CMQCC
California Maternal
Quality Care Collaborative

Treat it to Beat it: Supporting Timely Treatment of Severe Hypertension in Pregnancy

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This slide set is considered an educational resource but does not define the standard of care in California or elsewhere. Readers are advised to adapt the guidelines and resources based on their local facility's level of care and patient populations served and are also advised to not rely solely on the guidelines presented here.

Notes on terminology

- Throughout the presentation, the terms ‘mother’ or ‘maternal’ or ‘she’ or ‘her’ are used in reference to the birthing person. We recognize not all birthing people identify as mothers or women. We believe all birthing people are equally deserving of patient-centered care that helps them attain their full potential and live authentic, healthy lives.
- The term family is used to refer to any persons the pregnant or postpartum patient designates as such (alternatives: partners, husbands, support persons, loved ones).
- The term clinician is used to denote nursing and medical staff; whereas the term providers refers to clinicians with diagnosing and prescribing authority.
- The language around disclaimers and terminology are committee opinions and your own institution should be consulted for appropriate language to utilize.

Learning Objectives

- Recognize the importance of timely treatment of severe hypertension
- Review nursing assessment and the Acute Treatment Algorithm
- Discuss frequently asked questions regarding the treatment of severe hypertension
- Learn how to utilize your EHR to collect data and improve the consistency of treatment on your unit
- Understand how to employ the Maternal Data Center (MDC) Review of Timely Treatment Process Measure

Additional Logistics

- Continuing education contact hours are available for registered nurses through the California Board of Registered Nurses, Provider #3104, Mid-Coastal CA Perinatal Outreach Program.
- 50 minutes minimum of real-time attendance and completion of a post-event evaluation are required to obtain contact hours.
- Please enter any questions in the Q&A box – questions will be addressed at the end of the webinar as time allows.

The Importance of Timely Treatment of Severe Hypertension

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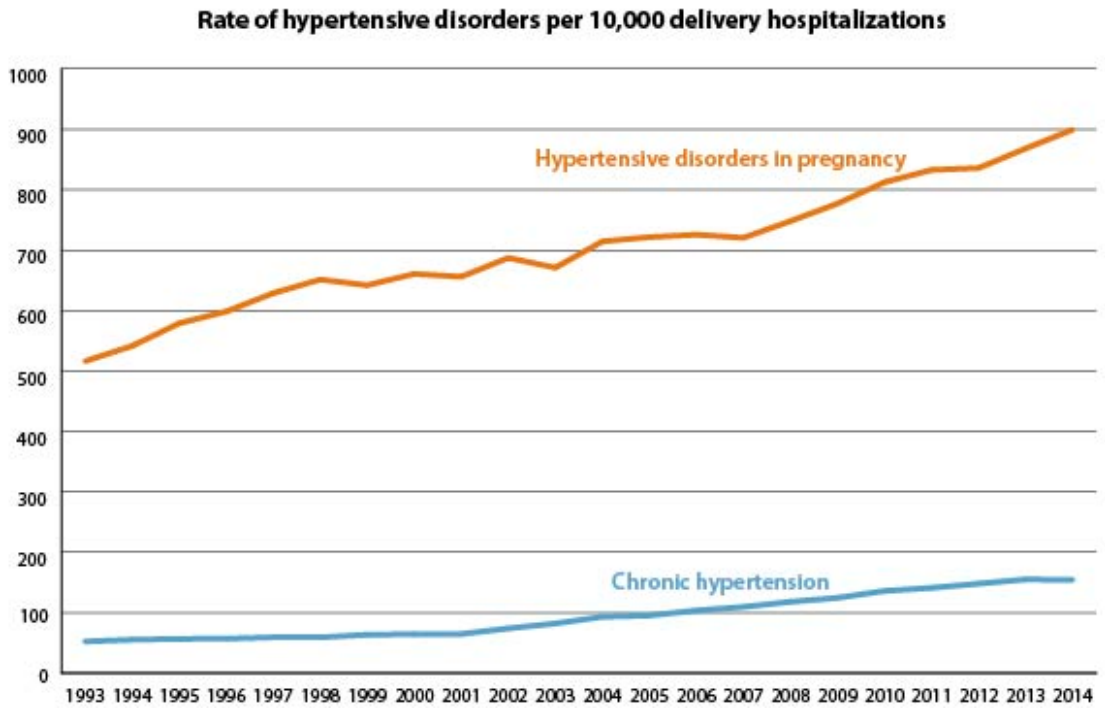
Maternal Hypertension in the U.S.,1993-2014

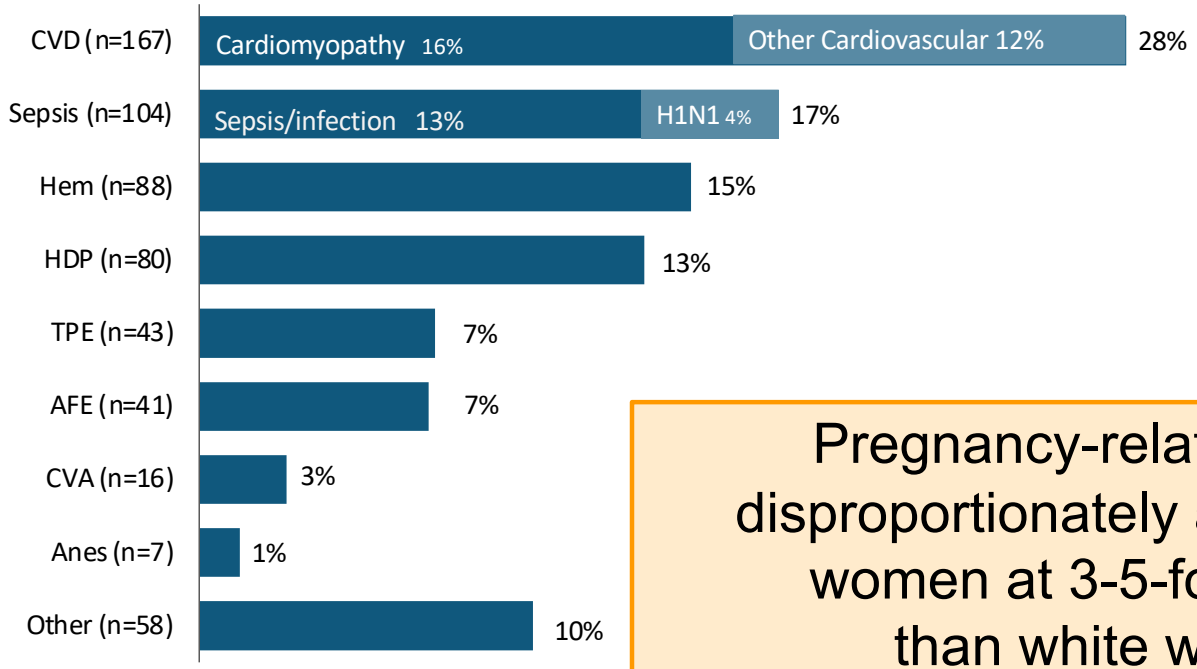
Hypertensive disorders of pregnancy

- Gestational hypertension
- Preeclampsia
- Eclampsia
- Chronic hypertension

Source: National Inpatient Sample, CDC
https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-complications-data.htm



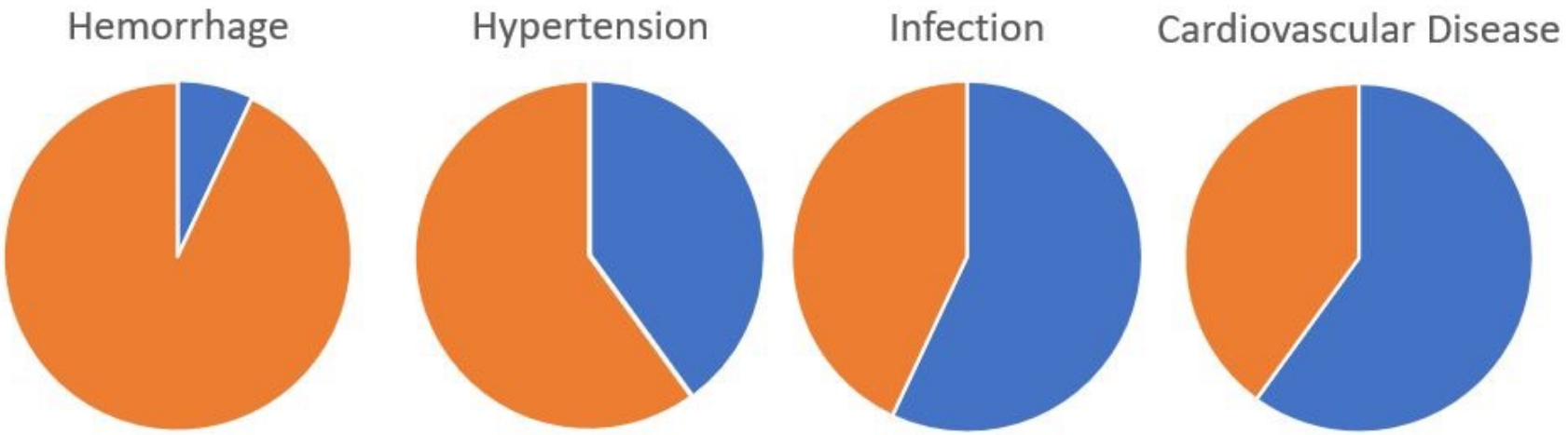
Pregnancy-Related Deaths by Cause, California 2008-2016 (N=608)



Pregnancy-related death disproportionately affects black women at 3-5-fold higher than white women

CA-PMSS Surveillance Report: Pregnancy-Related Deaths in California, 2008-2016. Sacramento: California Department of Public Health, Maternal, Child and Adolescent Health Division. 2021.

Proportion of preventable maternal deaths by cause



Berg C et al. Obstet Gynecol 2005

Blood Pressure and Risk of Stroke

- Historically, there has been less emphasis on control of BP to prevent stroke, yet this has been identified as a major knowledge gap. Control of severe HTN is associated with preventing cerebrovascular accidents and reducing SMM associated with preeclampsia.
- The recent publication from CA-PAMR[13] supports the conclusions made by Martin et al. Although these studies are retrospective, BP levels of ≥ 160/110 have been universally adopted as not only diagnostic for severe HTN, but also a clinical trigger requiring emergent antihypertensive therapy in pregnancy and the postpartum period.[14]
- Most maternal deaths (60- 80%) resulting from preeclampsia are a result of hemorrhagic stroke.[9-11]
- Early treatment of HTN has consistently been found to reduce the incidence of hypertensive crisis and SMM.[1] Data from multiple case studies revealed increased rates of heart failure, pulmonary edema, stroke, cerebrovascular hemorrhage, myocardial ischemia, and death when antihypertensive medications were not used in women with severe gestational HTN or preeclampsia with severe features.[2,3]

Equity and Targeting Racial Disparities as Top Priorities for Quality Improvement in the Management of HDP

Please visit the CMQCC Birth Equity Resources Webpage

- Foster individual, organizational and professional accountability
- Ensure that the patient, her family and the clinicians caring for her are well supported especially in the face of biases such as structural or interpersonal racism
- Hospital leaders should demonstrate an openness to feedback and reporting of concerning situations
- Many institutions have well-developed approaches for addressing potential sources of conflict, including communication tools and team training
- Hospital leaders need to make equity and targeting racial disparities their top priorities for quality improvement, and ensure that clinicians are trained on implicit bias and interpersonal, institutional and systemic racism

Nursing Assessment and the Acute Treatment Algorithm

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Stanford University SoM, CMQCC

Accurate Blood Pressure Measurement

- Accurate blood pressure (BP) measurement is essential to guide management decisions in order to avoid over- or under-treatment leading to adverse outcomes.
- Minimize factors that decrease the accuracy of BP measurements, and be consistent: same arm, same position, and correct cuff size.
- A severe-range BP obtained with an automated BP device should be validated with a manual measurement for accuracy.
- Evaluate BP trends vs. isolated values unless severe.

Steps
1. Prepare equipment
2. Prepare the patient
3. Take measurement
4. Record measurement

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Physiological Parameters	(Yellow) Triggers (Two or more)	(Red) Triggers (One or more)
Systolic BP, mm Hg (repeat in 15 min)	**< 90 or > 155* – 159**	**≥ 160**
Diastolic BP, mm Hg (repeat in 15 min)	**105* - 109**	**≥ 110**
Mean Arterial Pressure: mm Hg	**< 65 or > 110**	**< 55 or > 120**
Heart Rate: beats per min	**< 50 or 110-120**	**> 120**
Respiratory Rate: breaths per min	**< 12 or 25-30**	**> 30**
Oxygen Saturation: % on room air	**< 95**	**< 93**
Oliguria: ml/hr for ≥ 2 hours	**35-49**	**< 35**

	Severe (Red) triggers
Altered mental status	Maternal agitation, confusion or unresponsiveness
Neurologic	Unrelenting, severe headache unresponsive to medication
Visual Disturbances	Blurred or impaired vision
Physical	Shortness of breath or epigastric pain

If "Yellow" or "Red" BP Triggers, recheck BP within 15 minutes

*Lowering the threshold for treatment should be considered at systolic BP of 155 mm Hg or diastolic BP of 105 mm Hg.
See Borderline Severe-range Blood Pressures Section

Abnormal Maternal Assessment

↓

If sustained for **15** minutes
OR
If the nurse is clinically concerned with patient status
REQUEST PROVIDER EVALUATION

↓

Sustained BP ≥ 160 systolic OR ≥ 110 diastolic
Initiate Hypertension in Pregnancy Protocol:
Treat blood pressure with antihypertensive therapy within 1 hour
and
Treat with Magnesium Sulfate – 4-6** gm bolus, followed by maintenance dose 1-2 gm per hour based upon renal status
**Use 6 gm if BMI > 35

↓

IF O2 Sat < 93% or RR > 24
CONSIDER PULMONARY EDEMA

Hypertensive Emergency in Pregnancy/Postpartum

Applies to all forms of HDP: chronic, gestational, and preeclampsia with or without severe features

Systolic	Diastolic	Action
≥ 160	≥ 110	Repeat BP within 15 minutes. If BP remains within severe-range - treat within 30-60 minutes (ideally ASAP).

DO NOT WAIT TO TREAT THE HYPERTENSIVE EMERGENCY

ACOG Practice Bulletin #222, June 2020

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Medication Protocols: First Line Agents in Preeclampsia

Medication Agents	Labetalol IV[A]	Hydralazine IV[B,C]	Nifedipine (Immediate release)
Route	IV	IV	PO
Initial therapy	20 mg	5-10 mg	10 mg
Onset[E,F,G]	2-5 minutes	5-20 minutes	5-20 minutes
Peak[E,F,G]	5 minutes	15-30 minutes	30-60 minutes
Max dose[D] (Before switching agents)	140 mg	20 mg	50 mg
Mechanism of action	• Combined α and β-blocking agent • Arteriolar dilator • Decreases heart rate	• Arteriolar dilator	• Calcium channel blocker • Arterial smooth muscle dilator
Side effects	• Use with caution in patients with known asthma • Flushing, light headedness, palpitations and scalp tingling • Safe for use after cocaine and amphetamine use (including methamphetamine)[A]	• Tachycardia, headache[E] • Upper abdominal pain (rare) • Flushing • Nausea[B]	• Reflex tachycardia • Headache • Flushing • Nausea • Vomiting

A: (Richards, Hollander et al. 2017) B: (Raheem, Saaid et al. 2012) C: (Duley, Meher et al. 2013) D: (ACOG 222 2020) E: (Cohan and Checcio 1985) F: (Cheng, Cheng-Lai et al. 2005) G: (Raheem, Saaid et al. 2012)

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Acute Treatment Algorithm

Evaluation and Treatment of Antepartum and Postpartum Preeclampsia/Eclampsia

Part 2: Antihypertensive Treatment Algorithm for Hypertensive Emergencies

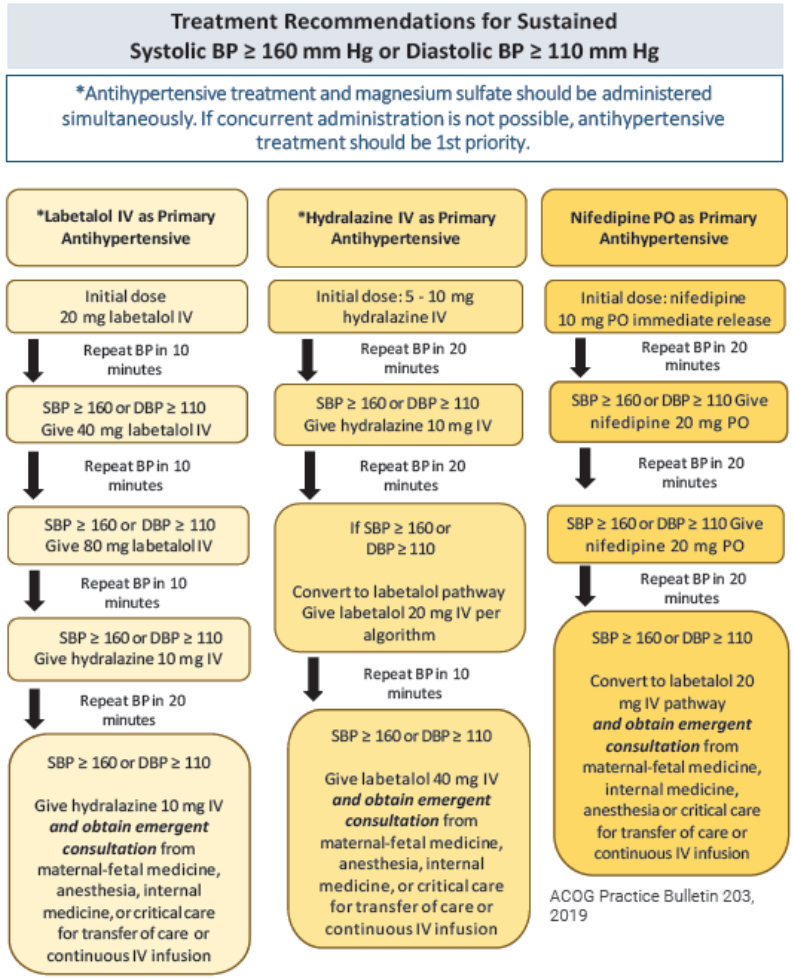
Target BP: 130-150/80-100 mm Hg

Once BP threshold is achieved:

- Q10 min for 1 hr
- Q15 min for 1 hr
- Q30 min for 1 hr
- Q1hr for 4 hrs

*Intravenous hydralazine or labetalol should be given over 2 minutes. In the presence of sinus bradycardia or a history of asthma, hydralazine or nifedipine are preferred as initial agents. If maternal HR > 110, labetalol is preferred.

ACOG Practice Bulletin 203, 2019



Magnesium Sulfate

Magnesium sulfate for seizure prophylaxis is indicated for:

- Preeclampsia with **severe features** and **severe gestational hypertension**
- All cases of severe (≥ 160 mm Hg / ≥ 110 mm Hg), sustained (lasting 15 minutes or more) hypertension ***regardless of classification***

Magnesium Sulfate is ***not*** universally recommended for preeclampsia without severe features

Borderline Severe-Range Blood Pressure Recommendations

- Physician notification of borderline severe BPs
- Physician evaluation of the patient
- Continuous electronic fetal monitoring
- Inpatient observation for a minimum of **24-48 hours**
- Vital signs and symptom assessment every **2 hours** for a minimum of **24 hours**
- Serial assessment of serum labs at least daily for **2 days**

Consider antihypertensive therapy and magnesium sulfate at ≥ 155-159/ ≥ 105-109 mm Hg

*Refer to Toolkit Section: Borderline Severe-range Blood Pressures: A Clinical Conundrum

Preeclampsia in the ED

- Most important 1st step is to identify if patient is or has been pregnant in the last 6 weeks
  - If **YES** → assess *immediately*
- BP "trigger" in this population (≥ 160/110) is lower than values for hypertensive emergencies in non-OB patients
- ED personnel should be familiar with risk factors and signs and symptoms of postpartum preeclampsia and eclampsia

ED clinicians should focus on:
Maternal resuscitation
BP management
Seizure prophylaxis
Notifying OB team

Improving Health Care Response to Hypertensive Disorders of Pregnancy, a CMQCC Quality Improvement Toolkit, 2021.

Key points regarding the treatment of severe hypertension

Appendix L: FAQs for Timely Treatment for Acute-Onset Severe Hypertension…

Treatment Considerations

- 15 minutes confirmation of BP sustainment is the definition of a hypertensive emergency that needs immediate treatment, NOT the definition of preeclampsia.
- The confirmatory BP should be done within 15 minutes. This provides a sufficient gap to formally confirm persistent elevated BP independent of other causes.
- One severe-range BP requires the initiation of frequent BP measurements every 15 minutes for at least one hour.
- Treatment of acute-onset severe hypertension is an emergency and should take precedence over starting magnesium sulfate.

Treatment Considerations

- The emergency response begins with the 1st BP measurement. A confirmation BP should be taken, but calls to the provider and preparation/initiation of medication can be started while waiting for the confirmatory BP measurement if clinically indicated.
- For the Maternal Data Center's "Timely Treatment for Severe Hypertension" measure, timely treatment is considered to be treatment within 30-60 minutes of the second (confirmatory) blood pressure.

Clinicians may consider antihypertensives at 155/105 mm Hg given the association with increased maternal morbidities at this threshold in several studies.

Fetal Considerations

- Following antihypertensive treatment, hypotension is uncommon and often transient. Fetal heart rate changes are even rarer and respond well to standard intrauterine resuscitation measures.
- Fetal responses to sudden hypotension are more common in women receiving epidural anesthesia.
- In the CMQCC Preeclampsia Collaborative, among women being treated for acute-onset severe hypertension, < 1% were associated with significant changes in the fetal heart rate pattern in the hour after treatment.
- The risks associated with an untreated hypertensive emergency are greater than the risks of treatment.

But what about…

- …BP measurements that vacillate between severe and nearly severe?
  - *Those with acute-onset severe HTN can have strokes. Serial measurements of 162/105, 158/104, 165/100; 159/109 shows persistence and risk. We recommend antihypertensive treatment.*

- …A severe-range BP followed in 15 minutes by less concerning BP (145/95 mm Hg)?
  - *This scenario does not require treatment BUT does indicate the need for frequent monitoring of BP and observation.*

But what about….

- …if in another hour after the 145/95, the BP rises again to severe range?
  - *Here there may be choices: begin treatment or await another BP within 15 min to document persistent severe-range (while preparing the medication). This judgment depends, among other factors, on how low the BPs were between the 2 severe BPs.*
- … if the nurse does not take a confirmatory BP for 30-40 minutes and it is still severe range? (“It was not within 15 minutes…”).
  - *The severe-range pressure is persistent so treatment should commence immediately.*

How to utilize your EHR to collect data and improve the consistency of treatment on your unit

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Medical Director L&D
Cedars Sinai Medical Center

Timely Treatment of HDP at Cedars-Sinai

- Objectives:
  - Quantify the number of patients who did not receive timely treatment of confirmed, severe hypertension
  - Identify barriers to timely treatment
  - Evaluate if race/ethnicity was associated with timeliness of treatment

Methods

- Modifications enacted to facilitate timely treatment
  - Modified order parameters to allow emergent phone order for antihypertensives/no longer require resident bedside assessment
  - Added antihypertensives to Pyxis machines on postpartum unit and trained postpartum RNs to administer IV antihypertensives
  - Created “Badge Buddy” for RNs and Residents with protocols for treatment of severe hypertension
  - Treatment of severe, acute hypertension covered at RN annual skills day, and semiannual training
  - Ongoing resident and provider Simulation training

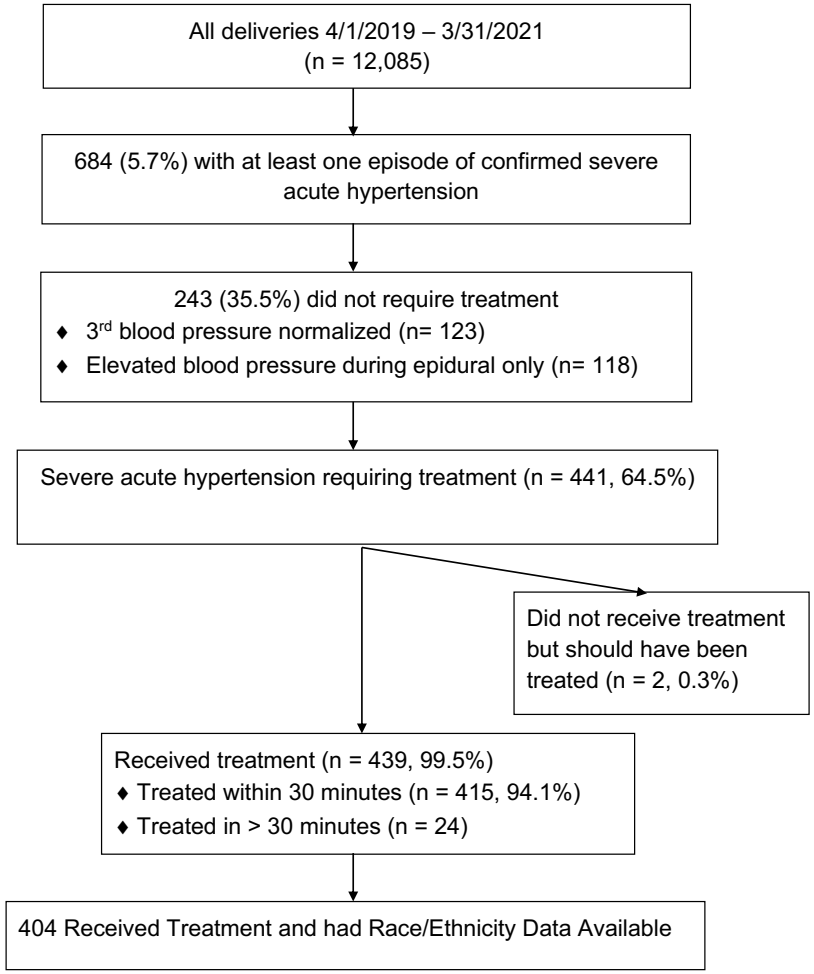
Methods

- Created automated, monthly report for all women admitted for delivery encounter
- Identified women who experienced acute, severe peripartum hypertension
  - Severe hypertension: systolic ≥ 160 mmHg or diastolic ≥ 110 mmHg, 2 readings 15 minutes apart

Methods

- If treatment was indicated but delayed or not given, the EMR was manually reviewed
- Further, extracted demographic data
  - Maternal race/ethnicity, parity, pre-pregnancy BMI, insurance status, history of chronic hypertension.

Results


All deliveries 4/1/2019 – 3/31/2021
(n = 12,085)
684 (5.7%) with at least one episode of confirmed severe acute hypertension
243 (35.5%) did not require treatment
♦ 3rd blood pressure normalized (n= 123)
♦ Elevated blood pressure during epidural only (n= 118)
Severe acute hypertension requiring treatment (n = 441, 64.5%)
Did not receive treatment but should have been treated (n = 2, 0.3%)
Received treatment (n = 439, 99.5%)
♦ Treated within 30 minutes (n = 415, 94.1%)
♦ Treated in > 30 minutes (n = 24)
404 Received Treatment and had Race/Ethnicity Data Available

Results

Table 1. Patient and Pregnancy Characteristics in Patients with and without Severe Acute Peripartum Hypertension, 4/2019-3/2021			
	Severe Acute Peripartum Hypertension	No Severe Acute Peripartum Hypertension	P-value
	n = 684	n = 11385	
Maternal Age, mean (SD)	35.2 (5.3)	33.9 (4.8)	<0.001
>35, n (%)	388 (56.7%)	5240 (46.0%)	<0.001
>40, n (%)	129 (18.9%)	1211 (10.6%)	<0.001
Prepregnancy BMI[1], mean (SD)	26.3 (6.8)	23.8 (4.9)	<0.001
Obese, n (%)	140 (22.9%)	1207 (11.9%)	<0.001
Government Insurance[2], n (%)	37 (6.0%)	434 (4.2%)	0.03
Race/ethnicity[3], n (%)			
White	270 (42.7%)	6476 (61.2%)	<0.001
Black	83 (13.1%)	745 (7.0%)	
Asian	133 (21.0%)	1378 (13.0%)	
LatinX	142 (22.4%)	1793 (16.9%)	
Other	5 (0.8%)	194 (1.8%)	
Nulliparity[4], n (%)	457 (68.4%)	5952 (52.5%)	<0.001
Chronic hypertension, n (%)	115 (16.6%)	162 (1.4%)	<0.001
1 missing in 1309, 2 missing in 1000, 3 missing in 850, 4 missing in 62			

Results

Table 2.	Timely Treatment of Severe Acute Peripartum Hypertension by Race/Ethnicity (n = 439)		
	Treated in ≤ 30 minutes (n = 415)	Treated in > 30 minutes (n = 24)	P-value
Race/ethnicity[1], n (%)			
White (n = 163, 40.4%)	157 (96.3%)	6 (3.6%)	0.59
Black (n = 54, 13.4%)	50 (92.6%)	4 (7.4%)	
Asian (n = 86, 21.3%)	80 (93.0%)	6 (6.9%)	
LatinX (n = 98, 24.3%)	92 (93.8%)	6 (6.1%)	
Other (n = 3, 0.7%)	3 (100%)	0 (0.0%)	
[1] Missing in 35			

Results

- Most common barriers to timely treatment (n=24)
  - Initial patient refusal of medication
  - Slight delay in notification of provider
  - Antihypertensive medications temporarily held or delayed during assessment and treatment of concurrent morbidity (e.g., hemorrhage)
  - Delay in IV access
  - Difficult to interpret BP values due to maternal shivering

Conclusions

- Using an automated monthly report for all women admitted for delivery, we demonstrated:
  - 94.1% of patients who experienced acute, severe hypertension were treated in a timely manner (within 30 minutes)
  - Race/ethnicity did not affect timeliness of treatment
  - Identified and addressed potential causes of delay in treatment

How to utilize your EHR to collect data and improve the consistency of treatment on your unit

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Cedars Sinai Medical Center

Leveraging the EHR to Monitor Timely Treatment of Acute-onset Severe Hypertension

Step 1 → Create auto-generated monthly report

Step 2 → Sort by treated w/in 30 min, treated in > 30 min, not treated

Step 3 → Targeted chart review

Step 4 → Report out/create dashboard

Step 1: Create the report

- To include all patients with 2 severe range BPs recorded w/in 15 minutes
- One row per patient (2 full episodes)
- Minimal variables to include: Initial/confirmatory blood pressure values and date/time, first medication ordered and date/time, first medication administered and date/time, given/refused, time from 2nd elevated to order time, time from 2nd elevated to administration time, indicator for ≤30 or > 30 minutes

Severe Sys1	Severe Dias1	Severe BP Date/Time	Severe Sys2	Severe Dias2	2nd Severe BP Time	First Medication Order Time	Medication Ordered
168	95	04/29/2022 22:46	170	98	04/29/2022 22:47	04/30/2022 00:04	NIFEDIPINE 10 MG PO CAPS

1st Admin Date/Time	First Medication Given	Given/Refused	Dose	2nd Elevated to Order Date/Time	Second Elevated to Admin Time	Past Target Time
04/30/2022 00:32	NIFEDIPINE 10 MG PO CAPS	Given	10	1.27 Hours	1.74 Hours	*

Step 1: Create the report

- Additional variables could include:
  - Admission Date/Time, Delivery Date/Time (timing of episode, LOS)
  - Admitting Clinician (patterns of med choice by doctor, etc)
  - Minimum systolic and diastolic BP within 3 hours of first medication administration time (incidence of post-medication hypotension)
  - Repeat all variables calculated for subsequent episode(s) of acute-onset severe hypertension
    - We include 2 episodes per patient

Step 1: Create the report – EHR data source

In Epic: Chart Review → Select Admission → Flowsheets → V/S

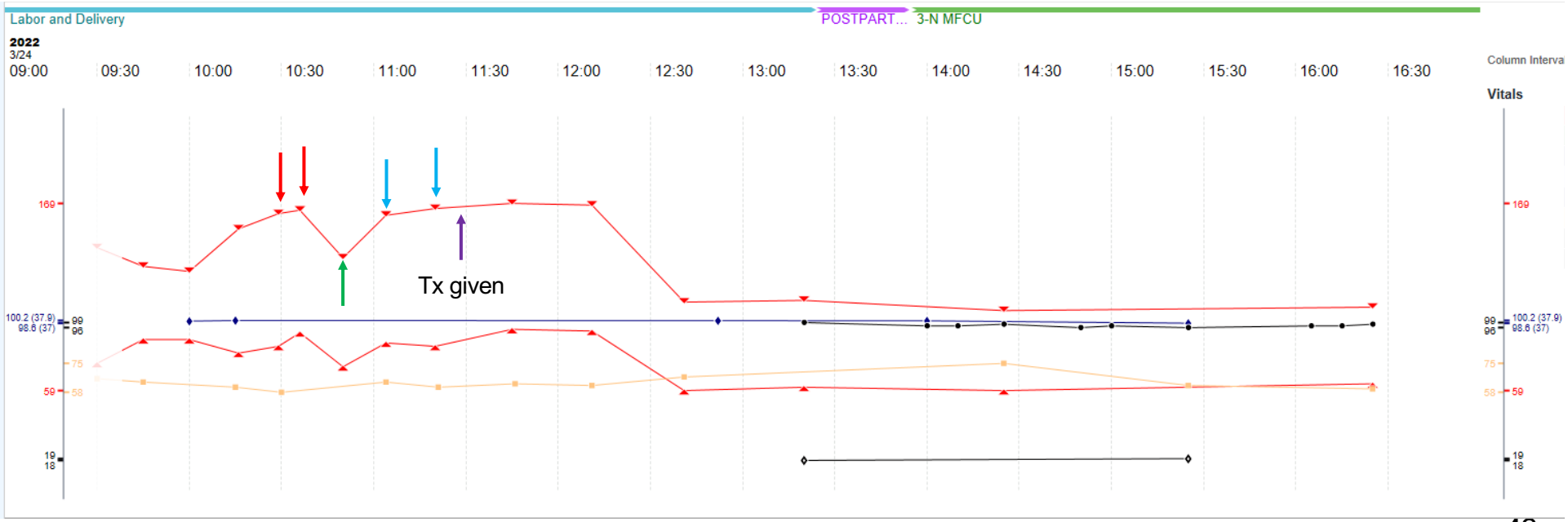
BP	126/64 -AC	145/88 -AC	141/85 -AC	137/77 -AC	159/84 -AC
Respiratory					
SpO2	—	98 % -AC	—	—	—
Row Name	03/31/22 1014	03/31/22 1011	03/31/22 1005	03/31/22 1002	03/31/22 1000
Vital Signs					
Pulse	69 -AT	70 -AT	—	—	69 -AT
BP	151/82 -AT	163/85 ! -AT	161/96 ! -AT	143/89 -AC	176/83 ! -AT
Respiratory					
SpO2	—	100 % -AT	—	—	—
Row Name	03/31/22 0906	03/31/22 0822	03/31/22 0723	03/31/22 0722	03/31/22 0628
Vital Signs					
Temp	—	—	—	—	98.3 °F (36.8 °C) -CA
Temp src	—	—	—	—	Oral -CA
Pulse	—	60 -AC	65 -AC	—	85 -CA
Heart Rate Source	—	—	—	—	NIBP -CA
Resp	—	—	—	—	18 -CA
BP Method	—	—	—	—	Automatic -CA
BP	139/83 -AC	140/88 -AC	—	136/71 -AC	113/82 -CA
BP Location	—	—	—	—	Right arm -CA
Cuff Size	—	—	—	—	Adult - Medium -CA
Patient Position	—	—	—	—	Standing -CA
Respiratory					
Device	—	—	—	—	Room Air -CA

Step 2: Sort by treatment category (Timely, Not timely, Not Treated)

[redacted]	[redacted]	First Administration Time	First Medication Given	Given/Refused	Dose	2nd Elevated to Order Time	2nd Elevated to Admin Time	Past Target Time
[redacted]	[redacted]	03/01/2022 19:14	NIFEDIPINE 10 MG PO CAPS	Given	10	0 Minutes	7 Minutes	
[redacted]	[redacted]	03/01/2022 19:23	LABETALOL 5 MG/ML IV SOLN	Given	20	4 Minutes	17 Minutes	
[redacted]	[redacted]	03/03/2022 07:21	LABETALOL 5 MG/ML IV SOLN	Given	20	19 Minutes	21 Minutes	
[redacted]	[redacted]	03/05/2022 23:28	LABETALOL 5 MG/ML IV SOLN	Given	20	2 Minutes	5 Minutes	
[redacted]	[redacted]	03/08/2022 19:45	LABETALOL 5 MG/ML IV SOLN	Given	20	2 Minutes	3 Minutes	
[redacted]	[redacted]	03/09/2022 00:33	NIFEDIPINE 10 MG PO CAPS	Given	10	1 Minutes	8 Minutes	
[redacted]	[redacted]	03/11/2022 16:58	NIFEDIPINE 10 MG PO CAPS	Given	10	0 Minutes	3 Minutes	
[redacted]	[redacted]	03/16/2022 05:06	LABETALOL 5 MG/ML IV SOLN	Given	20	8 Minutes	15 Minutes	
[redacted]	[redacted]	03/16/2022 21:27	LABETALOL 5 MG/ML IV SOLN	Given	20	7 Minutes	15 Minutes	
[redacted]	[redacted]	03/20/2022 10:29	NIFEDIPINE 10 MG PO CAPS	Given	10	2 Minutes	9 Minutes	
[redacted]	[redacted]	03/25/2022 03:34	NIFEDIPINE 10 MG PO CAPS	Given	10	3 Minutes	7 Minutes	
[redacted]	[redacted]	03/28/2022 03:15	LABETALOL 5 MG/ML IV SOLN	Given	20	10 Minutes	12 Minutes	
[redacted]	[redacted]	03/30/2022 16:58	LABETALOL 5 MG/ML IV SOLN	Given	20	16 Minutes	18 Minutes	
[redacted]	[redacted]	03/31/2022 19:03	LABETALOL 5 MG/ML IV SOLN	Given	20	7 Minutes	8 Minutes	
[redacted]	[redacted]	04/01/2022 19:00	NIFEDIPINE 10 MG PO CAPS	Given	10	4 Minutes	3 Minutes	
[redacted]	[redacted]	03/24/2022 11:25	NIFEDIPINE 10 MG PO CAPS	Given	10	47 Minutes	49 Minutes	*
[redacted]	[redacted]	03/30/2022 16:42	LABETALOL 5 MG/ML IV SOLN	Given	20	46 Minutes	55 Minutes	*
[redacted]	[redacted]	03/05/2022 10:36	LABETALOL 5 MG/ML IV SOLN	Given	20	29 Minutes	40 Minutes	*
[redacted]	[redacted]							
[redacted]	[redacted]							
[redacted]	[redacted]							
[redacted]	[redacted]							
[redacted]	[redacted]							

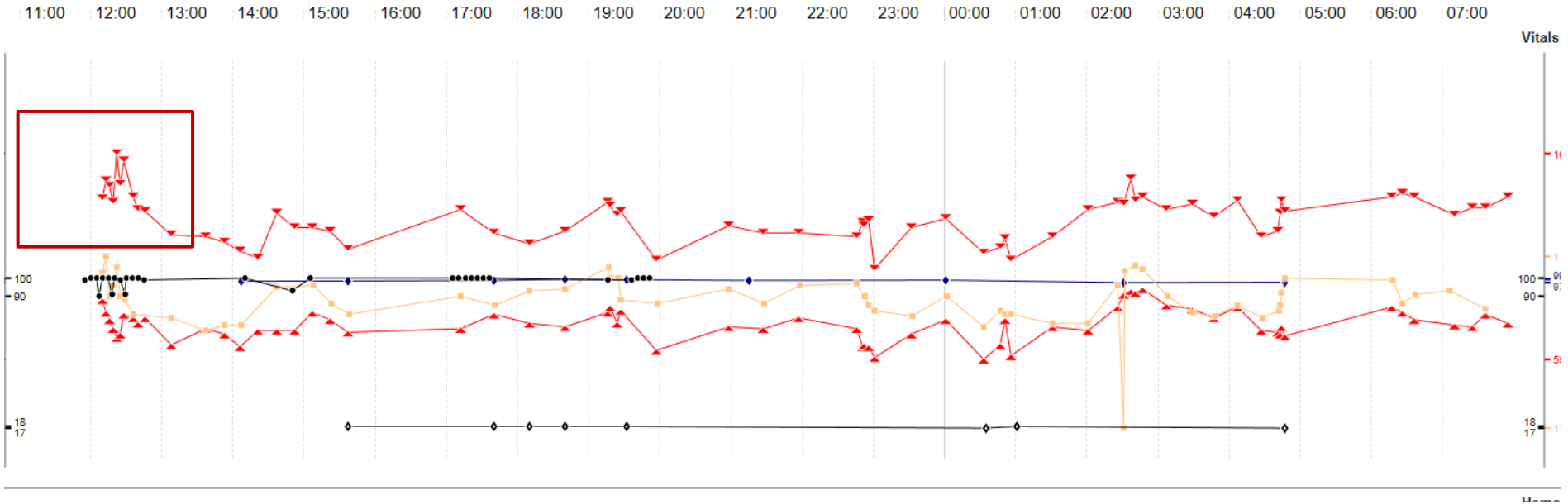
Step 3: Targeted chart review (Example 1)

Severe Hypertension Date/Time	First Administration Time	Second Elevated to Admin Time	Past Target Time
03/24/2022 10:29	03/24/2022 11:25	49 Minutes	*



Step 3: Targeted chart review (Example 2)

Severe Hypertension Date/Time	Second Severe BP Time	First Medication Order Time
03/16/2022 12:22	03/16/2022 12:28	

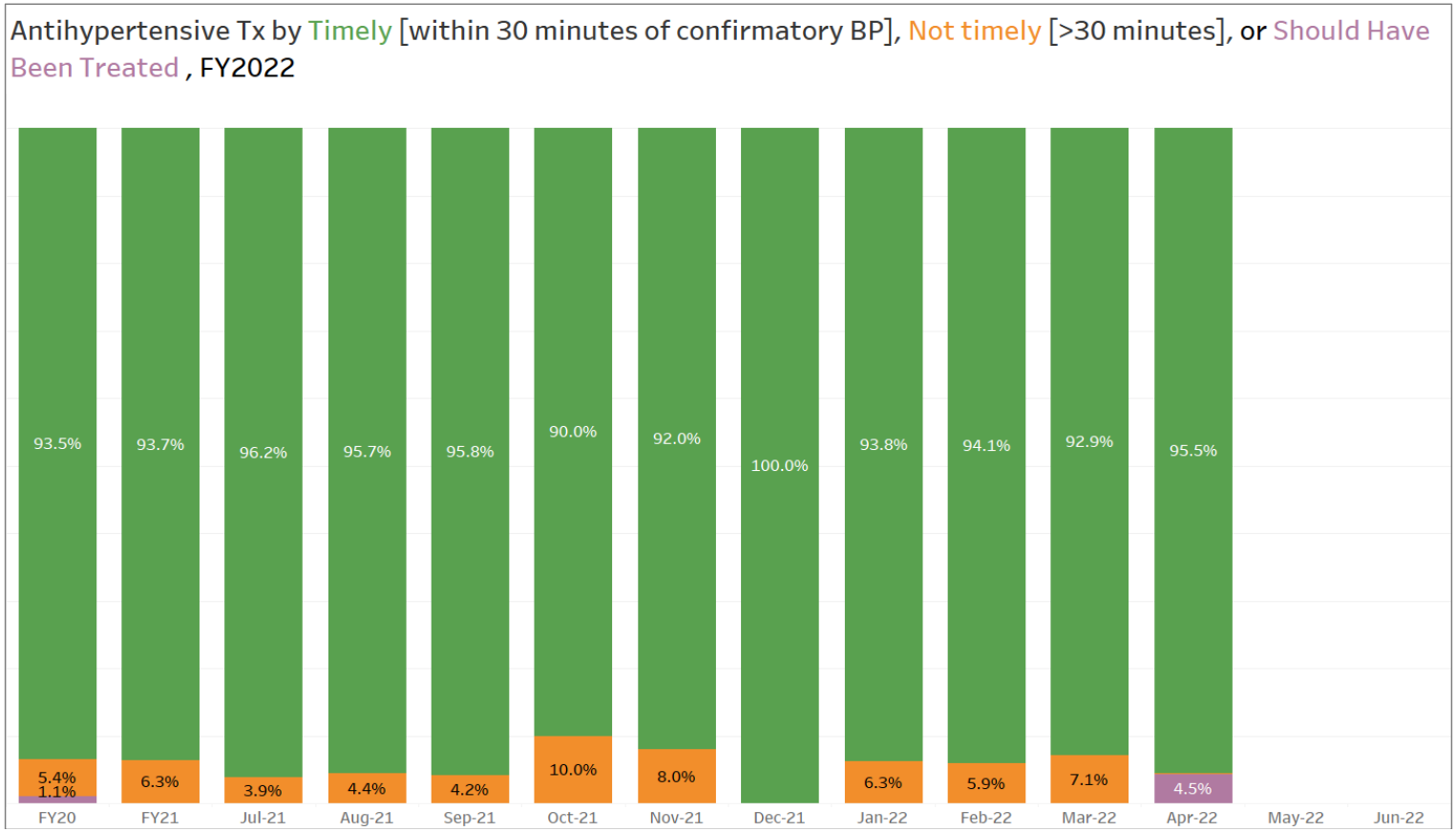


Step 3: Targeted chart review

(only those not treated or not timely)

Category	Why not treated or not timely	First Administration Time	First Medication Given	Given/Refused	Dose	2nd Elevated to Order Time	2nd Elevated to Admin Time	Past Target Time
Timely	Normalized then tx within 5 minutes	03/24/2022 11:25	NIFEDIPINE 10 MG PO CAPS	Given	10	47 Minutes	49 Minutes	*
Timely	Normalized then tx within 23 minutes	03/30/2022 16:42	LABETALOL 5 MG/ML IV SOLN	Given	20	46 Minutes	55 Minutes	*
Timely		03/01/2022 19:14	NIFEDIPINE 10 MG PO CAPS	Given	10	0 Minutes	7 Minutes	
Timely		03/01/2022 19:23	LABETALOL 5 MG/ML IV SOLN	Given	20	4 Minutes	17 Minutes	
Timely		03/03/2022 07:21	LABETALOL 5 MG/ML IV SOLN	Given	20	19 Minutes	21 Minutes	
Timely		03/05/2022 23:28	LABETALOL 5 MG/ML IV SOLN	Given	20	2 Minutes	5 Minutes	
Timely		03/06/2022 19:28	NIFEDIPINE 10 MG PO CAPS	Given	10	-5 Minutes	0 Minutes	
Timely		03/08/2022 19:45	LABETALOL 5 MG/ML IV SOLN	Given	20	2 Minutes	3 Minutes	
Timely		03/09/2022 00:33	NIFEDIPINE 10 MG PO CAPS	Given	10	1 Minutes	8 Minutes	
Timely		03/11/2022 16:58	NIFEDIPINE 10 MG PO CAPS	Given	10	0 Minutes	3 Minutes	
Timely		03/16/2022 05:06	LABETALOL 5 MG/ML IV SOLN	Given	20	8 Minutes	15 Minutes	
Timely		03/16/2022 21:27	LABETALOL 5 MG/ML IV SOLN	Given	20	7 Minutes	15 Minutes	
Timely		03/20/2022 10:29	NIFEDIPINE 10 MG PO CAPS	Given	10	2 Minutes	9 Minutes	
Timely		03/24/2022 16:00	NIFEDIPINE 10 MG PO CAPS	Given	10	-4 Minutes	0 Minutes	
Timely		03/25/2022 03:34	NIFEDIPINE 10 MG PO CAPS	Given	10	3 Minutes	7 Minutes	
Timely		03/28/2022 03:15	LABETALOL 5 MG/ML IV SOLN	Given	20	10 Minutes	12 Minutes	
Timely		03/30/2022 16:58	LABETALOL 5 MG/ML IV SOLN	Given	20	16 Minutes	18 Minutes	
Timely		03/31/2022 19:03	LABETALOL 5 MG/ML IV SOLN	Given	20	7 Minutes	8 Minutes	
Timely		04/01/2022 19:00	NIFEDIPINE 10 MG PO CAPS	Given	10	4 Minutes	3 Minutes	
Not timely	Treated in 40 minutes	03/05/2022 10:36	LABETALOL 5 MG/ML IV SOLN	Given	20	29 Minutes	40 Minutes	*
No tx needed	During epidural, next time normalized on its own							
No tx needed	During epidural only							
No tx needed	During epidural only							
No tx needed	Normalized							

Step 4 -Report out / create dashboard



Step 4 -Report out/create dashboard

Severe Hypertension (sBP >160 or dBP >110) by Treatment Category

Item	July 2021	August 2021	September 2021	October 2021	November 2021	December 2021	January 2022	February 2022	March 2022	April 2022	May 2022	June 2022
# Severe HTN	36	34	39	29	41	24	39	27	34	39		
% with Severe HTN	6.5	6.1	6.8	5.2	7.7	4.9	8.3	5.4	6.4	7.7		
Deliveries	556	554	572	563	534	492	470	499	528	505		
Not timely treatment	1	1	1	2	2	0	2	1	1	0		
Should have been treated	0	0	0	0	0	0	0	0	0	1		
Timely treatment	25	22	23	18	23	14	30	16	19	21		
Treatment needed	26	23	24	20	25	14	32	17	20	22		
Treatment not needed	10	11	15	9	16	11	7	10	14	11		

Timing When Treatment Not Timely FY2022

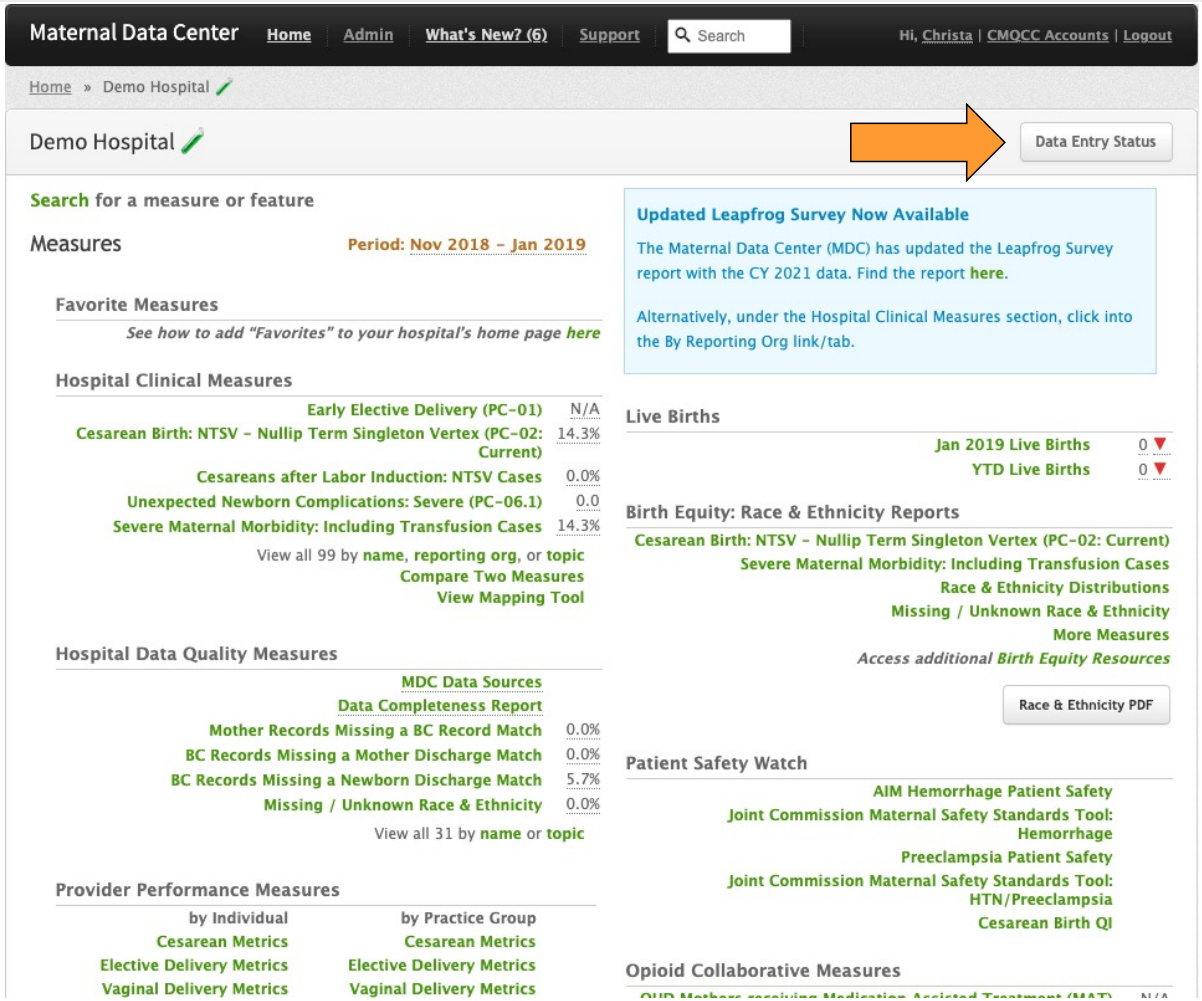
Item	FY2021	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22
Number not timely treated	16	1	1	1	2	2	0	2	1	1	0		
Tx in 31-60 minutes	14	1	1	1	1	2	0	2	1	1	0		
Tx in 61-120 minutes	1	0	0	0	1	0	0	0	0	0	0		
Tx in >120 minutes	1	0	0	0	0	0	0	0	0	0	0		

Reason for No Treatment FY2022

Reason	FY2021	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22
No tx needed: 3rd/Next BP was in range	55	6	3	5	4	5	5	3	6	7	5		
No tx needed: During epidural placement only	69	3	8	10	5	11	6	4	4	7	6		
No tx needed: Other	7	1	0	0	0	0	0	0	0	0	0		
Should have been treated but was not treated	0	0	0	0	0	0	0	0	0	0	1		
Total Not Treated	131	10	11	15	9	16	11	7	10	14	12		

Maternal Data Center (MDC) Review of Timely Treatment

Christa Sakowski, MSN, RN,
C-EFM, C-ONQS, CLE
Stanford University SoM,
CMQCC


Maternal Data Center
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Admin
What's New? (6)
Support
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Hi, Christa | CMQCC Accounts | Logout
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Demo Hospital
Data Entry Status
Search for a measure or feature
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Period: Nov 2018 - Jan 2019
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See how to add "Favorites" to your hospital's home page here
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Early Elective Delivery (PC-01) N/A
Cesarean Birth: NTSV - Nullip Term Singleton Vertex (PC-02: Current) 14.3%
Cesareans after Labor Induction: NTSV Cases 0.0%
Unexpected Newborn Complications: Severe (PC-06.1) 0.0
Severe Maternal Morbidity: Including Transfusion Cases 14.3%
View all 99 by name, reporting org, or topic
Compare Two Measures
View Mapping Tool
Hospital Data Quality Measures
MDC Data Sources
Data Completeness Report
Mother Records Missing a BC Record Match 0.0%
BC Records Missing a Mother Discharge Match 0.0%
BC Records Missing a Newborn Discharge Match 5.7%
Missing / Unknown Race & Ethnicity 0.0%
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Elective Delivery Metrics
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Vaginal Delivery Metrics
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Live Births
Jan 2019 Live Births 0
YTD Live Births 0
Birth Equity: Race & Ethnicity Reports
Cesarean Birth: NTSV - Nullip Term Singleton Vertex (PC-02: Current)
Severe Maternal Morbidity: Including Transfusion Cases
Race & Ethnicity Distributions
Missing / Unknown Race & Ethnicity
More Measures
Access additional Birth Equity Resources
Race & Ethnicity PDF
Patient Safety Watch
AIM Hemorrhage Patient Safety
Joint Commission Maternal Safety Standards Tool: Hemorrhage
Preeclampsia Patient Safety
Joint Commission Maternal Safety Standards Tool: HTN/Preeclampsia
Cesarean Birth QI
Opioid Collaborative Measures

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See prior months	December '21	January '22	February '22	March '22	April '22
Birth Data	✓ Complete	✓ Complete	✓ Complete	✓ Complete	✓ Complete
Discharge Data	✓ Complete	✓ Complete	✓ Complete	✓ Complete	
Data Linkage	✓ Complete	✓ Complete	✓ Complete	✓ Complete	
Labor Care Provider	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	
Early Elective Delivery	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	
Newborn Bloodstream Infection	✓ Complete	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	
Antenatal Steroids	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	
Bilirubin Screening	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	
DVT Prophylaxis	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	
Transfusions: Massive	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	
Timely Treatment for Severe Hypertension	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	
Exclusive Breast Milk Feeding (PC-05)	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	⚠ Action Needed	

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Chart Review: Timely Treatment for Severe Hypertension

Print Worksheet

Time Period: Discharges from January 2019

Encrypted Medical Record Number

Encrypted Medical Record Number: Add Patient

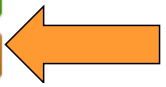
Remaining to Complete: 0/3

	Encrypted Medical Record Number	Delivery Date	Discharge Date	Gest. Age	Severe Hypertension? Systolic ≥160 OR Diastolic ≥110 See full definition See FAQs Yes	Severe Hypertension? No	Timely Treatment for Severe Hypertension? See full definition See FAQs Yes	Timely Treatment for Severe Hypertension? No	Review Complete?
	806913cce4	01/13/2019	01/17/2019	[Unknown]	☑	☐	☐	☑	✓
	311f76e68f	01/20/2019	01/21/2019	41	☑	☐	☐	☑	✓
	831a802690	01/22/2019	01/24/2019	38	☑	☐	☑	☐	✓

Remaining to Complete: 0/3

Return to Data Status Page

View Measure Results



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Trend: Timely Treatment for Severe Hypertension (AIM)

Graph & Data Downloads

Measure

- Hospital Trend
- Definition/Algorithm
- Intervention Chart
- Chart Review

Comparisons

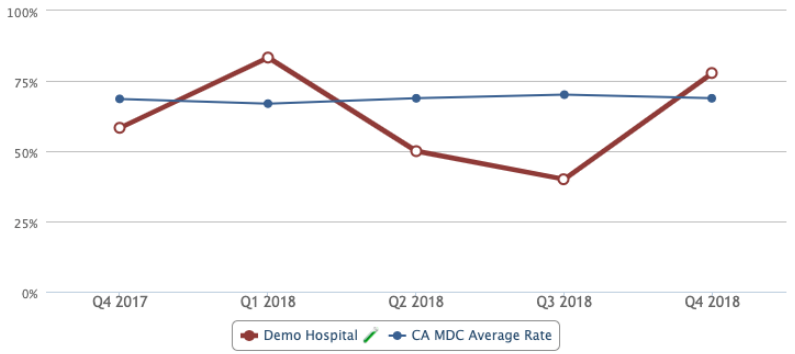
- Peer
- NICU Level
- All Hospitals
- Map by Patient Residence
- By Race & Ethnicity
- See More Comparisons
- Compare Two Measures

Appropriate medical management/timely treatment of acute-onset severe hypertension

Start Date: 09/01/2017 | Frequency: Quarterly
Corrections: Corrected | Display: Display
Benchmark: None

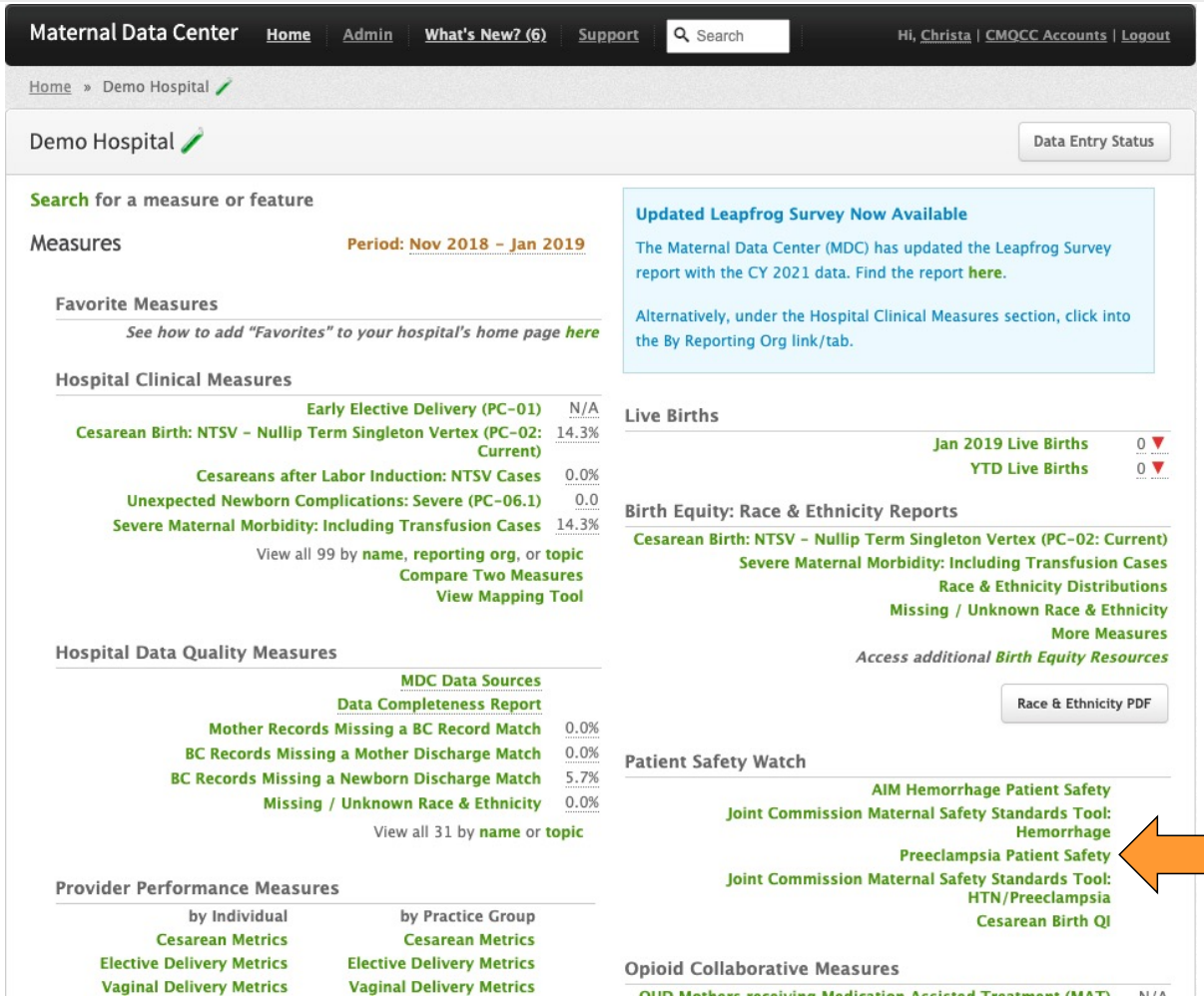
Displaying: X Demo Hospital | X CA MDC Average

White dots in the trend line indicate small denominator counts (< 30) you should interpret cautiously. Click here to learn more



Period	Demo Hospital	CA MDC Average Rate
Q4 2018	77.8%	68.8%
Q3 2018	40.0%	70.1%
Q2 2018	50.0%	68.8%
Q1 2018	83.3%	66.9%
Q4 2017	58.3%	68.6%

Click on any hyperlinked rate to see the drill down (patient-level details) of the numerator cases.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Opioid Collaborative Measures

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Hospital Clinical Measures: By Topic

By Name | By Reporting Org | By Topic

Show: ☐ Last 12 Months ☑ Last 3 Months ☑ Last Month

Cesarean Delivery Measures
Vaginal Delivery Measures
Overall Delivery Metrics
Maternal Morbidity
Hemorrhage/Transfusion Measures
Hypertension/Preeclampsia Measures

CSV (Excel)

Measure	Nov 2018 – Jan 2019 Rate	Jan 2019 Rate	Target
Bundle: Joint Commission Maternal Safety Standards Tool: HTN/Preeclampsia	0.0%	0.0%	
Hypertension Frequency	8.6%	13.3%	
Preeclampsia: ICU Admit Rate Among Preeclamptic Delivery Cases	N/A	N/A	
Preeclampsia: ICU Days per 100 Preeclamptic Delivery Cases	N/A	N/A	
Severe Maternal Morbidity Case Reviews	N/A	N/A	
Severe Maternal Morbidity Risk Adjusted 1.0	7.2%	8.1%	
Severe Maternal Morbidity: Including Transfusion Cases	14.3%	13.3%	
SMM Including Transfusions Among Preeclampsia Cases	0.0%	0.0%	
Timely Treatment for Severe Hypertension (AIM)	66.7%	50.0%	

Thank you!

For More Information and to Download the Toolkit

www.CMQCC.org/toolkits

Contact us:

info@cmqcc.org

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Cedars Sinai