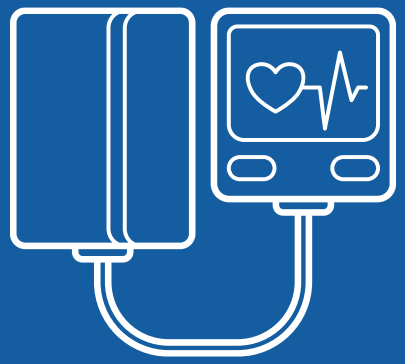


WELCOME!

The convening on remote blood pressure monitoring will begin shortly.

March 3, 2025

01 This convening will be recorded.

02 Please submit questions in the chat or use the “raise hand” feature.

03 Please mute yourself when you are not speaking.

04 Convening resources will be made available to attendees after the event.

Remote Patient Monitoring for Postpartum Hypertension at Baystate Medical Center

Kathaleen Barker, MD, FACOG

Assistant Professor of Ob/Gyn at UMASS Chan Medical School- Baystate

Medical Director of Labor & Delivery

Medical Director of Wesson Evaluation and Treatment Unit

Baystate Health | ADVANCING CARE. ENHANCING LIVES.

Baystate Medical Center

~4,200 births per year

~30% of patients with hypertensive disorders of pregnancy

- Including chronic hypertension, gestational hypertension and preeclampsia

Heterogenous provider group

- Employed physicians
- Employed residents
- Employed midwives
- Community/private physicians
- Community/private midwives

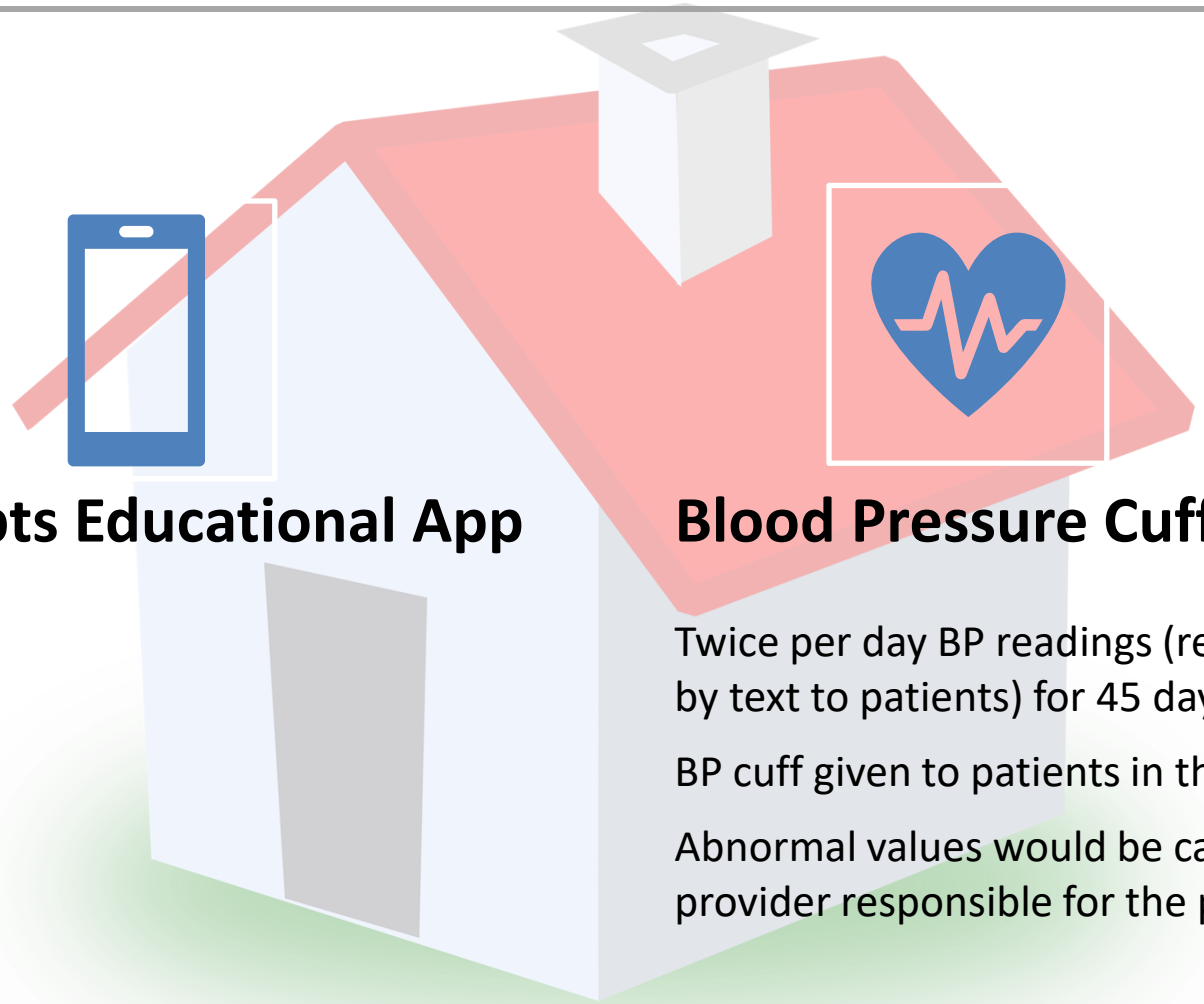
Multiple EMRs (Cerner for employed groups and hospital, athena for private groups)

Previous Standard for PP Care

Blood pressure check within 3-10 days postpartum	In person visits	Significant variation between and within practices on postpartum follow up

• This corresponds with observational studies showing worsening of hypertension in these windows
• ACOG recommendations
	• Compliance is varied and suboptimal
	  • <50% in published studies
	• Childcare, pandemic, transportation are all factors limited compliance
	  • Greatest impact on marginalized communities
		• Difficult for discharge teaching

New Standard for Postpartum Care



Babyscripts Educational App

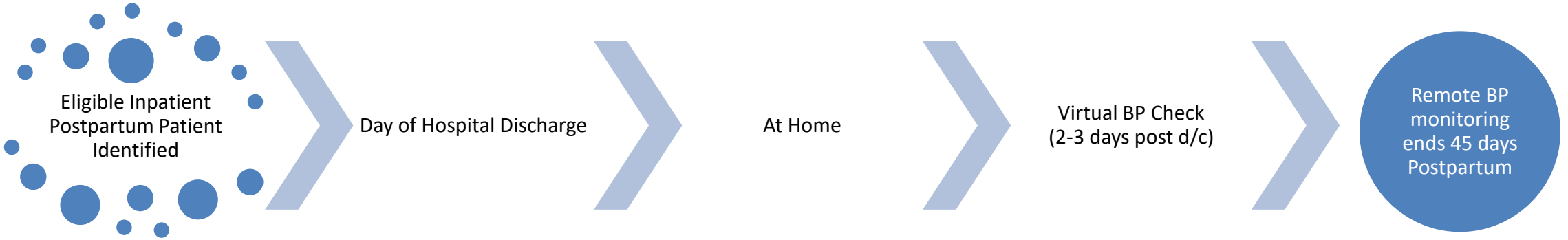
Blood Pressure Cuff

Twice per day BP readings (reminders sent by text to patients) for 45 days

BP cuff given to patients in the hospital

Abnormal values would be called to the provider responsible for the patient

Baystate Medical Center Workflow



- One of following diagnosis:
  - Gestational Hypertension,
  - Preeclampsia,
  - Eclampsia,
  - HELLP syndrome,
  - Chronic Hypertension
- Speaks Spanish or English (Or has family member who does)
- Has smart phone

- Provider enters order in EMR for Program
- Postpartum nurse enrolls the patient electronically
- Nurse supplies the BP cuff and educates patients on proper use

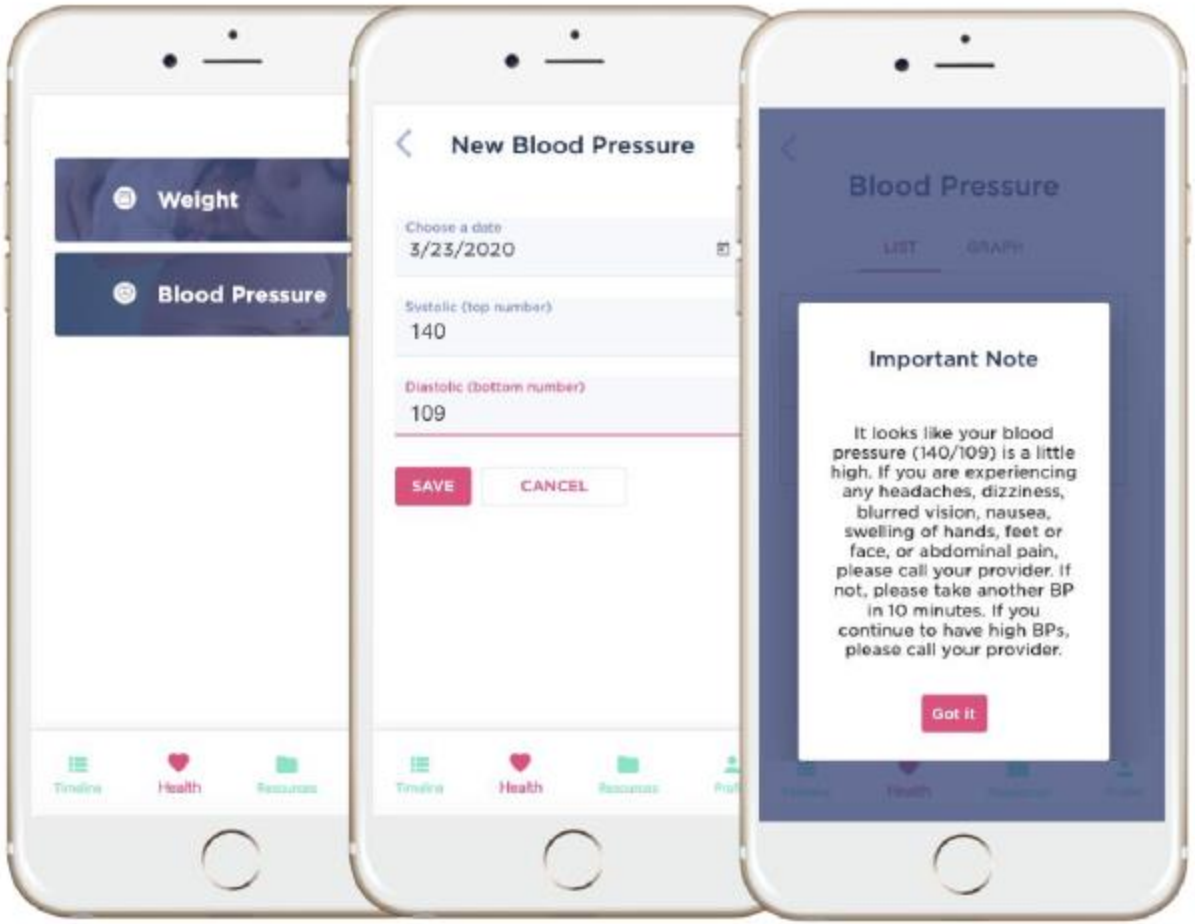
- Patient checks BP twice per day and logs it in the app
- Elevated BP trigger a symptom questionnaire

BP >160/110 or BP >140/90 PLUS symptom Trigger real time call to office or on call provider

- Ambulatory office calls patient to check in and reviews BP logged
- Provider consulted for management based on existing standards in the practice

Patients retain BP cuff and access to educational app (content for 1 year postpartum)

BP Trigger Workflows - Elevated



Elevated Blood Pressure
Between 140/90 and 160/100

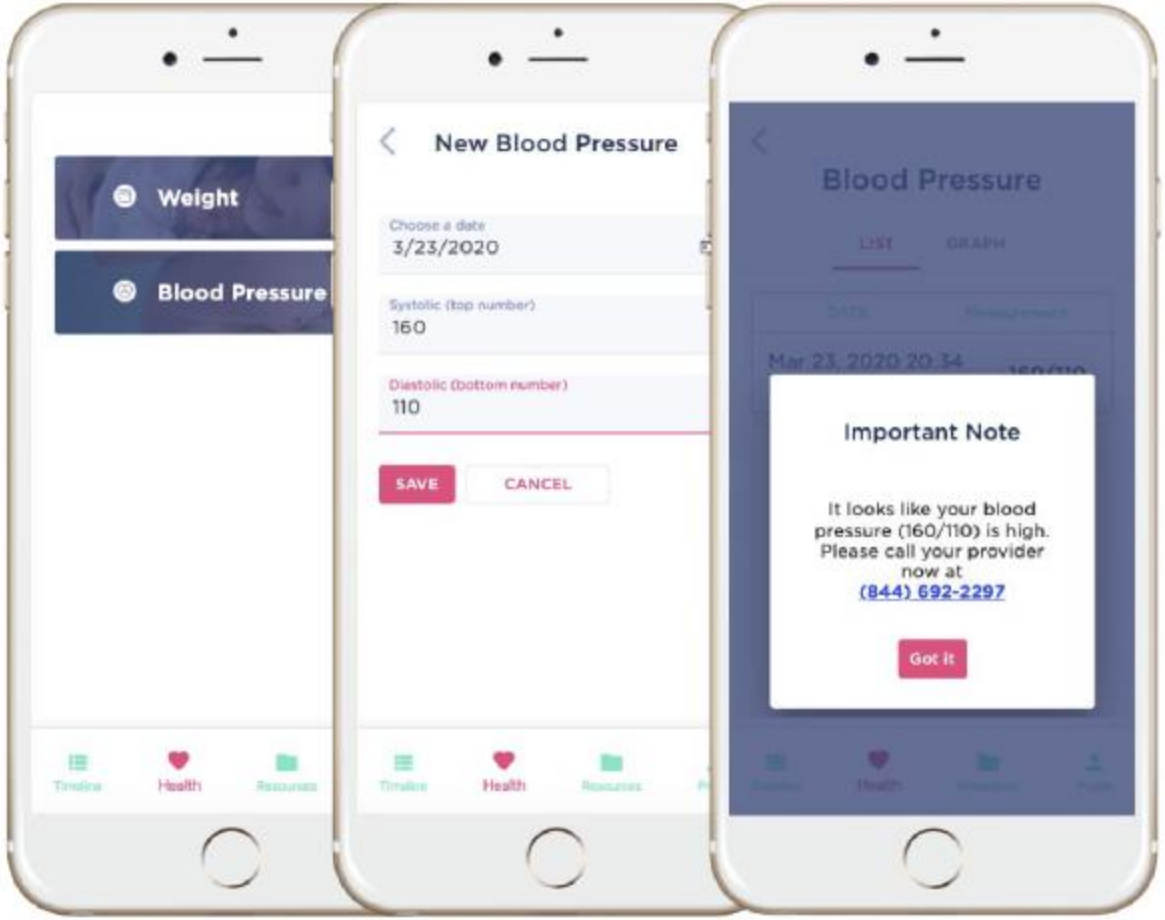
CUSTOMIZABLE Thresholds

Call Center Checks In
Patient receives SMS and E-mail

Retake Blood Pressure
Report Symptoms
If BP remains elevated and/or symptoms are reported

BABYSCRIPTS™

BP Trigger Workflows - Critical



BABYSCRIPTS™

Critical Blood Pressure
Above 160/100

CUSTOMIZABLE Thresholds

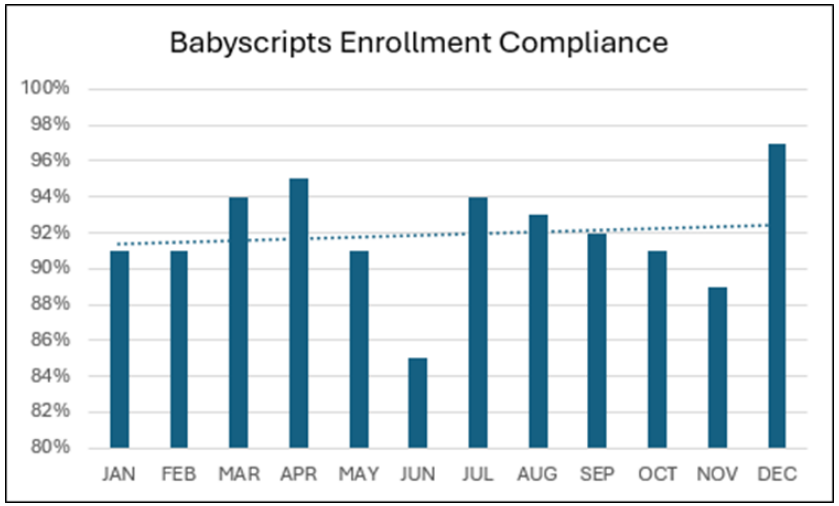
Call Center Checks In
Patient receives SMS and E-mail

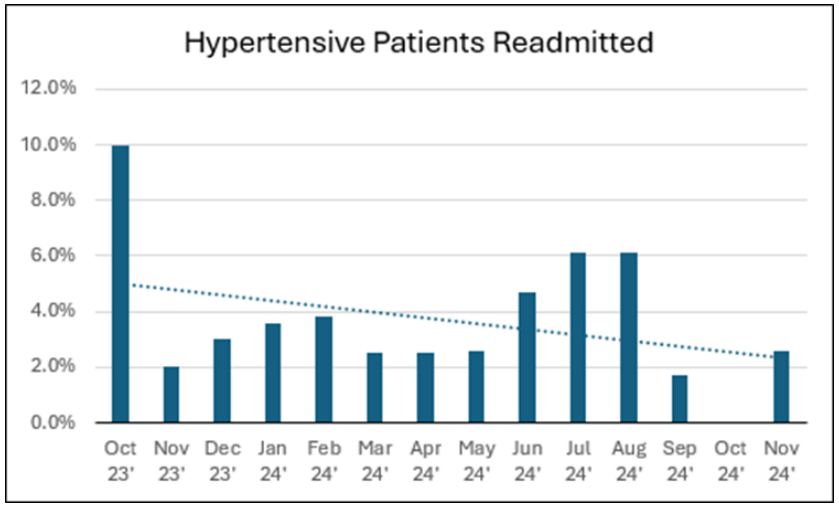
Trigger Event Called In
Clinic receives call immediately

Baystate Data

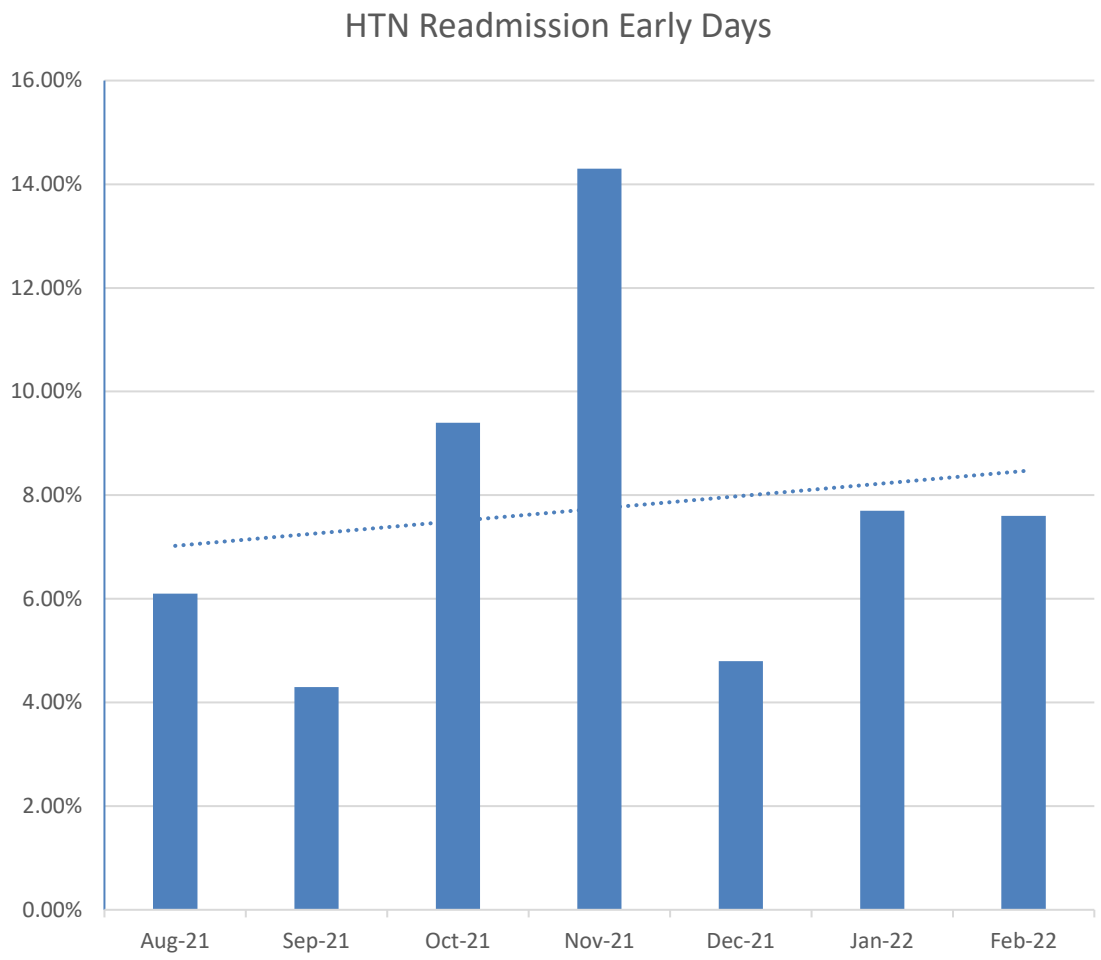
- 1380 patients enrolled in 2024
  - 92% of patients with hypertensive disorders of pregnancy

- Readmission rate in 2024
  - Average 3.6%
  - Median 2.8%



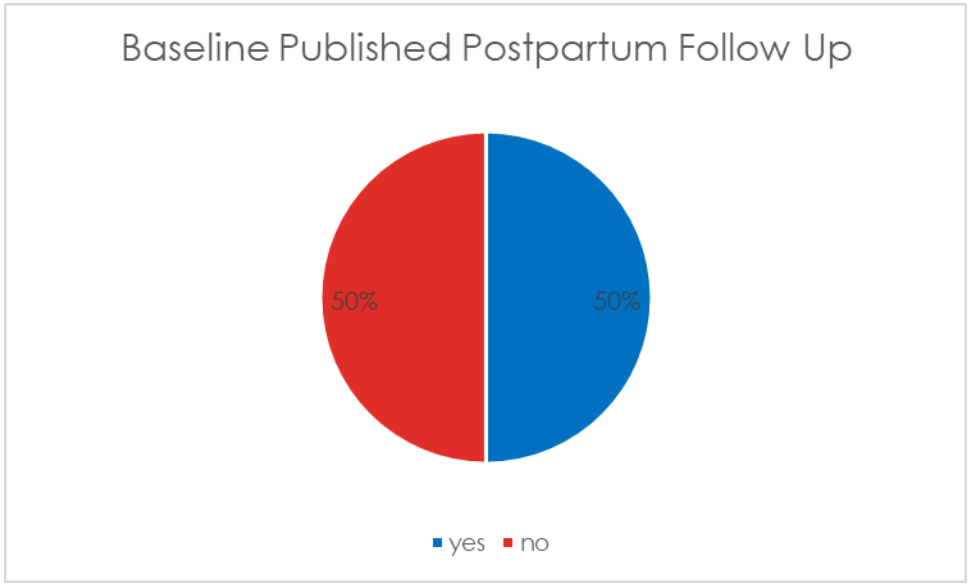


Early Days Data

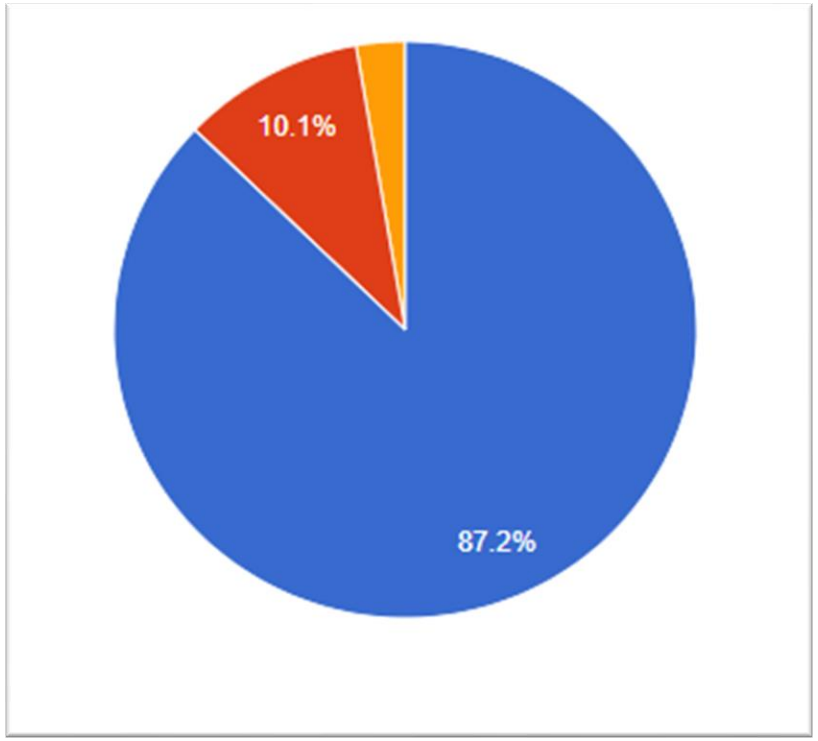


- Do NOT be surprised when readmission rates go UP
- When you start looking for something, you will find more of it

Impact on Postpartum Care



Postpartum Follow up with Babyscripts



Patient Feedback

"I felt very connected and supported by my health care provider and her office"

"Monitoring health while at home was convenient while taking care of a newborn"

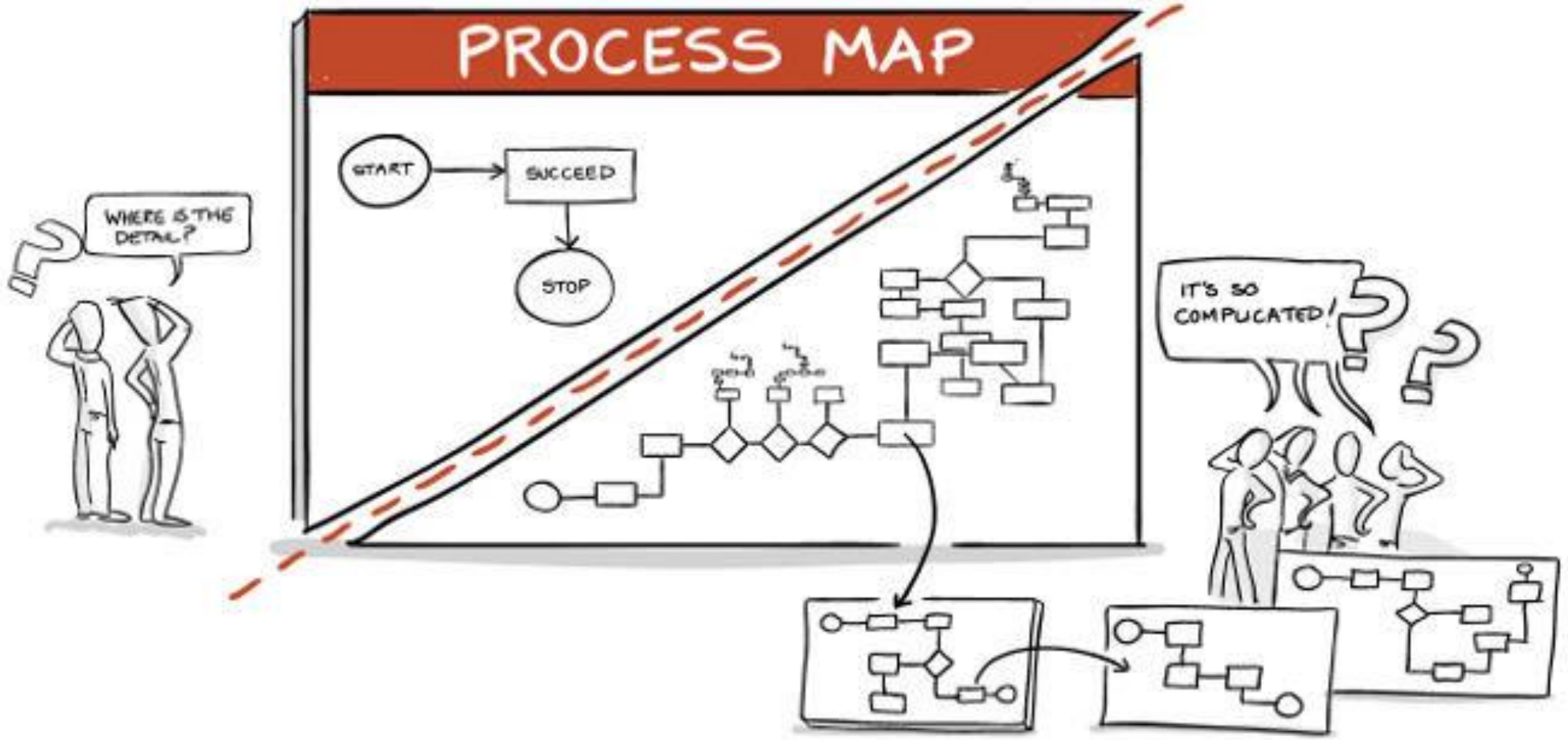
"Cambiar nada, todo perfecto. Solamente darla las gracias a todos"

"I felt safe knowing I had a reliable machine to check my blood pressures and they could be directly communicated to my care team if dangerously high"

"It was extremely convenient! The hospital I birthed at is an hour away from my home so it made it easy to give them accurate BP measurements postpartum"

"The care team was amazing! The Babyscripts and the team saved my life and our baby's life. Thank you!"

How did we get here?



Establish a team

- Executive sponsor
- Overall clinical Champion
- Inpatient nursing leader
- Inpatient nurse educator
- Outpatient nursing leader
- Outpatient clinical champion
- Outcomes Nurse/Data support

Establish the clinical expectations

- Who will be eligible for postpartum RPM?
  - Protocols and guidelines help
- What triggers will you use to escalate care?
  - Will the communication/process be same or different during office hours and at night?
- What thresholds do you want to use for medication initiation or modifications?

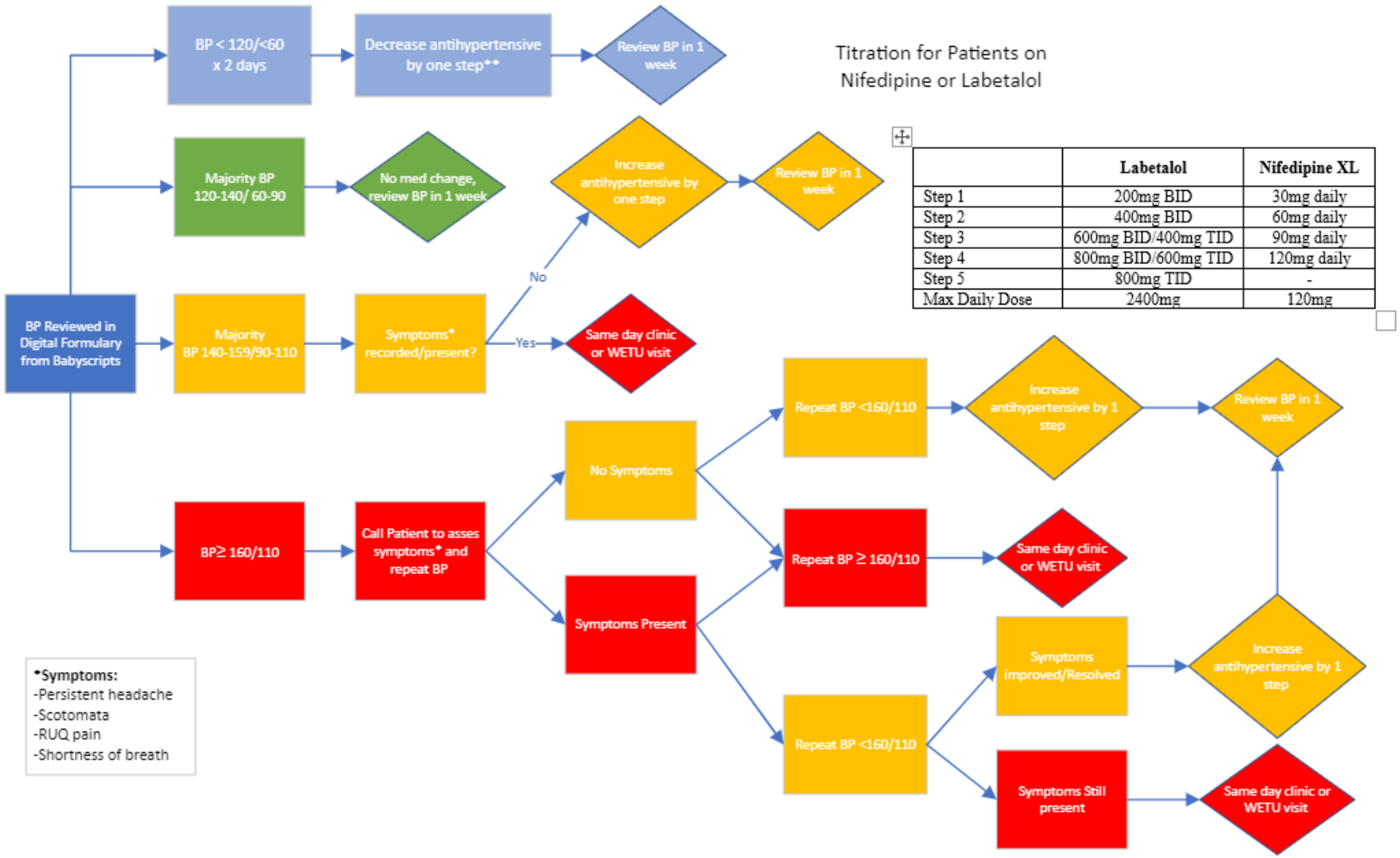
Baystate Clinical Triggers

Postpartum Htn Monitoring	Elevated	Critical*
Systolic BP	140	160
Diastolic BP	90	110
Symptom Count	1	n/a
Office Hours Response	call office	call office
After hours response	page on call provider	page on call provider

*Primary difference is in the messaging patient receives through the app

Algorithm 1: Postpartum Antihypertensive Medication Initiation in Outpatient Setting

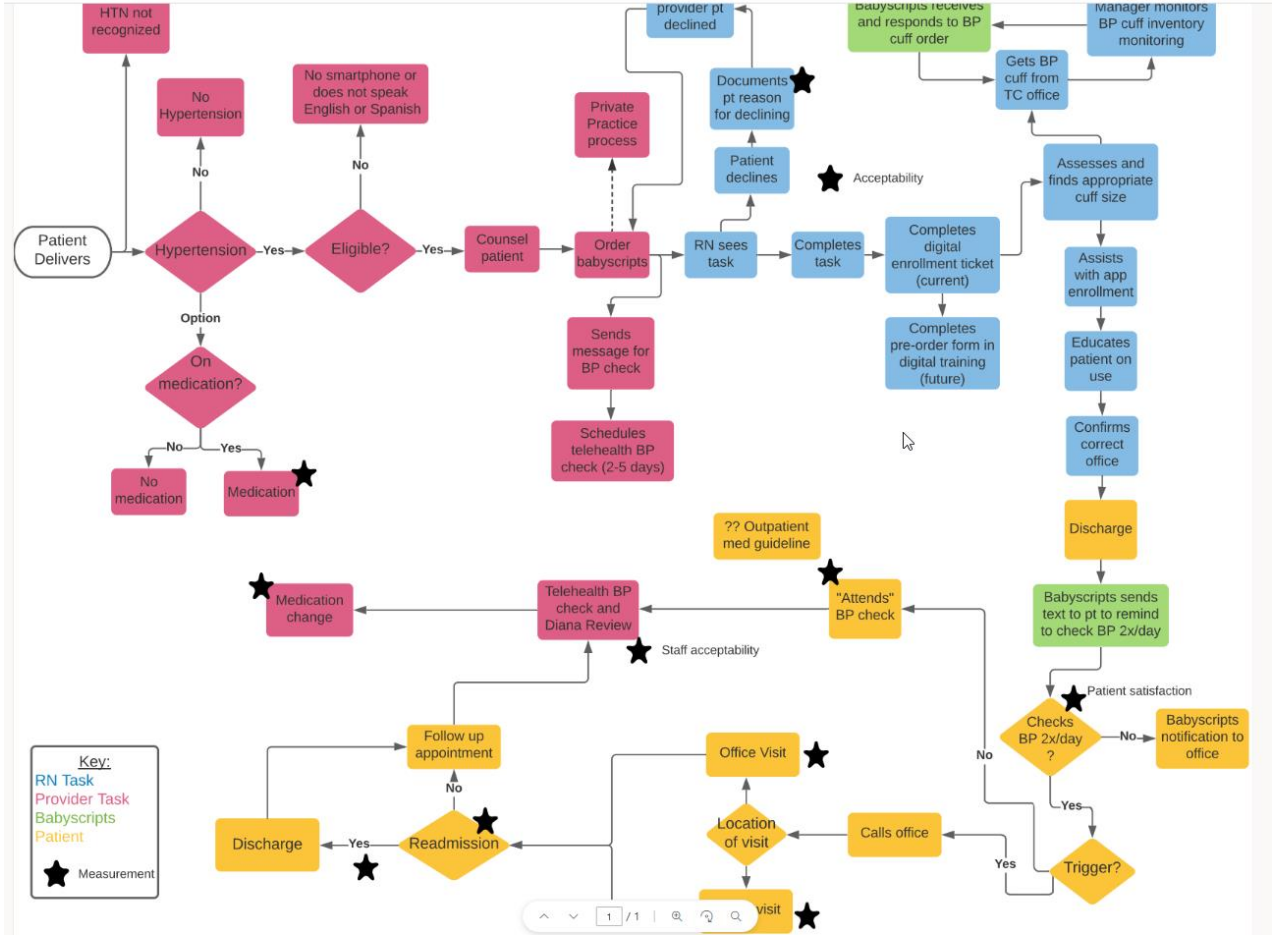
Algorithm 2: Patients currently on oral antihypertensive medication



Titration for Patients on Nifedipine or Labetalol

	Labetalol	Nifedipine XL
Step 1	200mg BID	30mg daily
Step 2	400mg BID	60mg daily
Step 3	600mg BID/400mg TID	90mg daily
Step 4	800mg BID/600mg TID	120mg daily
Step 5	800mg TID	-
Max Daily Dose	2400mg	120mg

Create a process map to define responsibilities



Educate, educate, educate

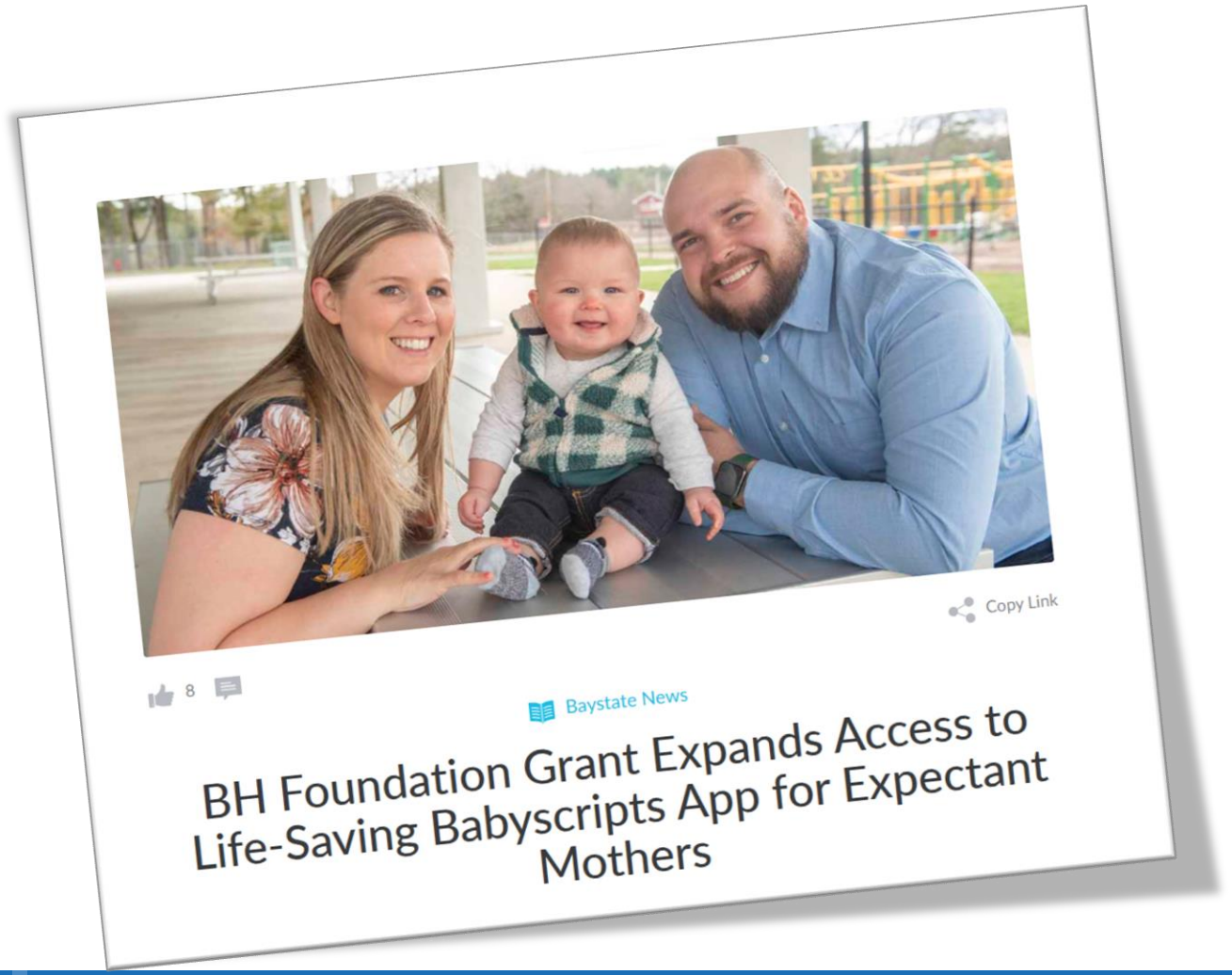
AMBULATORY NURSES AND PROVIDERS

INPATIENT NURSES AND PROVIDERS

Expect challenges

- Increase in triage calls- nursing and providers
- Challenges about “validity of home BP cuff”
- Diagnostic criteria for enrollment
  - Convincing people “real” hypertension matters
- Financial sustainment
  - Start working on reimbursement now

Questions?



Boston Medical Center

Obstetrics Remote Blood Pressure Program: Overview, Best Practices & Lessons Learned

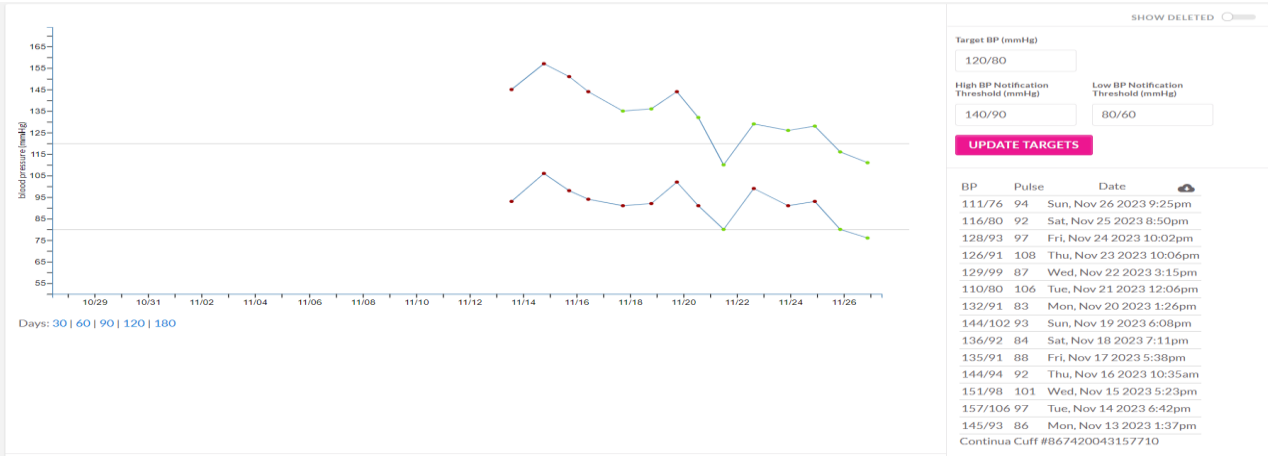
Megan O'Brien, MSN, RN- Clinical Program Manager

March 3rd, 2025

Boston Medical Center
HEALTH SYSTEM

Overview: Antepartum and Postpartum Blood Pressure Program

- Cell-enabled technology bridges digital divide: no reliance on a patient's data plan or access to wi-fi/broadband, apps, Bluetooth, etc…
- Care model based on home BP measurements helps to build trust, consistency with team members and primary OB.
- Better data for accurate diagnosis and timely treatment. Right level of care at the right time.
- Elements of preeclampsia education created based on feedback from qualitative interviews directly from our patients who had preeclampsia during their births at BMC.
- Education tool is multilingual (English, Spanish, Haitian Creole)



Components

- DME: **Cell-enabled** remote blood pressure monitoring
- Personnel: 1.5 FTE **nurse** (~350 patients) 0.4 Clinical Pharmacist. MFM provider as needed. Administrative and operations support.
- Technology: Iterated **digital portal** that allows for succinct data review of out of range BP's by RN.
- EMR: Remote data is integrated into Epic by launch tab and dot phrase; E-consultation is used for medication management via Pharm-D and MFM team(s).
- Education: Telemedicine visit with BP RN at first prenatal visit (or at qualifying diagnosis) and within 72 hrs of discharge for postpartum patients to review BP's & provide education reinforcement.

Continued Goal: Breaking population health barriers

- We have provided **over 3400 of our eligible patients with blood pressure cuffs** since the program's launch in April 2022 (1400 patients annually, ~40% of BMC's delivery volume).
- The Clinical Nurse Program Manager connects with patients in the remote portal (text messaging) and through telehealth visits (video or phone) for initial enrollment visits (prenatal and postpartum) and as needed based on received data.
- As a result of the increased touchpoints we have established more trusting relationships and continuity with our patients
- We are **educating patients early and often** on the proper way to take their blood pressure, why taking their blood pressure is important, what **signs and symptoms of preeclampsia** to look out for, empowering the patient to self evaluate and how to quickly access care if needed.

Prenatal Enrollment (USPSTF Criteria):
Chronic Hypertension
Type 1 or 2 Diabetes
History of pre-eclampsia
Multifetal Gestation
Kidney or Autoimmune Disease
New diagnosis of pre-eclampsia

Postpartum Enrollment:
Chronic Hypertension
History of pre-eclampsia
New diagnosis of gHTN, pre-eclampsia, Eclampsia

US Preventive Services Taskforce. (2017, April 25). *Preeclampsia: Screening*. Recommendation: Preeclampsia: Screening | United States Preventive Services Taskforce.

1 Who are we monitoring?

Characteristic	% (n)
Race/Ethnicity	
Black/African-American	59%
Hispanic/Latinx	23%
White	12%
Age	
20-29	25%
30-39	64%
40+	12%

Why are they being monitored?

Characteristic	% (n)
Chronic Hypertension	42%
DM 1&2	11%
Hx Pre-Eclampsia	28%
Twins	5%
Current Pre-Eclampsia	14%

Boston Medical Center (2023) Health Equity Accelerator, Internal Data.

Remote Patient Monitoring: Current Team Makeup & Clinical Workflows

BMC's RPM team:

-1.5 FTE Nursing (Review incoming BP data)

-0.4 Clinical Pharmacist

-0.1 Administrative & Operational support

-0.1 MFM Physician oversight

Nursing Responsibilities:

-Patient data is reviewed M-F 8-5pm.

-Nursing is the driver of all actionable care: medication titrations (through PharmD), MFM e-consults (antepartum med titrations), triage visits, communication to primary OB team. PCP connection at discharge.

Enrollment Process:

-**Outpatient:** At prenatal visit, as soon as enrollment dx is identified by OB provider. Medical Assistant fits device, correlates with clinic machine, registers device, schedules BP RN Telemedicine visit and gives written education material in patients preferred language (~10 minutes).

-**Inpatient:** If patient is not already enrolled and meets criteria for formal HTN diagnosis while inpatient, inpatient OB provider orders BP device, Postpartum RN fits the device, correlates with hospital machine, provides education and written instruction to patient in preferred language. Unit Coordinator registers device and schedules BP RN Telemedicine visit within 3 business days of discharge.

*Primary focus of education is for patients to understand how to interpret BP data and what to do if numbers reach certain thresholds. Goal is *NOT* for patients to wait for a call from staff/BP Team.

Best Practices and Lessons Learned

Practice Changes led by OB Task force:

- Formal review and revision of inpatient, L&D triage and ambulatory hypertension policies and guidelines.
- Creation of new HTN management guidelines for clinic visits, L&D triage and postpartum to drive standardization of care across practices, providers and care settings.
- BP Program algorithms and department based care now in sync.
- Program benefits from continuous oversight, PDSA cycles, staff facing education.
- 93% of patients meeting ACOG recommendation for BP check within 72 hrs of discharge.

Budget Support:

- Transitioned from fully grant funded to ambulatory (outpatient program) and nursing budget (inpatient program).
- Telemedicine visit volume supports RN FTE's and some cost but does not cover full annual expenses.

Nursing role evolution:

- Became a highly patient-centered care manager relationship.
- RN assists with BF referral, SW referral, PT-1 coordination, Mental health referral, Medication management, care coordination, PCP connection.

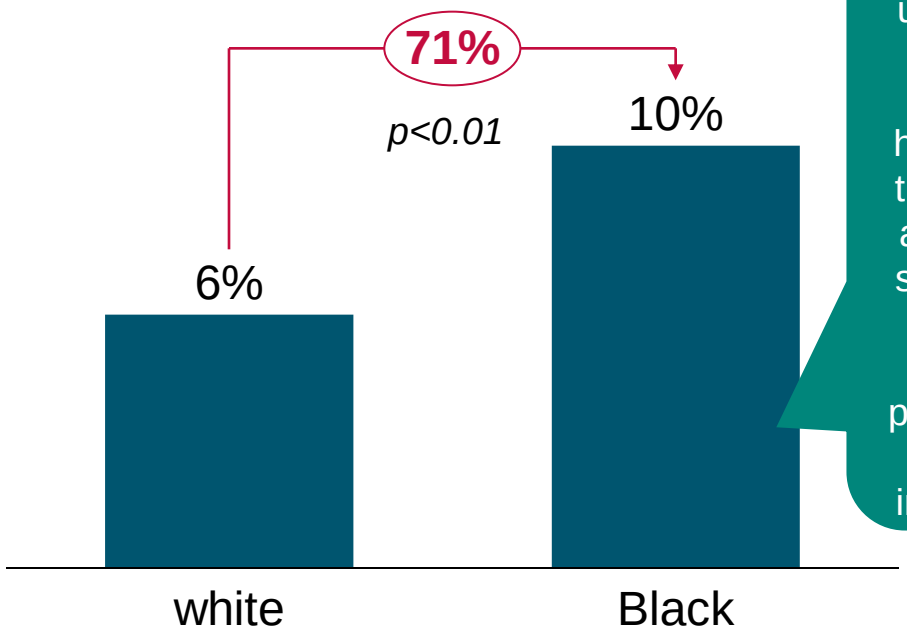
Early and frequent monitoring helps to accurately diagnose hypertension related conditions during pregnancy

Gestational HTN vs. Chronic Hypertension

Preeclampsia	Chronic hypertension
Earlier delivery	Later delivery
More prematurity	Less prematurity
Managed with hospitalization	Managed with medication and close monitoring

- Early distribution of blood pressure cuffs helps identify if a patient's rise is in blood pressure is associated with preeclampsia or chronic hypertension.
- Preeclampsia and chronic hypertension are managed differently and proper distinction is key in providing best practice recommendations.

Percent of pregnant patients who developed preeclampsia in each group



We are uncovering the diagnosis of chronic hypertension in the patients we are surveilling, suggesting this difference in preeclampsia prevalence may be lower than initially thought

Boston Medical Center
HEALTH SYSTEM

Boston Medical Center (2023) Health Equity Accelerator, Internal Data.

Thank you!

Boston Medical Center
HEALTH SYSTEM

Mass General Brigham

Home Safe

Saba Berhie, MD
Maternal-Fetal Medicine, BWH
Clinical Instructor, Harvard Medical School

On behalf of the Home Safe team

3.3.25

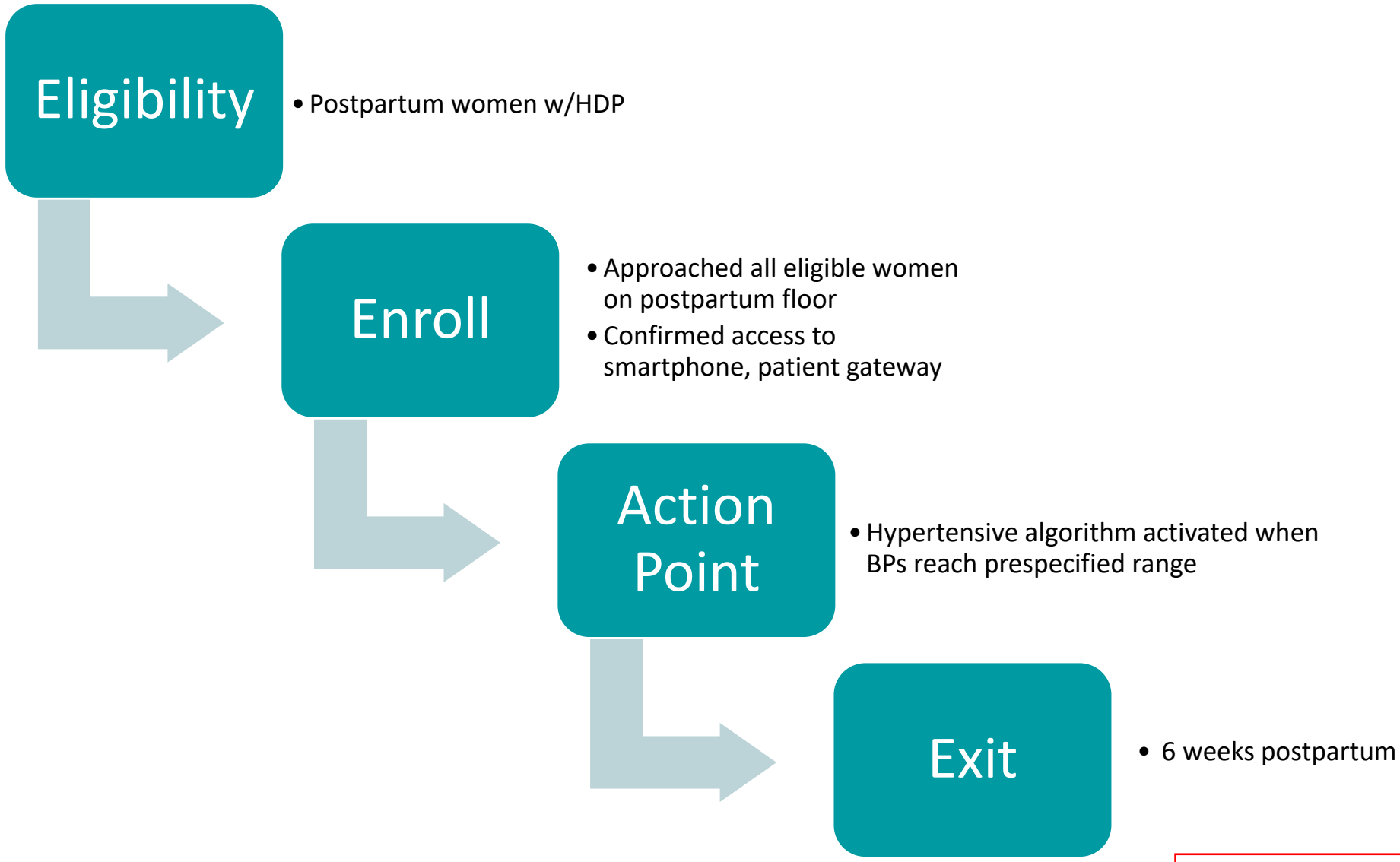
Disclosures

No disclosures

Home Safe: Postpartum BP Monitoring Program

- Remote home BP monitoring program
- Put into place structured BP monitoring program for postpartum people w/hypertensive disorders of pregnancy (HDP) for 6 weeks via EPIC EMR
- Enrolling: (Started 1/9/2023)
  - Those with HDP
  - Receiving care from faculty generalist, MFM, resident clinic at our institution
  - English or Spanish speaking
- Still continuing routine postpartum care/follow-up

Home Safe: Postpartum BP Monitoring Program



Home Safe: Team makeup and roles

- **Population Health Coordinator:** Seema Gupta
  - Enrolls patient
  - Troubleshoots connectivity
  - Connects with patients
  - Collects data for QI/research

- **MFM RN Team:** Led by Bridget Mirarchi, Stephanie Eleyi
  - Reviews BPs daily
  - Connects with patients
  - Escalates patients to PA team for same day visits, medication titration, triage evaluations

Home Safe: Team makeup and roles

- **Physician Assistant Team:** led by Nicole Patton
  - Part of inpatient rounding team
  - 1 week outpatient BP visit (virtual or in person)
  - Adds patients for same day visits
  - Remote medication titration
  - Decision making for triage

- **Physician Team:** led by me, Louise Wilkins-Haug, Ellen Seely, Ann Celi
  - Monthly meetings to troubleshoot issues with the program
  - Brainstorm innovative solutions
  - Apply for further funding, collaboration

Best Practices + Lessons Learned

- Continue routine care to ensure no patients are lost when starting a new program

- Standing meetings with the clinical team
  - Initially twice a month
  - Now once a month
  - Space to come together to troubleshoot, check-in

- Requires champions from all the different teams

- Leadership champions essential

- Data organization strategy early
  - REDcap or other secured sites

- Okay to begin a program 70% ready

- Prioritize the concerns of the team managing the day-to-day of the program

Considerations for health and racial equity

- Teaching hospital: essential to include patients from multiple services
  - Resident/faculty practices
- Language inclusion: Spanish
- Evaluate data to find areas for improvement, ways to connect with patients from diverse backgrounds
- PHC: point person improved adherence to program

642 people enrolled : 1/2023-12/2024		N(%)
Race	White	318 (49.5)
	Black	163 (25.4)
	Unknown	78 (12.1)
	Other	43 (6.7)
	Asian	37 (5.8)
	Native Hawaiian or other Pacific Islander	2 (.3)
	American Indian	1 (0.2)
Ethnicity	Non-Hispanic	485 (75.5)
	Hispanic	144 (22.4)
	Unknown	13 (2)
Insurance	Private	493 (76.8)
	Public	147 (22.9)
	Unknown	2 (0.3)
Marital Status	Married	363 (56.5)
	Single	242 (37.7)
	Other	31 (4.8)
	Unknown	6 (0.9)
G/P	Nulliparous	353 (55)
	Parous	289 (45)
Hypertension history	Gestational hypertension	159 (24.8)
	Preeclampsia with severe features	151 (23.5)
	Chronic hypertension	102 (15.9)
	Chronic hypertension with superimposed preeclampsia	100 (15.6)
	Preeclampsia without severe features	65 (10.1)
	Hx of Postpartum preeclampsia, other	65 (10.1)
Hypertensive medications	On anti-hypertensive during pregnancy	132 (20.6)
	Anti-hypertensive after delivery (started in hospital)	222 (34.6)
	Anti-hypertensive started after postpartum discharge (started outpatient)	158 (24.6)
Care Engagement	Attend 6 week postpartum visit	526 (81.9)
	At least one BP sent in during first week after discharge	434 (67.6)

		Yes	No	
Variable		N (%)	N (%)	P-value
Race	Black	88 (20.18)	71 (34.8)	
	Asian	29(6.65)	8(3.92)	
	Other	75 (17.2)	60 (29.41)	
	White	244 (55.96)	65 (31.86)	< 0.001
Ethnicity	Hispanic	89 (54)	54 (26.47)	
	Non-Hispanic	338 (77.52)	146 (71.57	
	Unknown	9 (2.06)	4 (1.96)	0.23
Insurance Type	Private	366 (83.94)	125 (61.27)	
	Public	69 (15.83)	78 (38.24)	< 0.001
Marital Status	Single	141 (32.34)	99 (48.53)	
	Unknown	0	6 (2.94)	
	Other	19 (4.36)	12 (5.88)	
	Married	276 (63.3)	87 (42.65)	<0.001
DELIVERY VARIABLES				
Primary OB Provider	CNM	31 (7.11)	30 (14.71)	
	Generalist	26 (5.96)	28 (13.73)	
	Resident Clinic	103 (23.62)	40 (19.61)	
	MFM	276 (63.3)	106 (51.96)	<0.001
Parity	Nulliparous	256 (58.72)	95 (46.57)	
	Parous	180 (41.28)	109 (53.43)	0.005
Mode of Delivery	Cesarean section	233 (53.44)	113 (55.39)	
	Forceps assisted vaginal delivery	13 (2.98)	3 (1.47)	
	Vacuum assisted vaginal delivery	7. (1.61)	0	
	Vaginal delivery after cesarean (VBAC)	12 (2.75)	2 (.098)	
	Spontaneous vaginal delivery	171 (39.22)	86 (42.16)	0.139
NICU Admission?	No	309	136	
	Yes	127	68	0.325

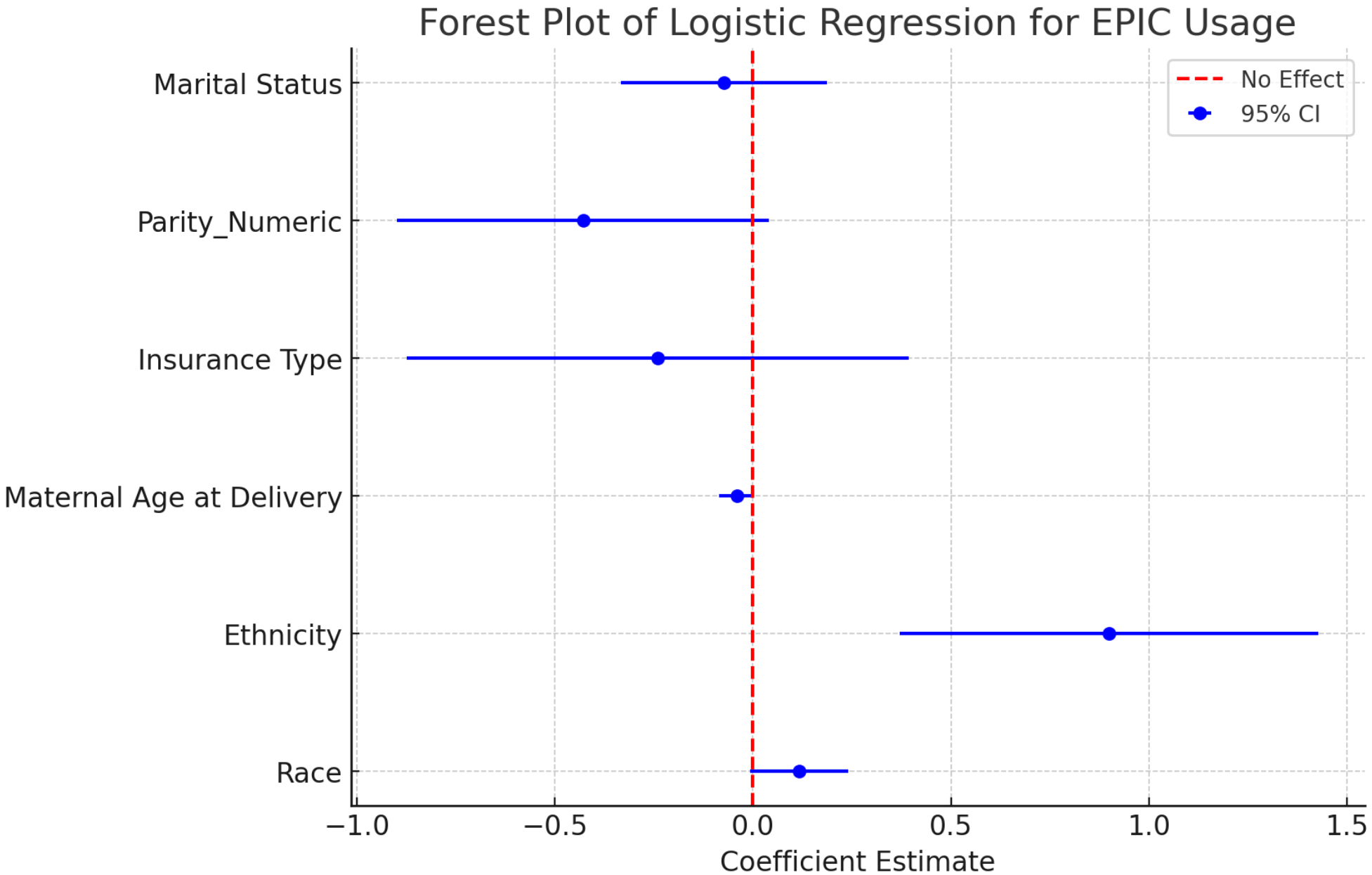
Patients sending in BP within 1 week postpartum

Maternal Disease Variables				
		Yes N (%)	No N(%)	P-value
Maternal Hypertension	Gestational hypertension	108 (24.77)	51 (25)	
	Preeclampsia with severe features	110 (25.23)	41 (20.1)	
	Chronic hypertension with superimposed preeclampsia	65 (14.91)	34 (16.67)	
	None	39 (8.94)	26 (12.75)	
	Preeclampsia without severe features	45 (10.32)	20 (9.8)	
	Chronic hypertension	69 (15.83)	32 (15.69)	0.796
On anti-hypertensive during pregnancy?	No	348 (79.82)	161 (78.92)	
	Yes	88 (20.18)	43 (21.08)	0.876
On anti-hypertensive after postpartum discharge? (started in hospital)	No	145 (33.26)	76 (37.25)	
	Yes	291 (66.74)	128 (62.75)	0.367

Patients sending in BP within 1 week postpartum

Patients sending in BP within 1 week postpartum

- Multivariable analysis: Parity (p = 0.003), suggesting that women with more previous births are less likely to send BP
- Race is trending towards significance
- Maternal hypertension, mode of delivery, NICU admission, and anti-hypertensive medication use do not appear to influence BP submission.



Thank you!

BETSY LEHMAN CENTER for Patient Safety

HEART-BP Quantitative Evaluation Plan

March 3, 2025

NOT FOR DISTRIBUTION

The Betsy Lehman Center for Patient Safety is …

… a non-regulatory Massachusetts **state agency** that catalyzes the efforts of providers, patients and policymakers to advance the safety and quality of health care in all settings

Within but not of CHIA*

OB data repository for PNQIN

HPC/BLC HEART-BP evaluation

*Center for Health Information and Analysis

Evaluation Workflow

- BLC will deidentify, aggregate and analyze data before sharing it with partners
- Awardees will access summary analyses through Tableau or Excel

* Emergency department and hospital discharge data that hospitals are required to submit to sister state agency, Center for Health Information and Analysis

BLC does not need data use agreements with awardees

- Awardees have signed contracts with Health Policy Commission (HPC)
  - Language specifies evaluation data will be submitted to BLC
- BLC and HPC have an ISA in place
  - Specifies rules for BLC protecting confidential data
  - Specifies BLC analyzes data and provides de-identified data to HPC
- BLC general counsel has indicated no further agreements are required

Why collect data?

- Evaluation—telling the story of your program
- Implementation—understanding if you're reaching goals
- Learning—understanding the impact of choices, changes, or circumstances
- Quality Improvement—understanding where things have improved and where there's room for improvement
- Equity—understanding what populations need and where disparities exist

HPC role with data

- Supporting development of workflows
- Reviewing processed data, collaborating with BLC and awardees on data cleaning and quality assurance
- Supporting awardee review of data
- Supporting Quality Improvement efforts based on data
- Evaluation

Evaluation

- Evaluation
  - At the highest level, asking "How did it go?"
- Answering key questions
  - How many people were served?
  - How long did people stay in the program?
  - What were the outcomes?
    - BP, complications, ED visits, admissions
  - Is there a connection between any factors and positive or negative outcomes?
    - Factors could be time in the program, patient characteristics or needs, receipt of certain services, etc.

Data collection tips and lessons learned

- Start early!
- Identify the right people to talk to in order to facilitate data collection
- Build data collection into workflows
- Have a point person
- Ask questions

BLC role with data

- Intaking quantitative data from awardees
- Linking with administrative data
- Deidentify it
- Share deidentified and aggregate data with awardees and HPC
- Partner with HPC to support evaluation

Data measure tips and lessons learned

- Data consistency is key
  - Same column names every month
  - Same column order every month
  - Same formatting every month
- Participant ID = enrollee MRN
  - Used for data linkages across data files from awardees, BP monitoring vendors, Hospital Discharge Data
  - Should be consistent across all data files
  - Should be included in all data files

Data Submission Process: MoveIt

- MoveIt is the secure data transfer service used to send confidential data files between awardees and BLC
- User accounts will be set up for awardees by CHIA. Awardees will be sent a step-by-step guide to logging in, sending, and downloading files securely
  - Process is similar to sending/receiving emails through a browser-based email service
- Awardees sign into MoveIt with email, password, and authentication code (sent via email, text message, or MFA app)
  - MoveIt requires passwords to be changed regularly
  - For password resets, email DL-SecurityTeam@chiamass.gov
- Your hospital's IT security team may have MoveIt blocked in your system
  - Please check with them that you can access *filetransfer.chiamass.gov*

Outcome Reporting Schedules

Participation/Enrollment (% offered, % disenrolled)	• Awardees submit data to BLC every month • Due 2-4 weeks after last day of month (July data due by Aug. 31st) • Analyses ready 2 weeks later (Sept. 15 for July data)
Readmissions/Severe Maternal Morbidity	• Relies on administrative data. Awardees do not submit extra data elements • Some awardees updated monthly (~September 15th for July discharges) • Other awardees updated quarterly (~December 1 for July 1-September 30, 2025)
ED visits	• **ED visit rate** relies on administrative data and updated quarterly (~December 1 for July1-September 30, 2025) • **Reason for ED visit** relies on awardee reporting. Awardees will be asked to report on ED reasons 2X- halfway through data collection and at the end.

SMM monthly program: Hospitals submit data to CHIA monthly instead of quarterly

CHIA will intake all delivery discharge records from interested hospitals through the CHIA submission portal every month.

BLC staff will then run analysis in SAS to identify SMM cases for each hospital

Identified cases will then be shared with provider teams for confirmation after which final reports will be generated

Generated reports will be saved in a secure website where hospitals can then log in and see/review their report

- **Uses data submission process hospitals already use**
  - Only change is how often files are submitted (from quarterly to monthly)
- **BLC will coordinate with CHIA, awardee clinicians, and hospital data submitters for onboarding**

Thank You!

Betsy Lehman Center

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- Julia Prentice, Julia.Prentice@betsylehmancenterma.gov
- Zev Morgan, Zev.Morgan@betsylehmancenterma.gov

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- General evaluation questions
- Catherine MacLean, Catherine.MacLean@mass.gov
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THANK YOU FOR JOINING!

Questions?

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