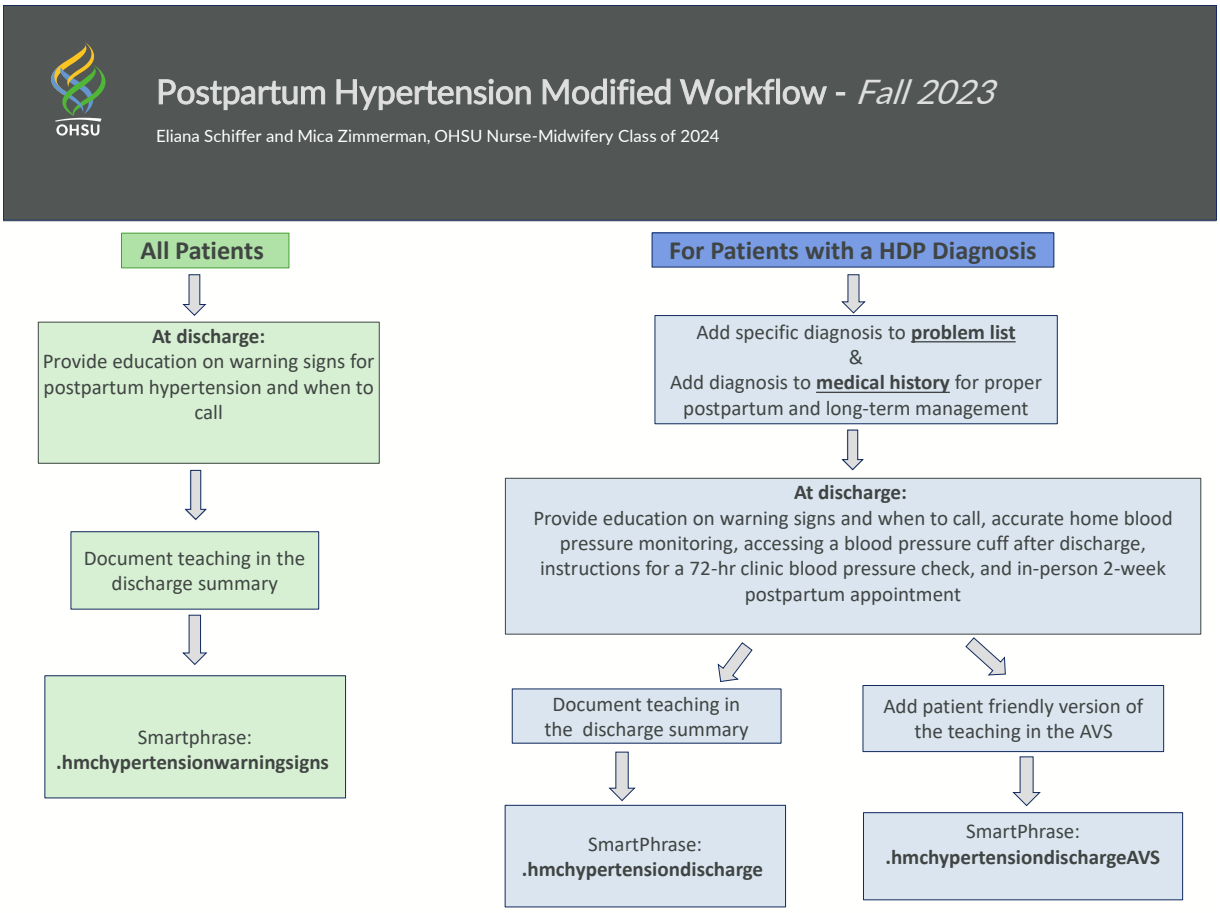
**Appendix A**: Modified workflow diagram



**Appendix B**: Patient-friendly AVS

## Postpartum Preeclampsia Discharge Instructions

You are still at risk after your baby is born

**What is it?** Postpartum preeclampsia is a serious disease related to high blood pressure. It can happen to anyone who has just had a baby up to 6 weeks after the baby is born.

| Warning Signs | | |
|---|---|---|
|  **Severe headaches** |  **Seeing spots or having vision changes** |  **Feeling nauseous or throwing up** |
|  **Swelling in your hands and face** |  **Shortness of breath** |  **Stomach pain** |

**Risks to you:** Left unmanaged, postpartum preeclampsia can lead to seizures, stroke, organ damage, and even death.

**What can you do?** Watch for warning signs and call your provider!

| Recognizing these warning signs can save your life | |
|---|---|
| **Call your healthcare provider right away** If you can't reach your provider, call 911 or go directly to an emergency room and report that you have been pregnant | • Blood pressure at or exceeding 140/90<br>• Severe headache that won't go away<br>• Vision changes<br>• Stomach pain<br>• Swelling in your hands and face<br>• Feeling nauseous or throwing up |
| **Have someone take you to the ER or call 911** | • Blood pressure at or exceeding 160/110<br>• Shortness of breath or trouble breathing<br>• Seeing spots in your vision<br>• Seizures |

# Monitoring Your Blood Pressure After Delivery

**Getting a Blood Pressure Cuff**

- Price: $40-100 or covered by your insurance. Check with your pharmacy to see what is covered. Safeway and Walgreens have in-store and delivery options. Be aware that pharmacies may be closed on the weekends.
- Size: We recommend using an arm cuff. To determine your cuff size, measure the distance around your mid upper arm.
- Call: Our office if you need help getting a blood pressure cuff.

| Arm circumference | | Recommended cuff size |
|---|---|---|
| centimeters (cm) | inches (in) | |
| 22-26 | 8.7-10.2 | Small adult |
| 27-34 | 10.6-13.4 | Adult |
| 35-44 | 13.8-17.3 | Large adult |
| 45-52 | 17.7-20.5 | Extra-large adult |

**Taking Your Blood Pressure**

- Be still: Don't smoke, drink caffeinated beverages or exercise within 30 minutes before measuring your blood pressure. Sit for at least five minutes before taking your blood pressure.
- Sit correctly: Sit with your back straight and supported (on a dining chair, rather than a sofa). Your feet should be flat on the floor and your legs should not be crossed. Your arm should be supported on a flat surface (such as a table) with the upper arm at heart level. Make sure the middle of the cuff is placed directly above the bend of the elbow. Check your monitor's instructions for an illustration or have your healthcare provider show you how.
- Be consistent: When you check your blood pressure, take it at the same time of day and in the same arm. Take your blood pressure at least two times.
- Keep track: Write down or record your blood pressure readings so you can share them with your physician or pregnancy care provider.

| | **Systolic Blood Pressure (top number)** | | **Diastolic Blood Pressure (bottom number)** | **Advice** |
|---|---|---|---|---|
|  | Less than 140 | And | Less than 90 | Continue to monitor as instructed |
|  | 140-159 | Or | 90-109 | Re-check in 20 minutes. Call if it continues to be elevated or if you develop symptoms |
|  | 160 or higher | Or | 110 or higher | Call immediately |

**Follow-up**

- 72-hr clinic blood pressure check: Please present to clinic on your third day postpartum for an in-person blood pressure check. Your nurse will help you schedule your appointment before discharge.
- 2-week postpartum visit: Please schedule your 2-week postpartum visit for in-person and bring your blood pressure cuff and log with you.

**Contact**

- Hillsboro Medical Center Women's Health Clinic: 503-681-4145