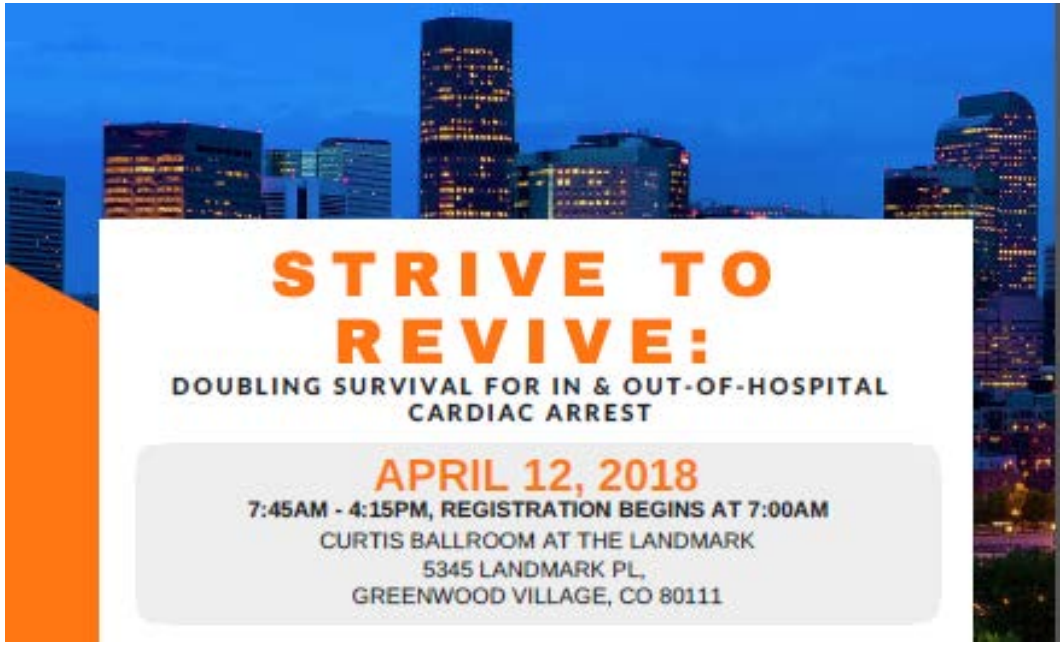
Maternal and New Born Cardiac Arrest: The science and how GWTG-Resuscitation is addressing these unique patient populations

March 16, 2018
12:00pm Central

Presenters:
Carolyn M. Zelop, MD
Taylor Sawyer, DO, M.Ed
Christina Sterzing, RHIA– American Heart Association

Heart.org/Resuscitation



For more info or to register:

Heart.org/strivetoreviveco

CME Credits

7.5 hours continuing education credit for physicians, mid-level practitioners, nurses, and emergency medical services

Featured Speakers

Comilla Sasson, M.D., PhD.
Veteran's Administration -
Eastern Colorado &
American Heart Association

Paul Chan, M.D., MSc
Professor of Medicine,
University of Missouri-Kansas City
Clinical Scholar,
Saint Luke's Mid America Heart Institute
Kansas City, MO

Sarah Perman, M.D., MSCE
Asst. Professor of Emergency Medicine,
University of Colorado School of Medicine
Denver, CO

Heather Wolfe, M.D., MSHP
Pediatric Critical Care Medicine
Philadelphia Children's Hospital
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American Heart Association | American Stroke Association

GET WITH THE GUIDELINES. RESUSCITATION

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MATERNAL AND NEW BORN CARDIAC ARREST: THE SCIENCE AND HOW GWTG-RESUSCITATION IS ADDRESSING THESE UNIQUE PATIENT POPULATIONS

Maternal Cardiac Arrest Registry

Carolyn M Zelop, MD

NO DISCLOSURES

GLOBAL AND U.S. MATERNAL MORTALITY

- Over the last 25 years, the global maternal mortality ratio (MMR) has **decreased from 281.5 to 195.7**
- MMR is defined as pregnancy-related deaths per100,000 live births.
- However, despite the United Nations' Millennium Development Goal for a 75% reduction in maternal mortality by 2015, from 1990-2015 the MMR of the US, **has been increasing from 16.9 to 26.4** climbing more than 56%.

Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 2016; 388:1775–812.
MacDorman MF, Declercq E, Cabral H, Morton C. Recent Increases in the U.S. Maternal Mortality Rate: Disentangling Trends From Measurement Issues. Obstet Gynecol 2016;128:447–55.
Moaddab A1, Dildy GA, Brown HL, et al. Health Care Disparity and State-Specific Pregnancy-Related Mortality in the United States, 2005-2014. Obstet Gynecol. 2016 Oct;128(4):869-75.).

THE REASONS FOR RISING US MMR ARE QUITE COMPLEX

- Ascertainment bias From vital statistics
- Role of socioeconomic status, tremendous racial and ethnic disparities that may be linked to health care access, and unaddressed comorbidities that manifest as maternal complications
- Between 2006-2010, the U.S. pregnancy-related mortality ratio by year and race/ethnicity was **12 for Non-Hispanic White women** compared to **38.9 for their Non-Hispanic Black counterparts**
- **Inadequate resuscitation science and translational perinatal resuscitation medicine**

Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 2016; 388:1775–812.
MacDorman MF, Declercq E, Cabral H, Morton C. Recent Increases in the U.S. Maternal Mortality Rate: Disentangling Trends From Measurement Issues. Obstet Gynecol 2016;128:447–55.
Moaddab A1, Dildy GA, Brown HL, et al. Health Care Disparity and State-Specific Pregnancy-Related Mortality in the United States, 2005-2014. Obstet Gynecol. 2016 Oct;128(4):869-75.).

MATERNAL MORTALITY AND CARDIAC ARREST

- Prevalence of maternal cardiac arrest **appears to be increasing**
- Cardiovascular etiologies are becoming the most prevalent etiologies revealed by pregnancy mortality surveillance data
- 1/12,000 hospitalizations for delivery is complicated by cardiac arrest
- This data is important for the clinician in the trenches who is called to participate in the resuscitation of a mother in cardiac arrest. The stakes are very high because there are 2 patients and although still uncommon, maternal cardiac arrest may occur in any hospital.

Mhyre et al. Anesthesiology 2014

ACLS
IN NONPREGNANCY

C – Circulation/Chest compressions

A – Airway

B – Breathing

D – Defibrillate

PREGNANT WOMEN ARE DIFFERENT

- Resuscitation maneuvers and interventions during maternal cardiopulmonary resuscitation must accommodate the physiological changes of pregnancy
- Increase cardiac output by 40% to accommodate uterine-placental unit
- Aortocaval compression as early as 20 weeks gestation
- 20% increased oxygen consumption
- Balanced acid/base status with respiratory alkalosis and metabolic acidosis
- Decreased GI sphincter tone leading to increased aspiration risk especially with loss of consciousness

ILCOR 2015, AHA 2015 and First scientific statement of maternal cardiac arrest from AHA 2015 recommend:

- left lateral uterine displacement to relieve aortocaval compression of the enlarging uterus that is greater than or equal to 20 weeks
- Perimortem delivery when ROSC is unsuccessful during maternal code blue when the uterine size is greater than or equal to 20 weeks
- All three publications underscored the low GRADE of evidence and the need to bridge the gaps in maternal resuscitation science
- New GWTG maternal and linked fetal/neonatal variables will provide more robust data

ACLS
IN PREGNANCY

C – Circulation/Chest compressions

A – Airway

B – Breathing

D – Defibrillate

E – Extract fetus

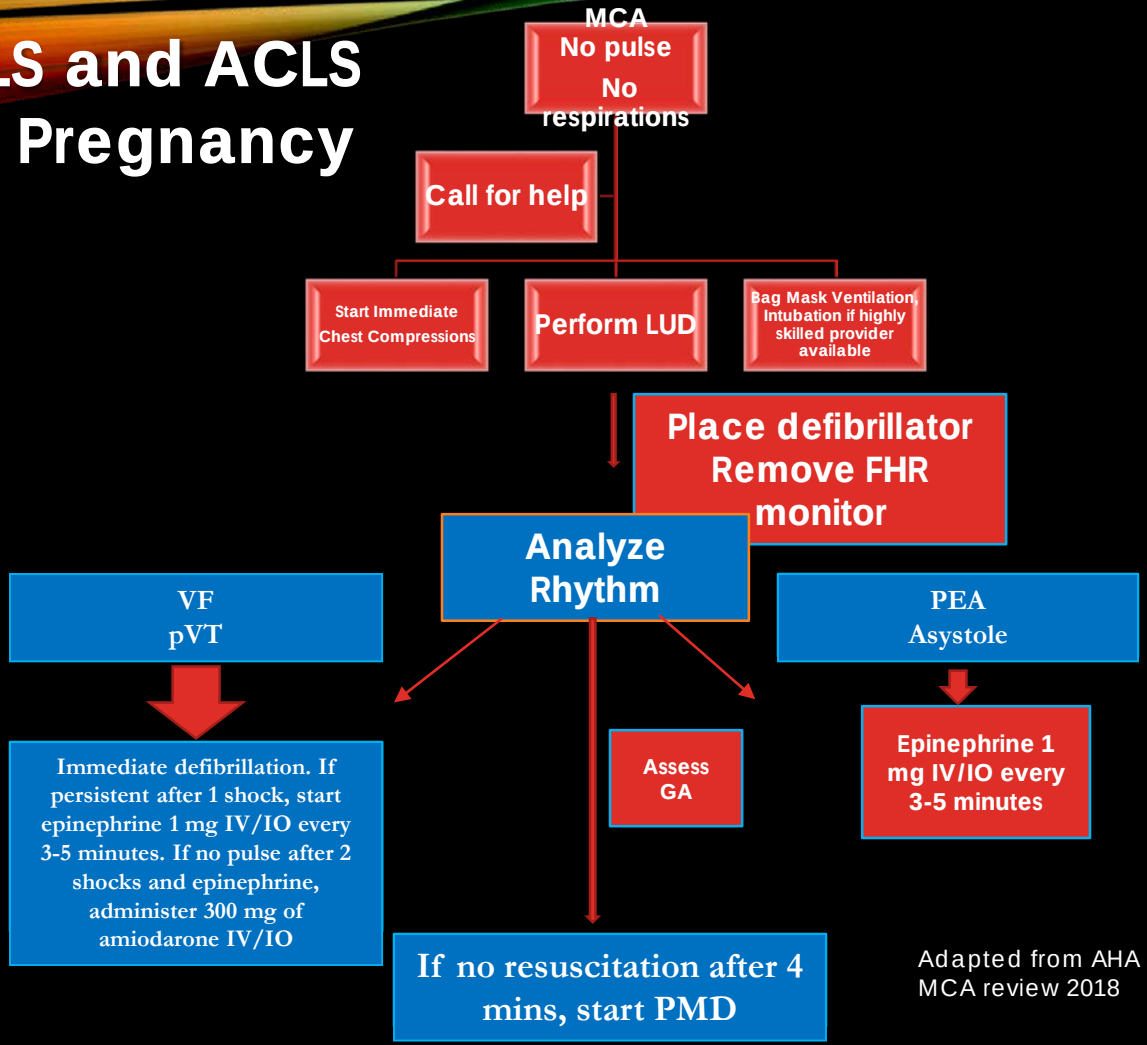
Chest Compressions

LUD

Airway/Breathing

Circulation

BLS and ACLS in Pregnancy



Adapted from AHA and AJOG MCA review 2018

Characteristics and Outcomes of Maternal Cardiac Arrest

C M Zelop, MD 1,2; S Einav, MD 3; J M Mhyre, MD 4; S Lipman, MD 5; J Arafeh RN, MS 5; R E Shaw, Ph.D 1; D P Edelson, MD 6; F M Jeejeebhoy 7

(1) The Valley Hospital, Ridgewood, NJ; (2) New York University School of Medicine, New York, NY;
(3) Shaare Zedek Medical Center Jerusalem, Israel; (4) University of Arkansas Medical Sciences; (5) Stanford University; (6) University of Chicago;
(7) University of Toronto William Osler HS

Abstract

Characteristics and Outcomes of Maternal Cardiac Arrest (MCA)

Objective:
Maternal mortality has risen in the US since the new millennium yet large cohort data of MCA are limited. We sought to describe contemporary characteristics and outcomes of in hospital MCA.

Study Design:
We queried the American Heart Association's Get with the Guidelines Resuscitation registry from 2000- 2016 to identify cases of MCA. We included all index cardiac arrests occurring in women aged 18-50 with a patient illness category designated as obstetric or location of arrest occurring in a delivery suite. Institutional review deemed this research exempt from ethical approval.

Results:
A total of 462 index events met criteria for MCA, with a mean age of 31 ± 7 years and a racial distribution of: 49.4% White, 35.3% Black, and 15.3% Other/Unknown. While 32% had no pre-existing conditions; 36.1% had respiratory insufficiency, 33.3% had hypotension/hypoperfusion, 12.6% had diabetes, 9.1% had renal insufficiency, 8.4% had acute CNS non-stroke events and 7.4% had cardiac disease. The index event was witnessed in 93.7% and a hospital –wide resuscitation response was activated in 77.0 % of events. In most cases, the first documented pulseless rhythm was non-shockable; pulseless electrical activity (50.8%) or asystole (25.6%). Only 11.7% presented with a shockable rhythm; ventricular fibrillation (6.5%) or pulseless ventricular tachycardia (5.2%) while the initial pulseless rhythm was unknown in 11.9% of MCA cases. An AED was applied in 21.6% of cases. The observed rate of ventilatory support was high (99.4%) with endotracheal intubation utilized in (416/462) (90.0%) of MCA cases. Epinephrine was administered in 86.8% of the cases. Return of spontaneous circulation occurred in 73.6% but 68 (14.7%) had more than one arrest. The rate of survival to discharge was 40.7% overall; 37.3% with non-shockable rhythms, 33% with shockable rhythms and 64.3% with unknown presenting rhythms.

Conclusions:
Maternal survival at hospital discharge in this cohort is less than 50%, lower than rates reported in other epidemiological datasets. More research is required in maternal resuscitation science and translational medicine to continue to improve outcomes and understand maternal mortality. These data support the need for a mandatory national database for MCA.

Background:
Maternal Mortality in the United States has reached unprecedented heights since the new millennium. The maternal mortality ratio (MMR) defined as the number of pregnancy related maternal deaths per 100,000 live births has risen more than 56% from 16.9% (95% uncertainty interval (UI) 16.2-17.8) in 1990 to 26.4% (24.6-28.4) in 2015 (Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 2016; 388:1775–812.). Maternal cardiac arrest (MCA) represents a final common pathway for a variety of maternal pathophysiologic insults. Despite the importance of MCA in characterizing maternal morbidity and mortality, large cohort studies detailing MCA remain limited.

Objective:
We sought to further describe contemporary characteristics and outcomes of in-hospital MCA.

Study Design:
We queried the American Heart Association's Get with the Guidelines (GWTG) ® Resuscitation voluntary registry from 2000-2016 to identify cases of MCA from 2000-2016. The data repository is powered by Outcomes, an IQVIA Company in Parsippany, New Jersey We included all index cardiac arrests occurring in women aged 18-50 with a patient illness categorized at the time of data abstraction as "obstetric" or those women whose reported location of arrest was the "delivery suite". See Figure 1 Variables captured for each patient included both demographic and clinical resuscitation parameters. Pregnancy parameters or linkage to fetal or neonatal outcomes was not available. Institutional review deemed this research exempt from ethical approval.
Statistical analysis was performed using Statistical Package for the Social Sciences (IBM/SPSS; 19.1). Descriptive statistics were utilized to report both the demographic features and the outcomes

Figure I
Identification of Maternal Cardiac Arrest Cases

Results:

A total of 462 women met criteria for MCA. Table I presents the information provided at the time of reporting regarding maternal age, race and pre-existing conditions of women experiencing MCA. Respiratory insufficiency and hypotension/hypoperfusion were common antecedents to MCA.

Characteristics of the arrests were also analyzed. The index event was witnessed in 93.7% and a hospital–wide resuscitation response was activated in 77.0 % of events. In most cases, the first documented pulseless rhythm was non-shockable: pulseless electrical activity (50.8%) or asystole (25.6%). Only 11.7% presented with a shockable rhythm: ventricular fibrillation (6.5%) or pulseless ventricular tachycardia (5.2%). The initial pulseless rhythm was unknown in 11.9% of MCA cases. Treatment and management characteristics of the MCAs were also analyzed. An AED was applied in 21.6% of cases. The rate of defibrillation was similar with shockable rhythms (42/51= 82%) and those with a non-shockable rhythms (74/91= 81%). The observed rate of ventilatory support was high (99.4%) with endotracheal intubation utilized in (416/462) (90.0%) of MCA cases. Epinephrine was administered in 86.8% of the cases. The medications utilized for resuscitation in this cohort are reported in Table 2.
Outcomes for this cohort of women sustaining MCA were also analyzed. Return of spontaneous circulation occurred in 340 (73.6%) women but 68 (14.7%) had more than one arrest. Overall, 188 women (40.7%) survived to hospital discharge. The rates of survival to hospital discharge, according to initial pulseless rhythm, were: 37.3% with non-shockable rhythms, 33% with shockable rhythms and 64.3% with unknown presenting rhythms

Table 1

		Mean ± SD (range)
Age admission (years)		31±7 (18-50)
		n (% of 462)
Race	White	228 (49.4)
	Black	163 (35.3)
	Other/Unknown	70 (15.2)
Pre-existing Conditions	None	148 (32)
	Respiratory Insufficiency	167 (36.1)
	Hypotension/ Hypoperfusion	154 (33.3)
	Diabetes	58 (12.6)
	Renal Insufficiency	42 (9.1)
	Acute CNS Non- Stroke Event	39 (8.4)
	Cardiac Disease	34 (7.4)

Demographic Information and Pre-existing Conditions of Women with MCA

Medication	Number (N)
Epinephrine	401 (86.8)
Vasopressin	64 (13.9%)
Dobutamine	8 (1.7%)
Dopamine	94 (20.5%)
Norepinephrine	127 (27.5%)
Anti-Arrhythmic agent	82 (17.7%)
Amiodarone	61 (13.2%)
Adenosine	4 (1%)
Bicarbonate	286 (61.2%)

Table II Medications Used for MCA

Discussion:

In this cohort of 462 cases of MCA, survival until hospital discharge was 40.7%. The high rate of respiratory insufficiency reinforces the current ACLS guidelines for maternal resuscitation that recommend concurrent chest compressions, left lateral uterine displacement if uterine size greater than or equal to twenty weeks gestation along with ventilation and oxygenation.
Cases of MCA in this cohort reveal a predominance (76.4%) of non-shockable first documented pulseless rhythms: pulseless electrical activity (50.8%) and asystole (25.6%). Although "etiology" of MCA was not captured in this dataset, these cardiac rhythms coincide with reversible causes of cardiac arrest such as hypovolemia (hemorrhage), hypoxia, acidosis, hypo/hyperkalemia, hypothermia, toxins (magnesium sulfate, opioids), thrombosis (pulmonary or coronary), tamponade and tension pneumothorax
The severity of MCA supersedes any concerns regarding medication exposure used during the resuscitation process. Epinephrine is the vasopressor of choice during resuscitation of MCA,
This study is the first to report outcomes for maternal cardiac arrest from GWTG dataset. The sample size of this MCA cohort is robust. However, our study has limitations. The current data lacks linkage with fetal/neonatal outcomes. This current dataset is not directed towards maternal resuscitation, and although the location of arrest and clinical category are recorded, the data set is missing critical variables to understand the epidemiology of maternal CPR, including mode of delivery, the timing of delivery relative to the arrest, perinatal outcomes, and the presence of common antecedent conditions for MCA.

Conclusion:

Maternal survival to hospital discharge was 41%, lower than rates of survival reported in other data sets focusing on maternal CPR. More research is required in maternal resuscitation science and translational medicine to produce data with sufficient granularity to improve MCA outcomes and understand maternal mortality. These data support the need for a mandatory national database for MCA that will provide the framework to ultimately increase survival and quality of life of our mothers.

Presented at SMFM 2/2018 and published in AJOG SMFM supplement 2/2018

WHY SHOULD HOSPITALS PARTICIPATE AND ENTER NEW DATA ELEMENTS FOR MATERNAL CARDIAC ARREST?

- Improve our understanding of maternal resuscitation science
- Enhance our knowledge of optimal chest compressions and maneuvers to relieve aortocaval compression
- Provide further incite into optimal airway management during maternal cardiac arrest
- Guide further recommendations regarding the gestational age and timing of perimortem delivery

UPDATED GWTG WITH PREGNANCY SPECIFIC VARIABLES

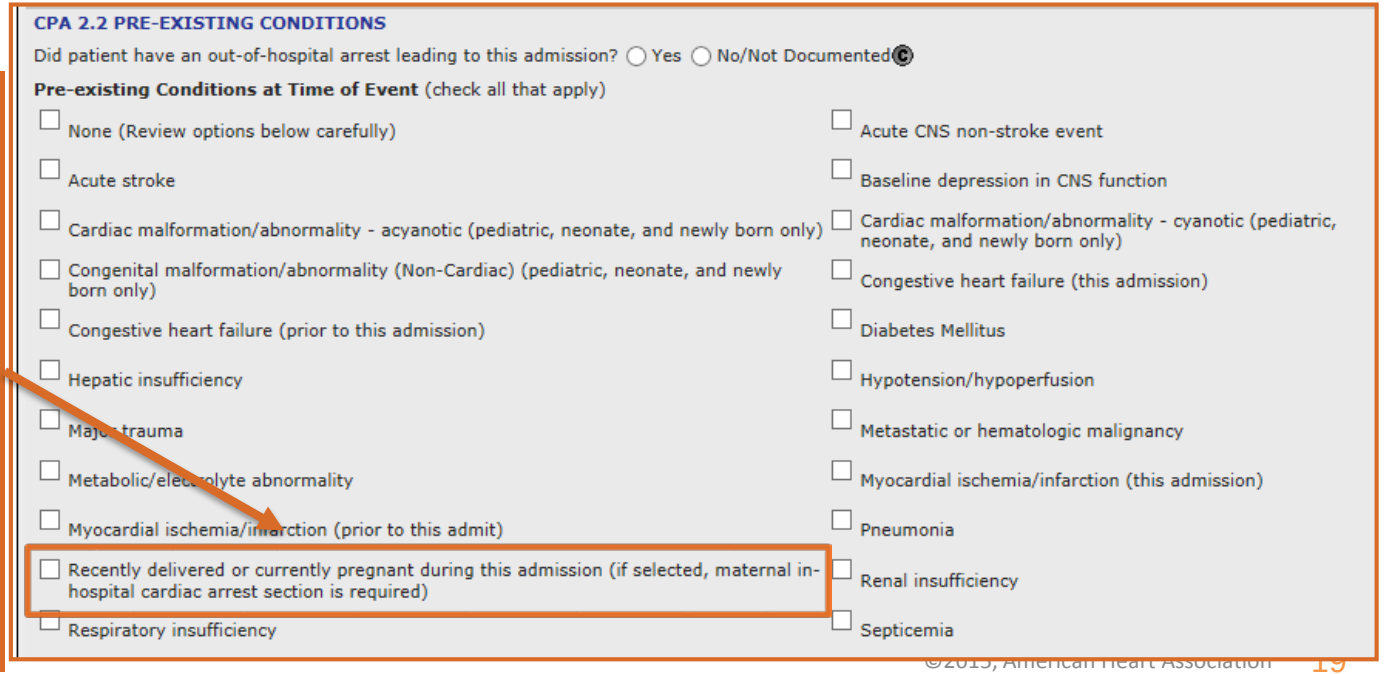
PMT Updates Summary

- 9 new data elements added to the CPA form to support research have been added to “Research” tab
- No measures were affected by the updates
- CRF and coding instructions have been updated to reflect updates
- Uploader documents have been updated to include the new data elements

CPA Pre-existing conditions: Recently delivered or currently pregnant

New response option for pre-existing conditions: recently delivered or currently pregnant.

Selecting this option will trigger the new data elements on the Research tab.



CPA 2.2 PRE-EXISTING CONDITIONS

Did patient have an out-of-hospital arrest leading to this admission? ◯ Yes ◯ No/Not Documented

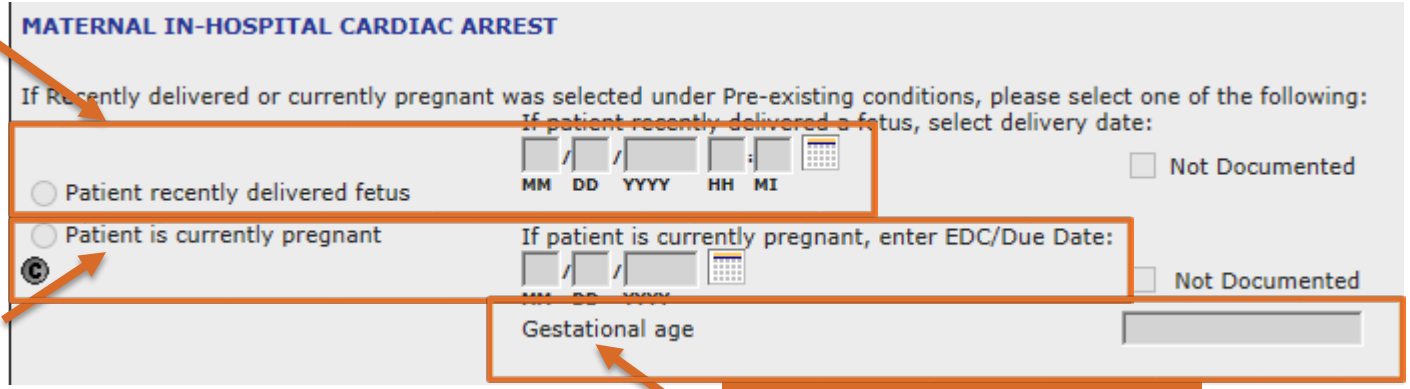
Pre-existing Conditions at Time of Event (check all that apply)

- ☐ None (Review options below carefully)
- ☐ Acute stroke
- ☐ Cardiac malformation/abnormality - acyanotic (pediatric, neonate, and newly born only)
- ☐ Congenital malformation/abnormality (Non-Cardiac) (pediatric, neonate, and newly born only)
- ☐ Congestive heart failure (prior to this admission)
- ☐ Hepatic insufficiency
- ☐ Major trauma
- ☐ Metabolic/electrolyte abnormality
- ☐ Myocardial ischemia/infarction (prior to this admit)
- ☐ Recently delivered or currently pregnant during this admission (if selected, maternal in-hospital cardiac arrest section is required)
- ☐ Respiratory insufficiency
- ☐ Acute CNS non-stroke event
- ☐ Baseline depression in CNS function
- ☐ Cardiac malformation/abnormality - cyanotic (pediatric, neonate, and newly born only)
- ☐ Congestive heart failure (this admission)
- ☐ Diabetes Mellitus
- ☐ Hypotension/hypoperfusion
- ☐ Metastatic or hematologic malignancy
- ☐ Myocardial ischemia/infarction (this admission)
- ☐ Pneumonia
- ☐ Renal insufficiency
- ☐ Septicemia

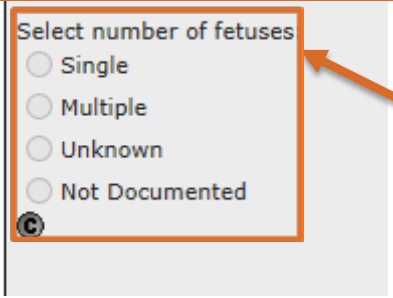
Research Tab: Maternal In-Hospital Cardiac Arrest

Select either recently delivered and delivery date OR

Select currently pregnant and due date



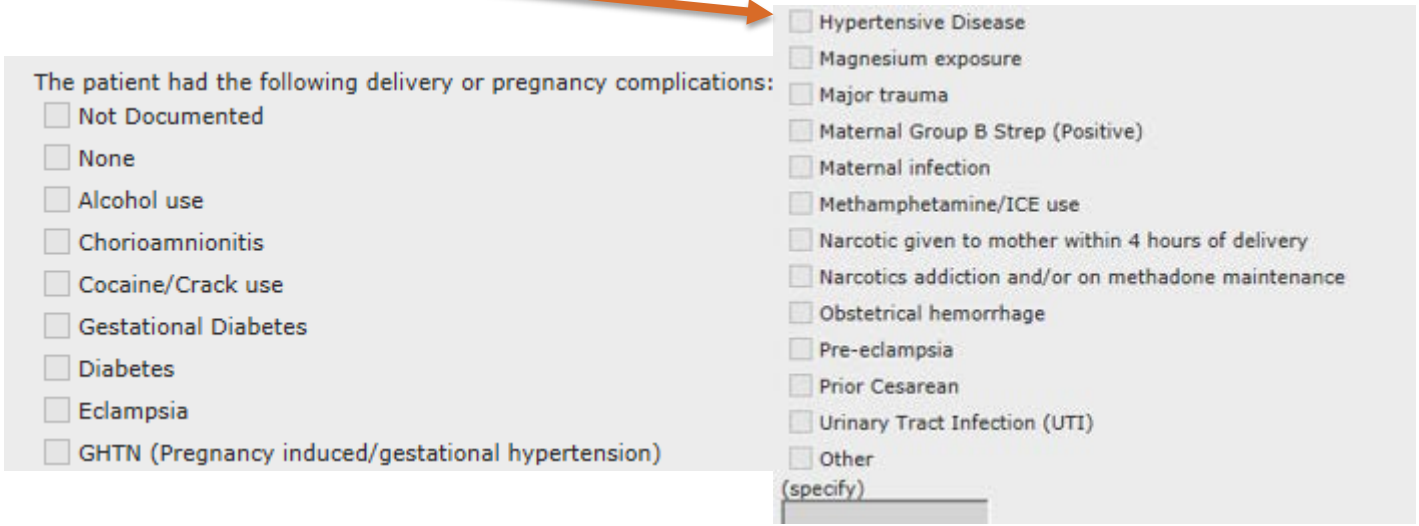
Gestational age is an auto-calculated field



Indicate number of fetuses during this episode of care

Pregnancy or delivery complications

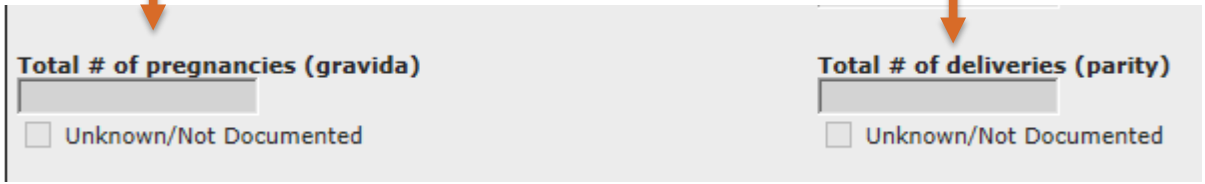
Indicate all of the documented delivery and pregnancy complications



Gravida and Parity History

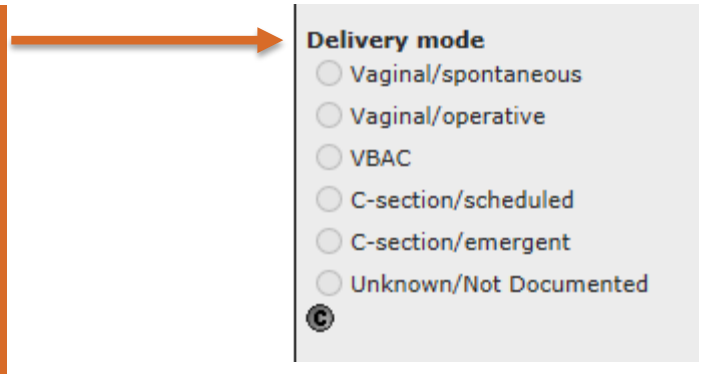
Enter total number of pregnancies

Enter total number of deliveries



Delivery Mode

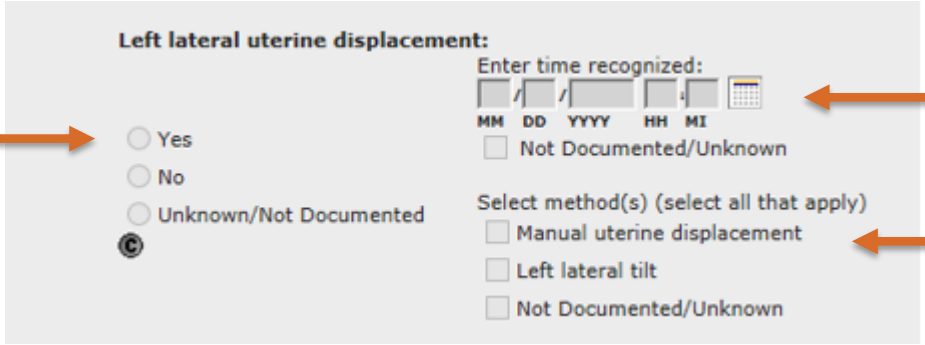
If patient has delivered recently, please select the delivery mode here



Left Lateral Uterine Displacement Information

Because of maternal physiologic changes, left lateral uterine displacement is required during cardiopulmonary resuscitation. This is performed by tilting the whole maternal body **25 to 30 degrees (Figure 215)**, or by manual uterine displacement (Figure 315).

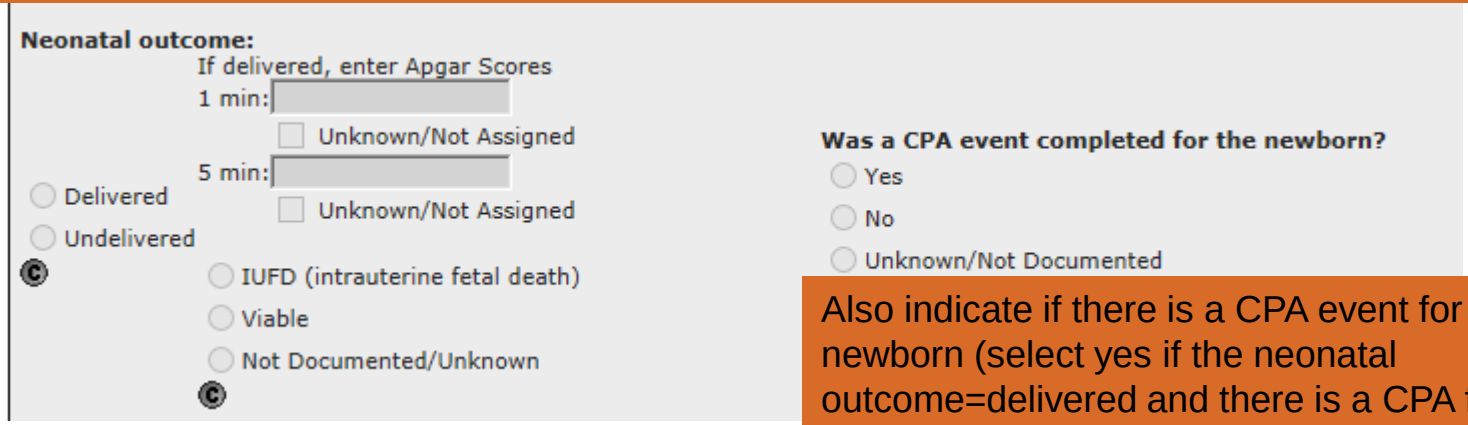
Select yes or no



If yes, enter date/time recognized and the method

Neonatal/newborn information

Select if the neonate was delivered or undelivered; if delivered enter the 1 and 5 minute Apgar scores; if undelivered, select either IUFD or viable (meaning, the patient is still pregnant and baby is alive)



Also indicate if there is a CPA event for the newborn (select yes if the neonatal outcome=delivered and there is a CPA form for the newborn); if the fetus is undelivered or there wasn't a CPA event for the newborn, select "no".

Newly Born Cardiac Arrest: How GWTG Resuscitation is Addressing this Unique Patient Population

Taylor Sawyer, DO, MEd
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Associate Division Head for Education
Division of Neonatal-Perinatal Medicine
University of Washington School of Medicine | Seattle Children's Hospital

Disclosure

- Neither I nor any member of my immediate family has a financial relationship or interest with any proprietary entity producing health care good or services related to the content of this CME activity
- My content will not include discussion/reference of any commercial products or services
- I do not intend to discuss an unapproved/investigative use of commercial products/devices

Learning objectives

- Review terminology use to describe patients in the first days to weeks of life
- Identify differences in the resuscitation practice between the newly born and neonate/infant
- Explain AHA GWTG-R quality metrics for the newly born

Clinical Scenario 1

- Resuscitation team is called to attend the cesarean section delivery of a 28 week gestation newborn
- Prenatal history is unremarkable
- Late decelerations on fetal monitor
- Baby born apneic and cyanotic, with heart rate of 40 bpm

Clinical Scenario 2

- NICU team called to evaluate a former 28 week gestation baby, now 2 months old
  - 36 weeks post-menstrual age
- History significant for respiratory distress syndrome, symptomatic patent ductus arteriosus, and severe bronchopulmonary dysplasia
  - Baby still on ventilator
- Team arrives to find baby apneic and cyanotic, with heart rate of 40 bpm

Clinical Scenario 3

- Emergency Room team called to evaluate a former 28 week gestation baby, now 2 months old
  - 36 weeks post-menstrual age
- History significant for unremarkable 6 week stay in the NICU
  - Discharged home 2 weeks ago
- Baby found apneic and lifeless at home in crib
- Team arrives to find baby apneic and cyanotic, with heart rate of 40 bpm

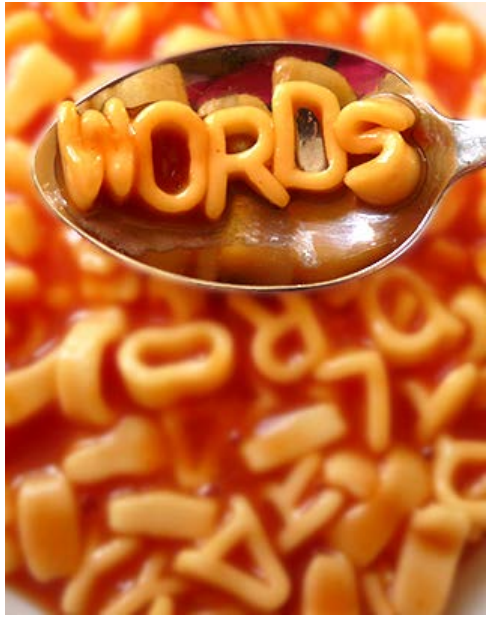
Clinical Scenario Questions?

What resuscitation guideline should be used in each of the three scenarios?

- Neonatal vs. Pediatric

How do you define high quality resuscitation in each case?

Terminology



http://www.sharksoupstudios.com/applications/word-soup

Terminology

"Newly born" - a baby undergoing transition from intrauterine to extrauterine life

https://www.gettyimages.com/detail/photo/newly-born-baby-being-cleaned-up-high-res-stock-photography/120002927

Kattwinkel J, et al. Part 15: neonatal resuscitation: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010 Nov 2;122(18 Suppl 3):S909-19.

Terminology

"Newborn" - a baby during their initial hospitalization in the newborn nursery or neonatal intensive care unit (NICU)

http://fox2now.com/2017/02/11/these-tiny-diapers-fit-babies-less-than-2-pounds/

Kleinman ME et al. Part 14: pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010 Nov 2;122(18 Suppl 3):S876-908.,

Terminology

"Neonate" – a baby who has completed perinatal transition and is ≤ 28 days of life

https://www.therecoveryvillage.com/drug-rehab/28-30-day-rehab-programs /

Stedman's Medical Dictionary. 28th Ed. 2005

Terminology

‘Infant’ - a baby between 28 days and one year of age

https://www.beaumont.org/health-wellness/blogs/when-and-why-infants-and-children-should-receive-vaccinations

Stedman’s Medical Dictionary. 28th Ed. 2005

Terminology

According to Neonatal Resuscitation Guidelines:

“Newborn” and “neonate” apply to any infant during the initial hospitalization

“Newly born” is intended to apply specifically to an infant at the time of birth

Kattwinkel J, et al. Part 15: Neonatal Resuscitation: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010 Nov 2;122(18 Suppl 3):S909-19.

Terminology

According to the American Heart Association GWTG-R:

Neonate/Infant = ≥ 24 hours old with age <1 year

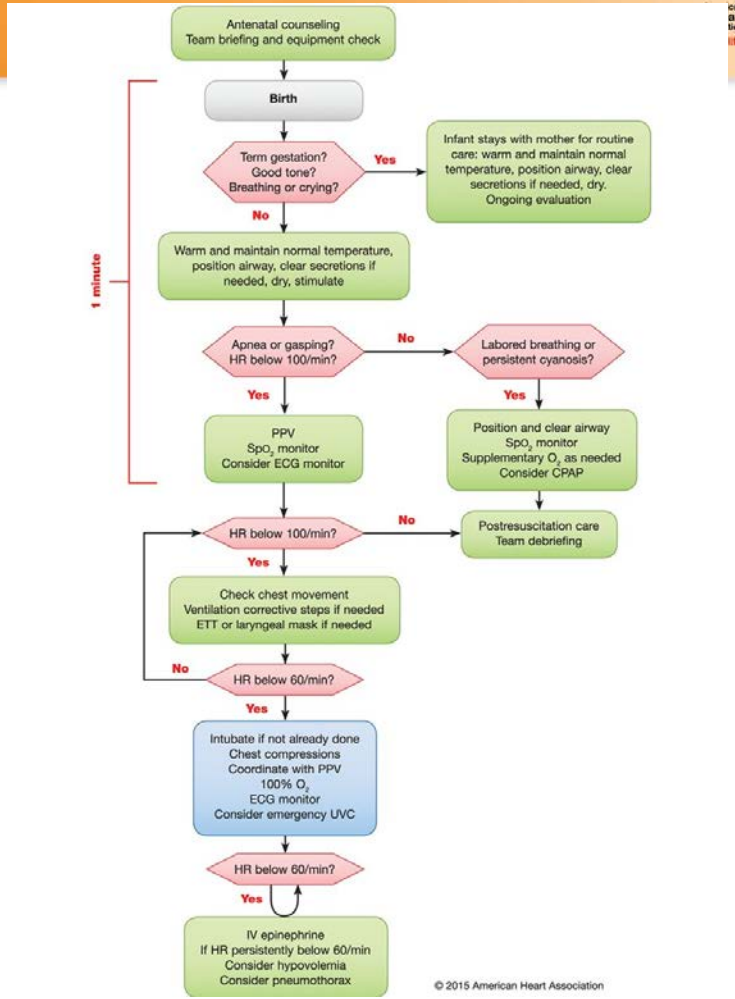
Newly born = < 24 hours old

during perinatal transition period

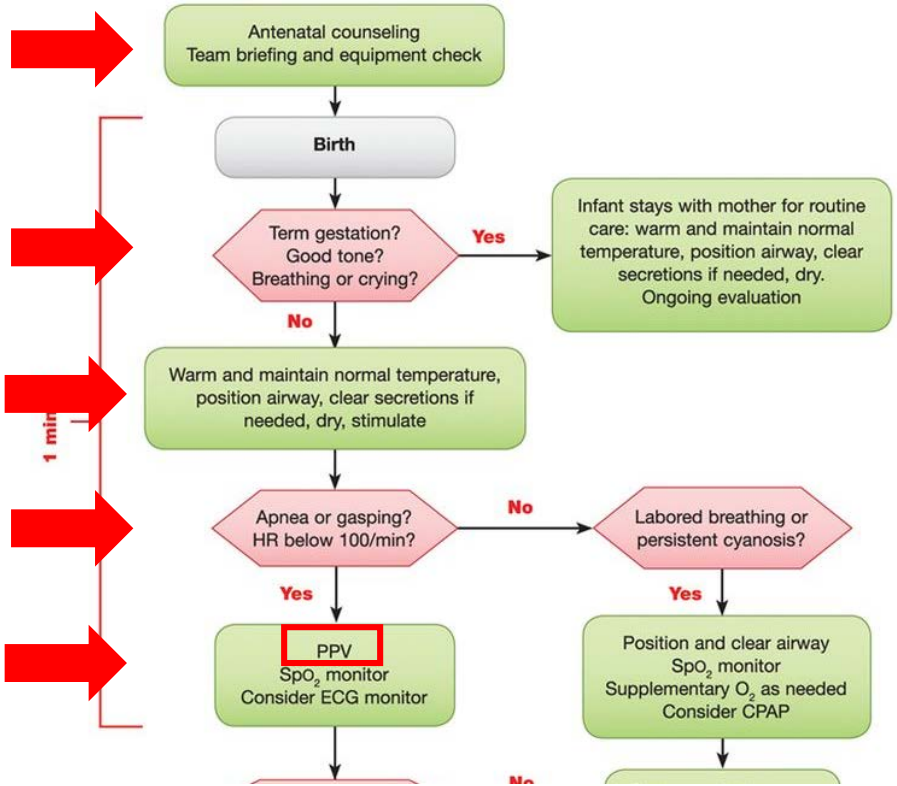
Resuscitation Fact Sheet http://www.heart.org

Resuscitation of the newly born

Neonatal Algorithm

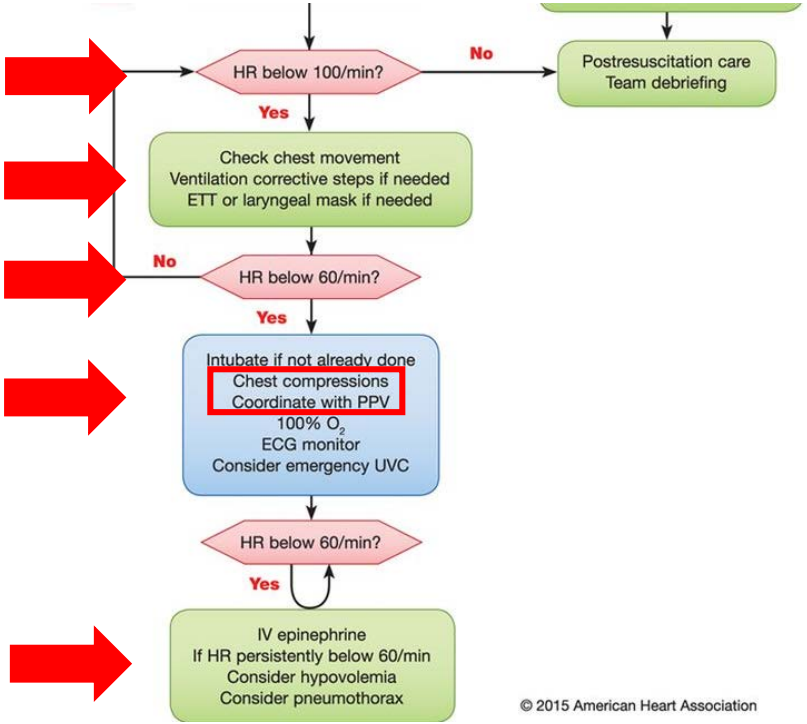


Neonatal Algorithm– “Golden Minute”



Neonatal Algorithm – After 1st minute

HR between 60-100



Neonatal Resuscitation - Takeaways

- Primary focus = **ventilation**
  - **A → B → C**

- Chest compressions indicated if HR < 60 bpm, *despite 30 seconds of effective ventilation*

- Intubate before starting chest compressions

When to use Neonatal and Pediatric Guidelines?

Neonatal Resuscitation Guidelines

Should be used for:

- “newly born infants undergoing transition from intrauterine to extrauterine life… also applicable to *neonates* who have completed perinatal transition and require resuscitation during the first few weeks to months following birth.”
- “Newborns who require CPR in the newborn nursery or NICU receive CPR using the same technique as for the newly born in the delivery room. “

Kleinman et al. Part 14: Pediatric Advanced Life Support 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122[suppl 3]:S876 –S908

Kattwinkel J, et al. Part 15: Neonatal Resuscitation: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010 Nov 2;122(18 Suppl 3):S909-19.

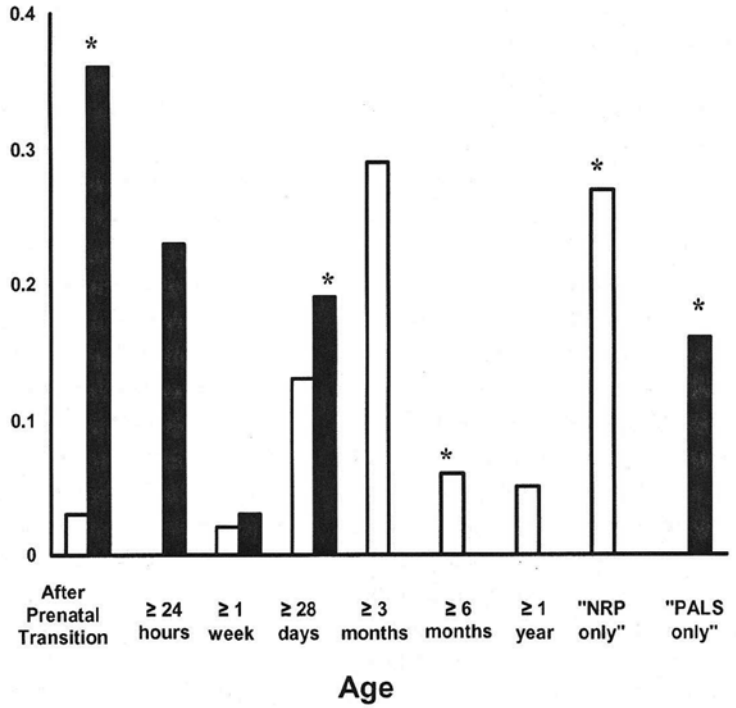
Pediatric Resuscitation Guidelines

Should be used for:

- “Newborns who require CPR in other settings (eg, prehospital, ED, PICU, etc.), should receive CPR according to infant [e.g. pediatric] guidelines.”
- “It is reasonable to resuscitate newborns with a primary cardiac etiology of arrest, regardless of location, according to infant guidelines, with emphasis on chest compressions.”

Kleinman et al. Part 14: Pediatric Advanced Life Support 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122[suppl 3]:S876 –S908

Time to use PALS, rather than NRP

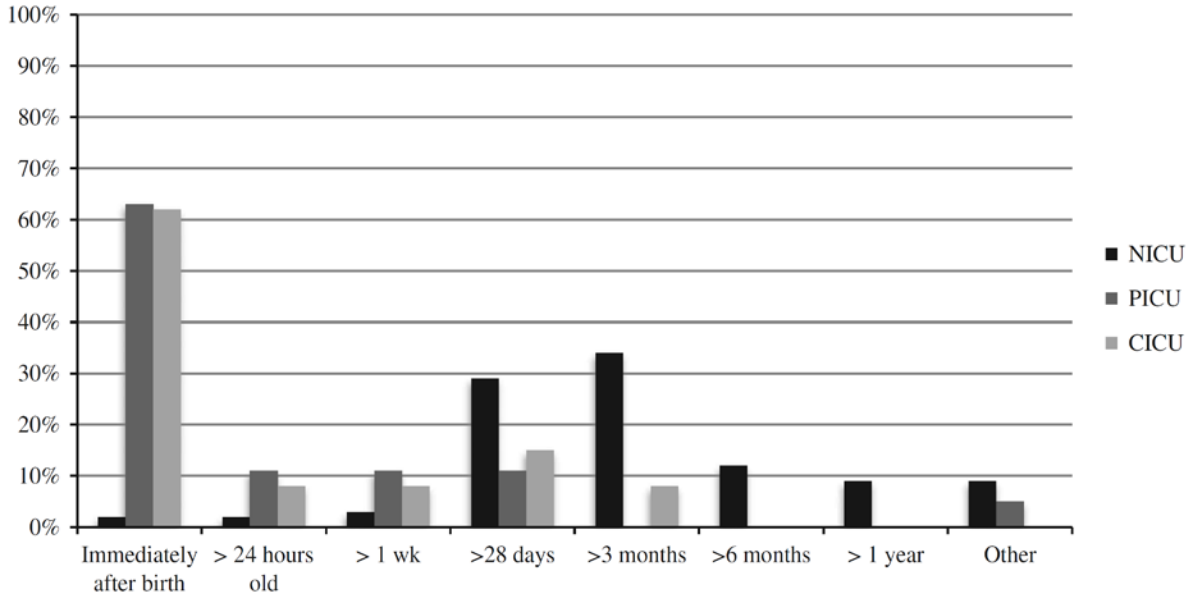


☐ Neonatology

■ Pediatric Critical Care

Sawyer T, et al. Infant resuscitation outside the delivery room., NRP or PALS: Results of a national survey. JNPM. 2009

Time to use PALS, rather than NRP



Ali N, Sawyer T, et al. Resuscitation practices for infants in the NICU, PICU and CICU: results of a national survey. J Perinatol. 2016

AHA GWTG-R Quality

Measures for the Newly Born

2017 CPA Quality Measures

CARDIOPULMONARY ARREST			
ADULT *age >=18 years*	PEDIATRIC *age <18 years and >=1 year*	NEONATE/INFANT *age <1 year and >=24 hours old*	NEWLY BORN *event occurred at delivery (< 24 hours old)*
Confirmation of airway device placement in trachea: Percent of events who had confirmation of airway device placement in trachea.	**Confirmation of airway device placement in trachea:** Percent of events who had confirmation of airway device placement in trachea	**Confirmation of airway device placement in trachea:** Percent of events who had confirmation of airway device placement in trachea.	**Confirmation of airway device placement in trachea:** Percent of events who had confirmation of airway device placement in trachea.
Time to first shock <= 2 min for VF/pulseless VT first documented rhythm: Percent of eventswith VF/pulseless VT first documented rhythm in whom time to first shock <=2 minutes of event recognition.	**Time to first chest compressions ≤1 min in pediatric patients:** Percent of events where time to first chest compressions ≤ 1 minute	**Time to first chest compressions ≤1 min in pediatric patients:** Percent of events where time to first chest compressions ≤ 1 minute	**Advanced airway placed prior to the initiation of chest compressions:** Percent of events who had an advanced airway (either laryngeal mask airway (LMA), endotracheal tube (ET) or tracheostomy tube) placed prior to initiation of chest compressions.
Time to IV/IO epinephrine ≤ 5 minutes for asystole or Pulseless Electrical Activity (PEA): Percent of events where time to epinephrine ≤ 5 minute of asystole or pulseless electrical activity.	**Time to IV/IO epinephrine ≤ 5 minutes for asystole or Pulseless Electrical Activity (PEA):** Percent of events where time to epinephrine ≤ 5 minute of asystole or pulseless electrical activity.	**Time to IV/IO epinephrine ≤ 5 minutes for asystole or Pulseless Electrical Activity (PEA):** Percent of events where time to epinephrine ≤ 5 minute of asystole or pulseless electrical activity.	**Pulse oximetry in place prior to the initiation of chest compressions:** Percent of events where pulse oximetry was in place prior to the initiation of chest compressions
Percent pulseless cardiac events monitored or witnessed: Percent of pulseless cardiac patient events were monitored or witnessed	**Percent pulseless cardiac events occurring in an ICU setting:** Percent of pulseless cardiac events occurring in an ICU setting (Adult ICU, PICU Pediatric Cardiac ICU, Neonatal ICU) versus a general inpatient area (General inpatient area, Step down/telemetry, Newborn Nursery)	**Percent pulseless cardiac events occurring in an ICU setting:** Percent of pulseless cardiac events occurring in an ICU setting (Adult ICU, PICU, Pediatric Cardiac ICU, Neonatal ICU) versus a general inpatient area (General inpatient area, Step down/telemetry, Newborn Nursery)	**Time to positive pressure ventilation <1 minute from CPA recognition:** Percent of events where the positive pressure ventilation was within 1 minute of event recognition.

http://www.heart.org/idc/groups/heart-public/@private/@wcm/@hcm/@gwtg/documents/downloadable/ucm_434082.pdf

2017 Newly Born CPA Quality Measures

Time to positive pressure ventilation <1 minute from CPA recognition: Percent of events where the positive pressure ventilation was within 1 minute of event recognition.

Pulse oximetry in place prior to the initiation of chest compressions: Percent of events where pulse oximetry was in place prior to the initiation of chest compressions

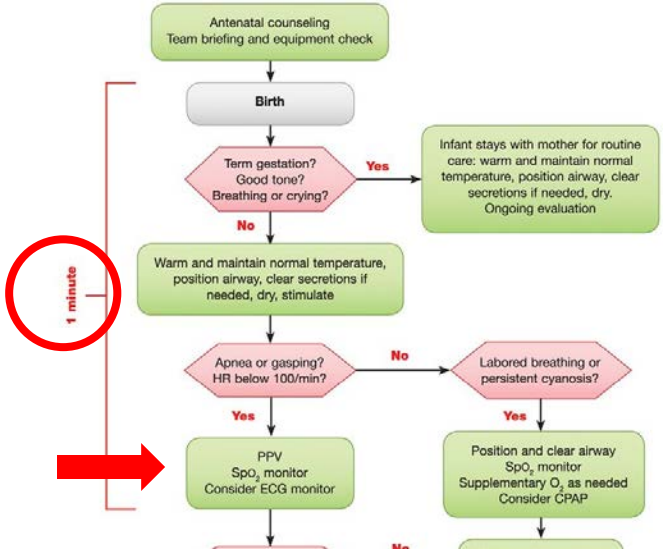
Advanced airway placed prior to the initiation of chest compressions: Percent of events who had an advanced airway (either laryngeal mask airway (LMA), endotracheal tube (ET) or tracheostomy tube) placed prior to initiation of chest compressions.

Confirmation of airway device placement in trachea: Percent of events who had confirmation of airway device placement in trachea.

http://www.heart.org/idc/groups/heart-public/@private/@wcm/@hcm/@gwtg/documents/downloadable/ucm_434082.pdf

Time to positive pressure ventilation < 1 minute from cardiopulmonary arrest recognition

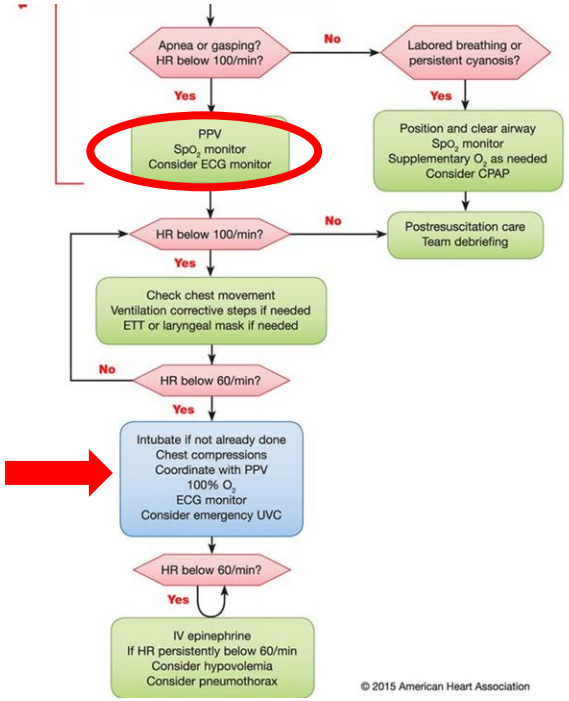
- "Approximately 60 seconds ("the Golden Minute") are allotted for completing the initial steps, reevaluating, and beginning ventilation if required"



Kattwinkel J, et al. Part 15: Neonatal Resuscitation: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010 Nov 2;122(18 Suppl 3):S909-19.

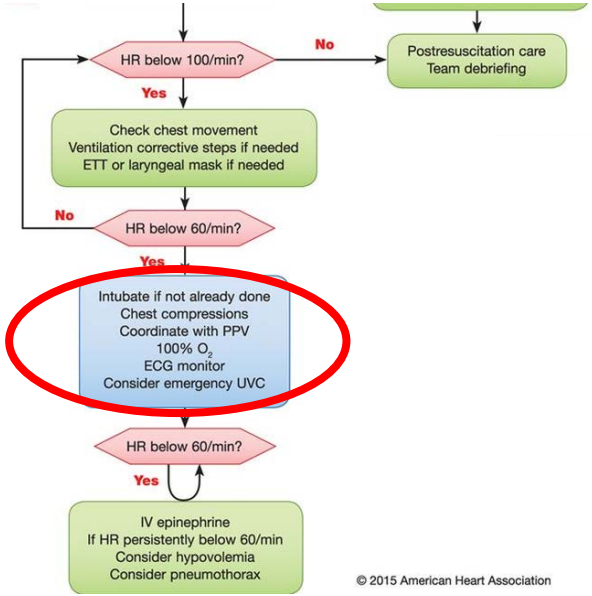
Pulse oximetry in place prior to the initiation of chest compressions

- Pulse oximetry recommended since 2010
  - Still not universal
- 2015 neonatal resuscitation guidelines recommend placement of a pulse oximeter if PPV required
- PPV precedes chest compressions



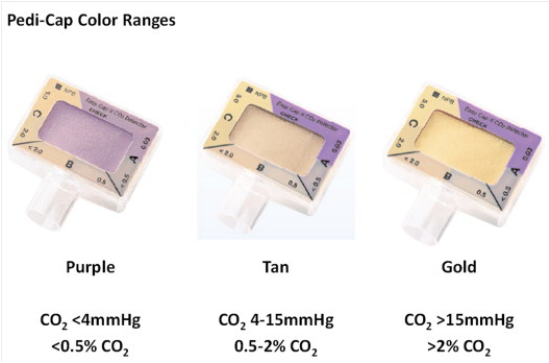
Advanced airway placed prior to the initiation of chest compressions

- The focus of newly born resuscitation is *ventilation*
- 2015 neonatal resuscitation guidelines recommend intubation, prior to the start of chest compression.



Confirmation of airway device placement in trachea

- Same metric as *neonate/infant*, *pediatric*, and *adult*
- Guidelines recommend that providers always use **both** *clinical assessment* and *devices* to confirm endotracheal tube location immediately after placement and throughout the resuscitation.



https://www.sciencedirect.com/science/article/pii/S0300957214007291

Conclusion

- Terminology use to describe patients in the first days to weeks of life may be confusing
  - "Newly born" = *at the time of birth*

- Resuscitation of the newly born focuses on ***ventilation***

- AHA GWTG-R quality metrics for the newly born are unique, and are based on neonatal resuscitation guidelines

THANK YOU!

- To the American Heart Association for recognizing the unique resuscitation needs of the newly born!

https://www.gettyimages.com/detail/photo/newly-born-baby-being-cleaned-up-high-res-stock-photography/120002927

Acknowledgment

GWTG-R Pediatric, Neonate/Infant, and Newly Born Recognition Measures Work Group

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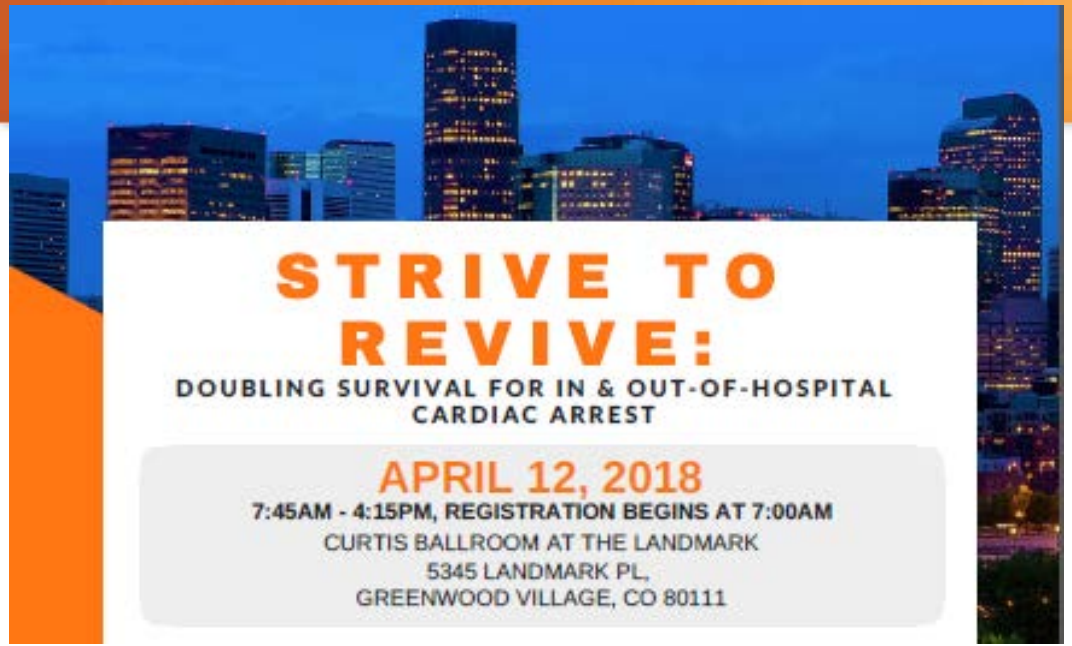

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Thank you for your active participation and contributions to GWTG-Resuscitation!