

# High Blood Pressure After Childbirth Nearly Triples Risk of Readmission

Team A: Kelly Gibson, MD; Joey Haddock, Grant Keane

Team B: Christopher Alban, MD; Tim Keogh, Natasha Joseph

Last updated 20 December 2022 • Check for updates at [EpicResearch.org](https://EpicResearch.org)

## Key Findings:

- Higher inpatient postpartum blood pressure readings correlate with higher readmission rates for postpartum patients after discharge. Patients with blood pressure levels at or above 160/110 shortly before discharge are nearly three times more likely to be readmitted than patients with normal blood pressure readings.

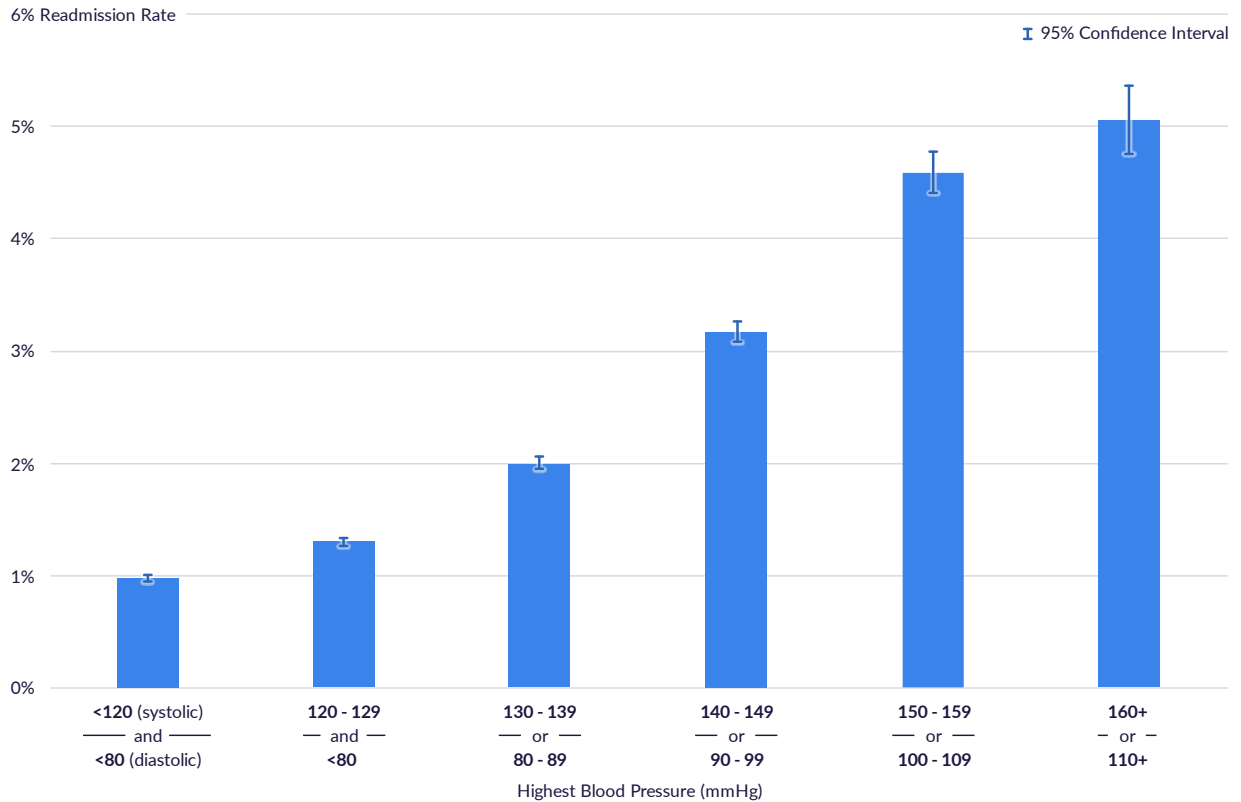
## Recommended Actions:

- Healthcare providers should actively manage blood pressures for postpartum patients after discharge.
- Healthcare organizations should use postpartum programs, such as home monitoring programs, to reduce the risk of postpartum readmissions.

Postpartum hypertension is a major reason for postpartum readmission in the United States<sup>1</sup>. Previous studies have found evidence that a postpartum patient's maximum blood pressure reading during the labor and delivery admission can help predict the likelihood of readmission<sup>2</sup>.

To further understand the relationship between postpartum blood pressure control at discharge and its influence on readmission rates within the first six weeks after delivery, we looked at more than 1.2 million birth encounters and grouped patients into categories based on the highest blood pressure reading taken in the 24 hours prior to their discharge. We then compared the readmission rates across these groups.

## Higher Blood Pressures Correlated with Increased Readmission Rates



"Higher Blood Pressures Correlated with Increased Readmission Rates," 2022. EpicResearch.org

Figure 1. Readmission rates within six weeks of delivery by highest blood pressure reading for the patient. Patients were grouped by the highest postpartum blood pressure reading within 24 hours prior to discharge.

In the first six weeks after delivery, readmission rates for all causes rose with increased blood pressure. More than 5% of postpartum patients with the highest blood pressure readings, equal to or greater than 160/110 mmHg, were readmitted. They were 2.8 times more likely to be readmitted than patients whose highest blood pressure reading during their birth admission fell into the normal range (systolic between 120 and 130 and diastolic below 80 mmHg).

Our data suggest a close relationship between postpartum blood pressure control and readmission in the postpartum period. As nearly 20% of patients can develop postpartum hypertension<sup>3</sup>, providers should actively manage blood pressure for their postpartum patients to minimize risk of readmission. Our findings also highlight future opportunities to study postpartum hypertension treatment and home monitoring programs.

*These data come from Cosmos, a HIPAA-defined Limited Data Set of more than 173 million patients from 185 Epic organizations including 1,063 hospitals and more than 22,500 clinics, serving patients in all 50 states and Lebanon. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions.*

## References

1. DM Stamillo, AJ Beckman, KA Boggess, JE Jelovsek, KK Venkatesh. *Risk factors for postpartum readmission for preeclampsia or hypertension before delivery discharge among low-risk women: a case-control study.* Am J Obstet Gynecol MFM. 2021 Mar; 3(3);100317.doi: 10.1016/j.ajogmf.2021.100317.
2. N Mukhtarova, O Alagoz, YH Chen, K Hoppe. *Evaluation of different blood pressure assessment strategies and cutoff values to predict postpartum hypertension-related readmissions: a retrospective cohort study.* Am J Obstet Gynecol MFM. 2021 Jan;3(1):100252. doi: 10.1016/j.ajogmf.2020.100252. Epub 2020 Oct 6. PMID: 33451628.
3. Goel A, Maski MR, Bajracharya S, et al. *Epidemiology and Mechanisms of De Novo and Persistent Hypertension in the Postpartum Period.* Circulation. 2015;132(18):1726-1733. doi:10.1161/CIRCULATIONAHA.115.015721

## Data Definitions

Term	Definition
<b>Readmission</b>	Any admission for a postpartum patient during the first six weeks post-delivery.

**Table 1: Higher Blood Pressures Correlated with Increased Readmission Rates**

Highest BP in Last 24 Hours of Admission	Readmissions	Number of Delivery Encounters	Readmission Rate	Error
<b>&gt;=160/110</b>	1001	19802	0.05055	0.003051393
<b>&gt;=150/100</b>	2289	49885	0.045885	0.001836144
<b>&gt;=140/90</b>	5042	158837	0.031743	0.000862183
<b>&gt;=130/80</b>	4929	245837	0.020049	0.000554091
<b>&gt;=120/80</b>	5033	385353	0.01306	0.000358462
<b>&lt;120/80</b>	3790	385492	0.009831	0.000311460
<b>Total</b>	22084	1245206	0.017735218	0.000231829

**Table 2: Readmission Odds Ratios by Highest Blood Pressure Reading**

Highest BP in Last 24 Hours of Admission	Odds Ratio	95% Confidence Interval
<b>&gt;=120/80 (Control)</b>		
<b>&lt;120/80</b>	0.777087741	[0.744750589, 0.810762289]
<b>&gt;=130/80</b>	1.430450696	[1.374657489, 1.488499620]
<b>&gt;=140/90</b>	2.063419362	[2.047644579, 2.206394834]
<b>&gt;=150/100</b>	2.699466097	[2.563188990, 2.842201282]
<b>&gt;=160/110</b>	2.822270508	[2.627981619, 3.028056086]