

Anything can happen
and it probably will

Brian Houston

PICTUREQUOTES.COM

A close-up photograph of a pregnant woman's belly, which is the central focus. Two hands are gently touching the skin of the abdomen. The lighting is dramatic, with the belly and hands highlighted against a dark, almost black background. The overall mood is intimate and tender.

Traumatic Arrest of the Obstetric Patient



4% OF THE
BIOLOGICAL
FEMALE
POPULATION
IS GRAVID



A 3D white figure is shown from the chest up, holding a green marker in its right hand. The figure is writing the quadratic formula on a black background. The formula is written in green and is centered in the image. The figure's head is visible behind the formula, and its hand is holding the marker as if it has just finished writing or is about to write.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$168,000,000 / 4\% =$$

$$-b \pm \sqrt{b^2 - 4ac}$$

6,720,000 PREGNANCIES ON
ANY GIVEN DAY

1:30,000 pregnancies result
in cardiac arrest

$x =$

2a

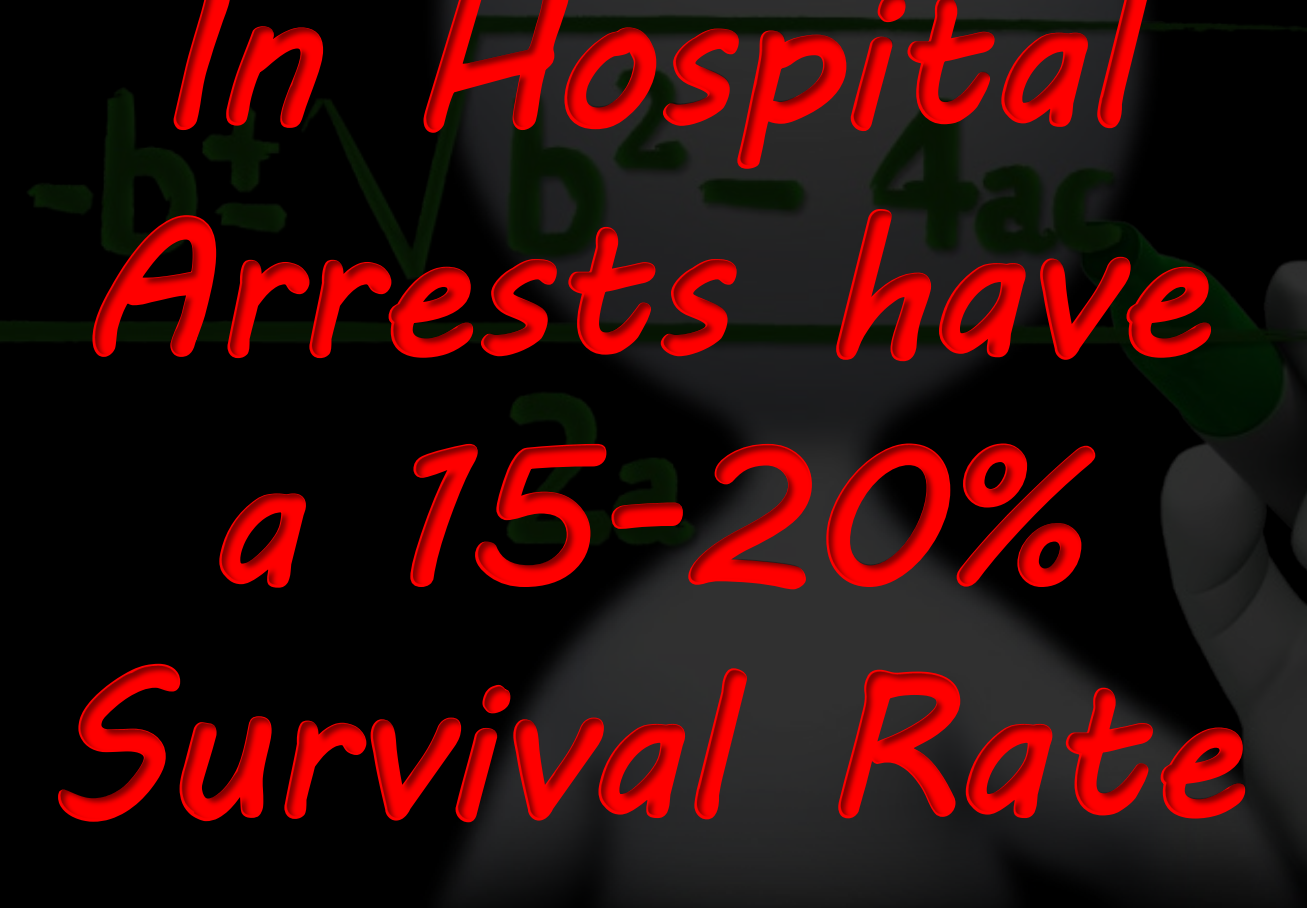
$$6,720,000 / 30,000$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

224 Will Suffer a
Cardiac Arrest

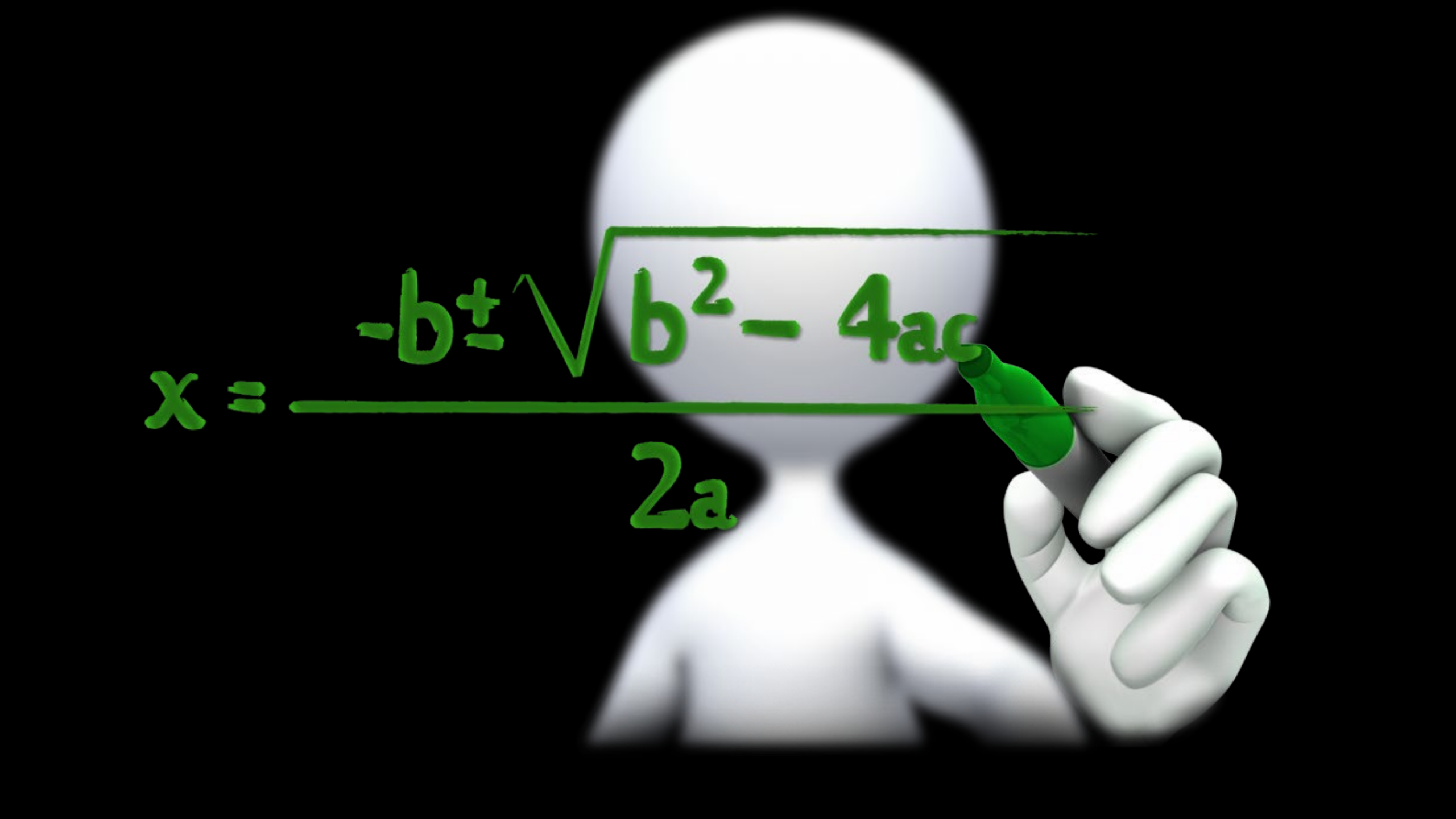
*In Hospital
Arrests have
a 15-20%
Survival Rate*

x =



**MOTOR VEHICLE ACCIDENTS
FOLLOWED BY DOMESTIC
PARTNER VIOLENCE ARE THE
TWO LEADING CAUSES OF
MATERNAL MAJOR TRAUMA**






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$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

2 % OF ALL MATERNAL
ARRESTS ARE DUE TO
TRAUMATIC ETIOLOGY

224 (Cardiac Arrest
Victims) / 2% =

4.5 TRAUMATIC
ARRESTS



Fail to prepare...

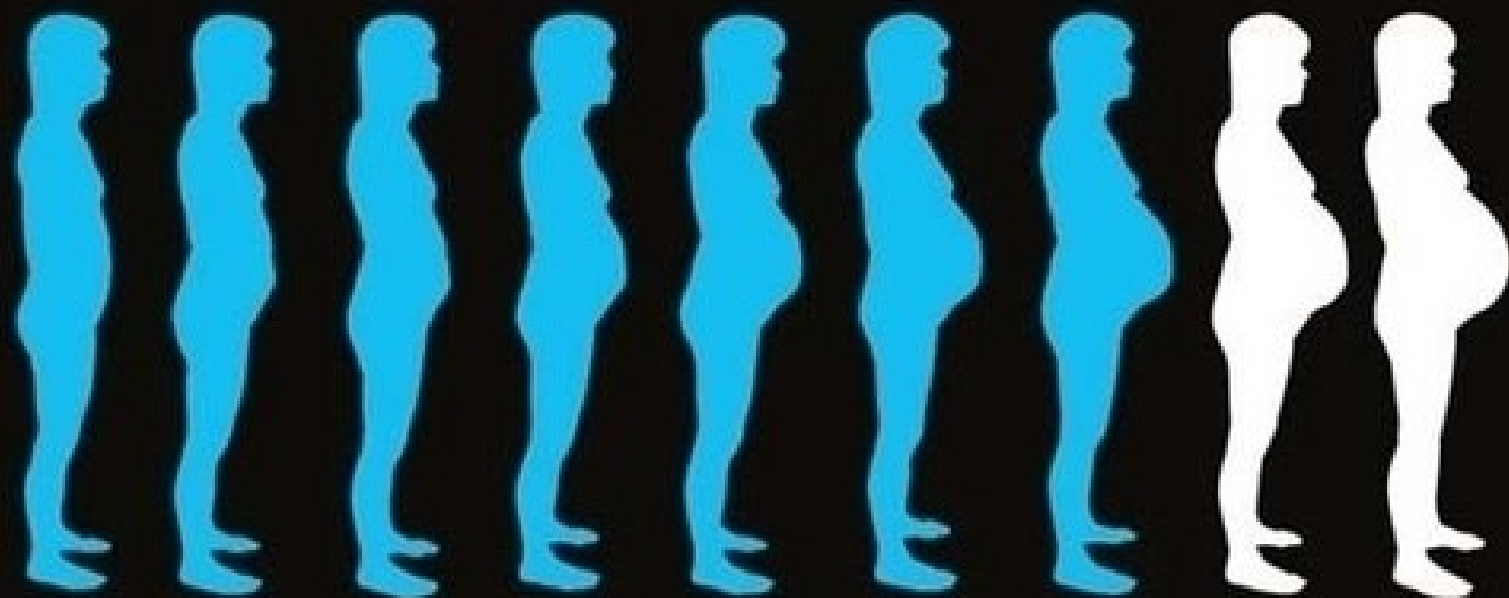
...prepare to fail

“There is good evidence to recommend clinical preventive action”

First Rule of OB Assessment?

WHEN IS IT OKAY

TO ASK A WOMAN IF SHE IS PREGNANT?



NO NO NO NO NO NO NO NO NO



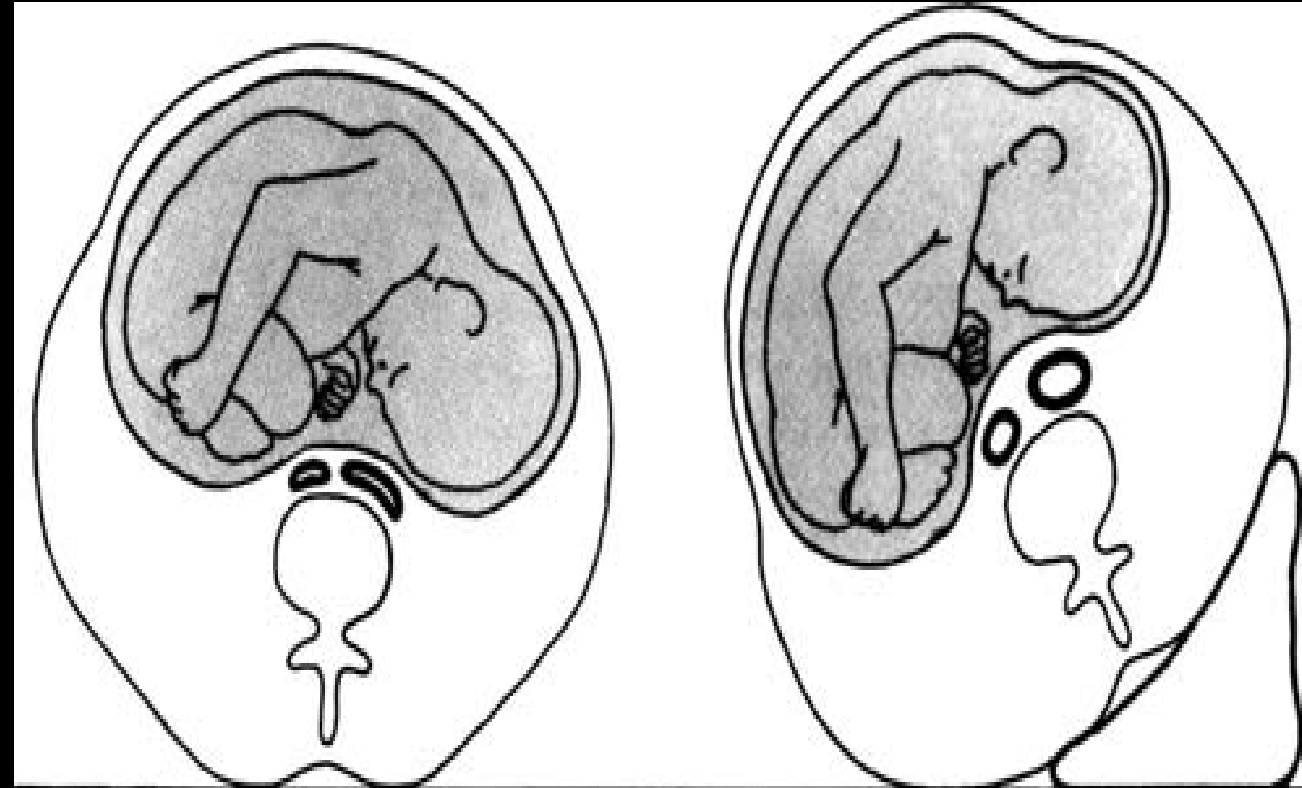
MAYBE

Physiological Changes to Remember

- Increased cardiac output of up to 40%
 - May see Left XD
- Upper airway: pharynx and larynx edema occur as a result of hormonal effects and may reduce visualization during laryngoscopy

Physiological Changes to Remember

- Aortocaval (IVC) compression as early as 20 weeks gestation
- 20% increased oxygen consumption
- Minute ventilation rise by 50% at term



Resuscitation Changes: C-Circulation

- Compressions 120/min
 - Mechanical devices not recommended
- Manual displacement of the Uterus
 - Left lateral displacement off the great vessels to maximize flow
- Fluids wide open
- Consider Blood Products O-

>20 weeks gestational size or uterus is palpable or visible



Left Uterine Displacement
One handed Technique



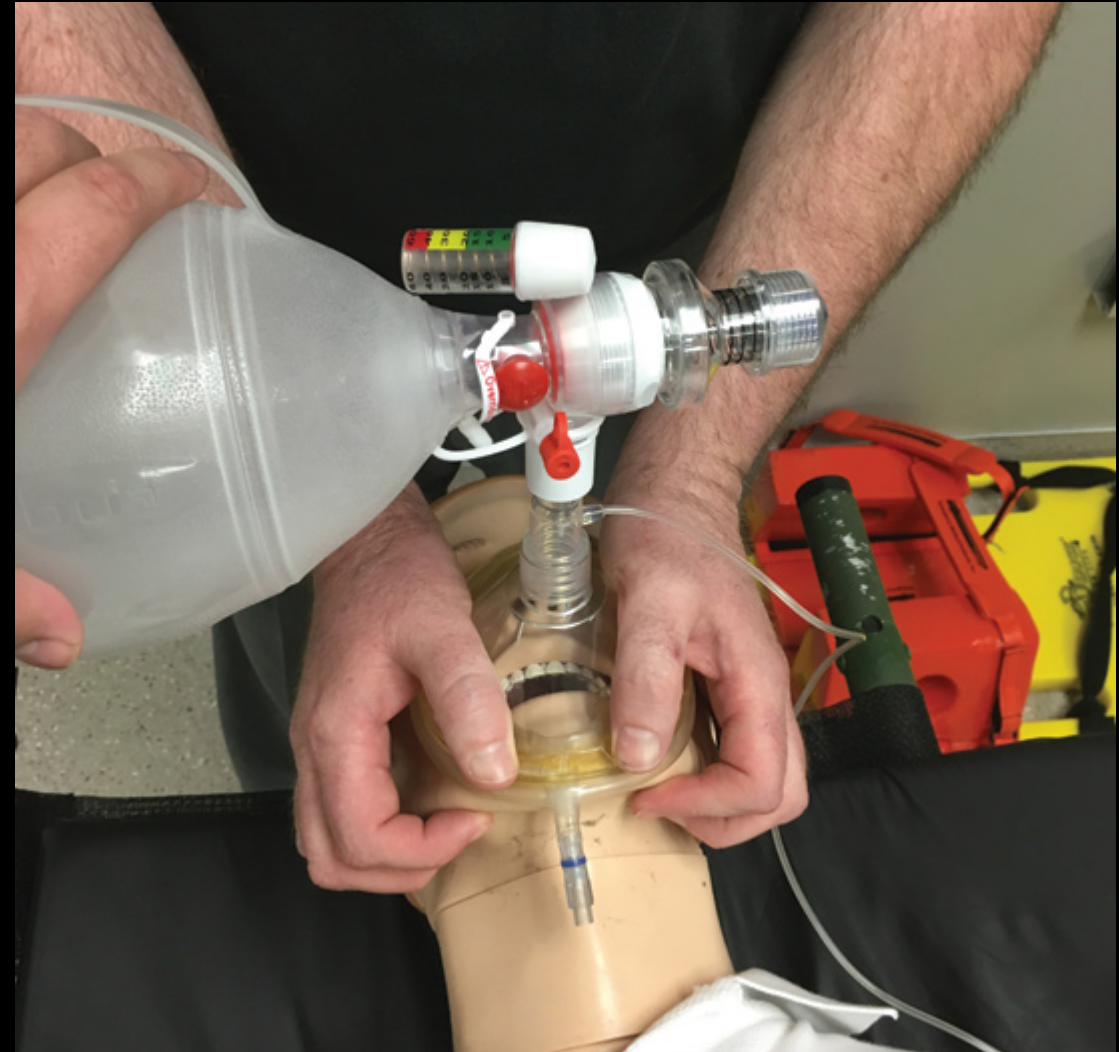
Left uterine Displacement
- 2 Handed Technique



Figure 4. Patient in a 30° left-lateral tilt using a firm wedge to support pelvis and thorax.

Resuscitation Changes: A- Airway Management

- 100% FIO2
 - Maintain saturations above 95%
 - Preoxygenate with high flow nasal canula and 2 thumbs up BVM technique
- Early intubation is recommended
 - Smaller diameter tube (6-6.5 recommended)
- Boujie is recommended to maximize success potential
- Only 1 field attempt due to increased laryngeal edema
- Have backup airways at hand



Resuscitation Changes: B- Breathing

- Maintain SPO2 95%
- Lower tidal volume/ greater minute volume
 - Decrease in residual capacity due to elevated diaphragm
- Higher rate
 - To compensate for lower tidal volumes, increase minute volume.
- Target ETCO2 greater than 10mm/Hg
 - Change greater than 10 points indicative of ROSC.



Resuscitation Changes: D- Defibrillation

- Defibrillation
 - Transthoracic impedance remains unchanged during pregnancy compared with the nonpregnant state
 - Expected to pass minimal energy to the fetus and is considered safe in all stages of pregnancy



SURVIVAL?

**BEST CHANCE OF FETAL
SURVIVAL, IS MOM
SURVIVAL**

**MOM'S BEST CHANCE OF
SURVIVAL IS:
REMOVE THE PARASITE**

YOU'VE GOT A PARASITE

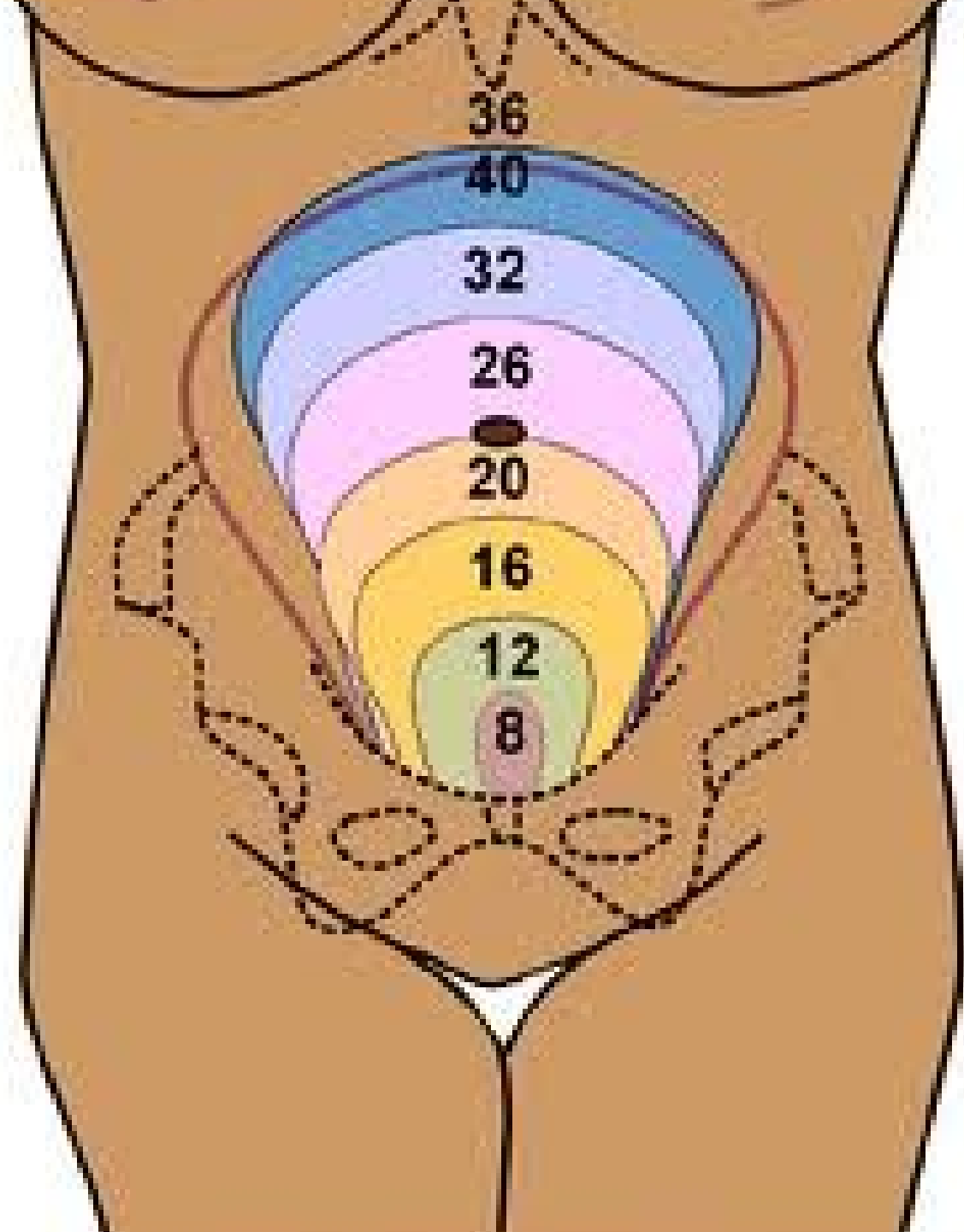


IT'S A BABY

- C - Circulation
- A - Airway
- B – Breathing
- D - Defibrillate

E – Extract the Fetus

A Caesarean section should be performed for viable pregnancies (≥ 23 weeks) no later than 4-5 minutes (**when possible**) following maternal cardiac arrest to aid with maternal resuscitation and fetal salvage.

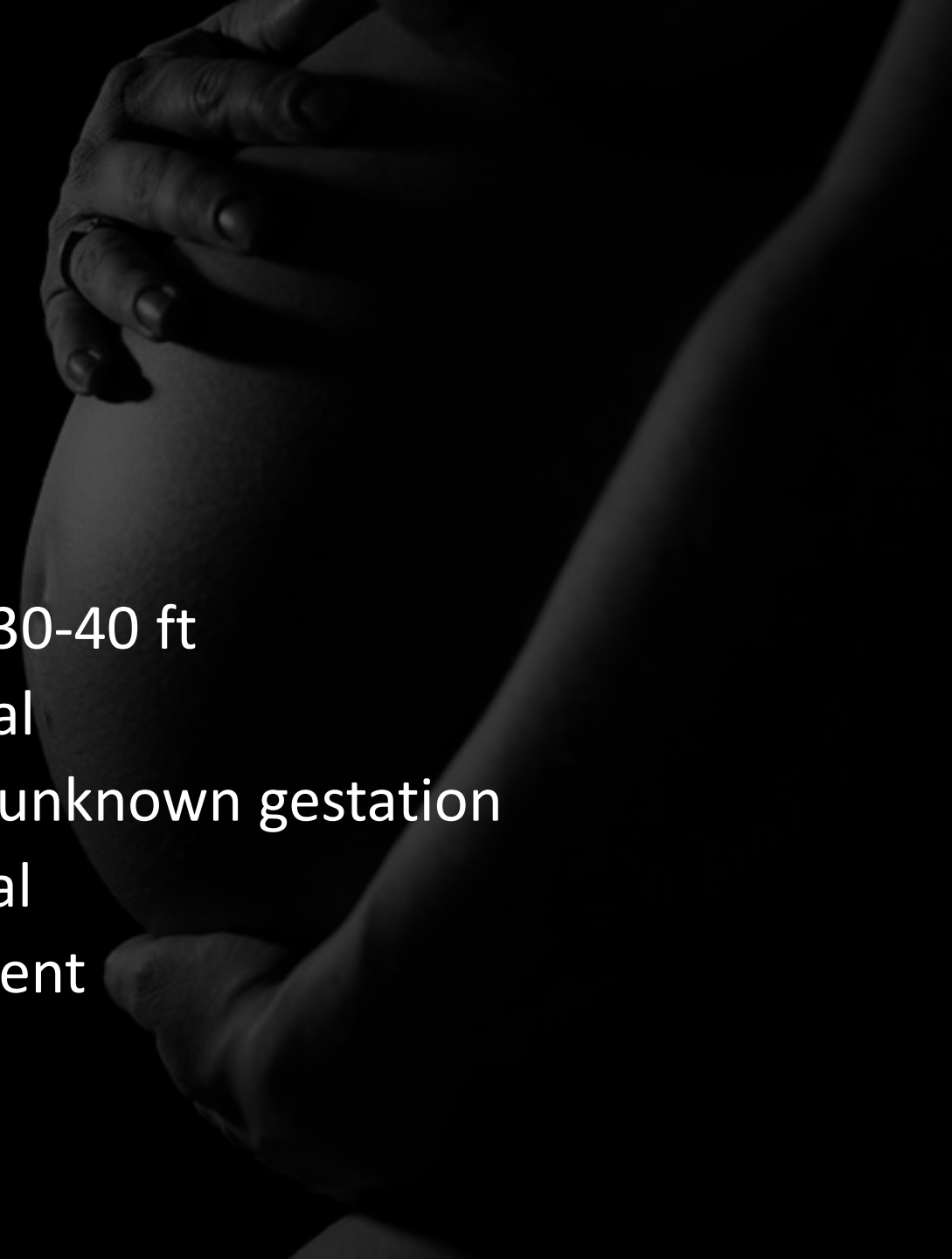




The Case

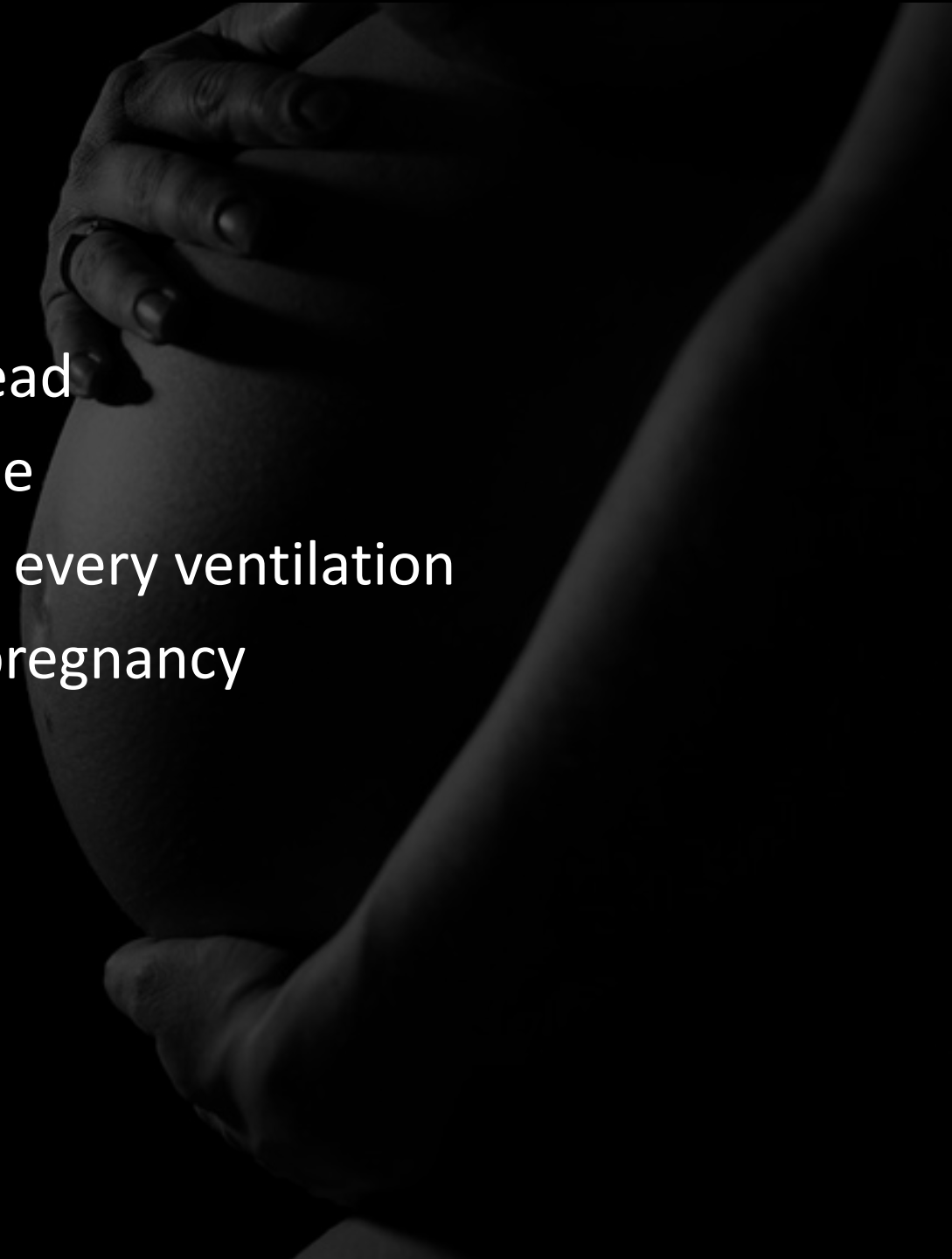
Scene size-up

- 26 Y/O Single occupant MVA
- Unknown rate of speed
- Unrestrained
- Ejected through windshield and thrown 30-40 ft
- Pulseless and apneic on initial EMR arrival
- Initial report states possibly pregnant of unknown gestation
- CPR is in progress upon ambulance arrival
- Asystole noted on initial monitor placement
- Air Transport is inbound: ETA 20 min



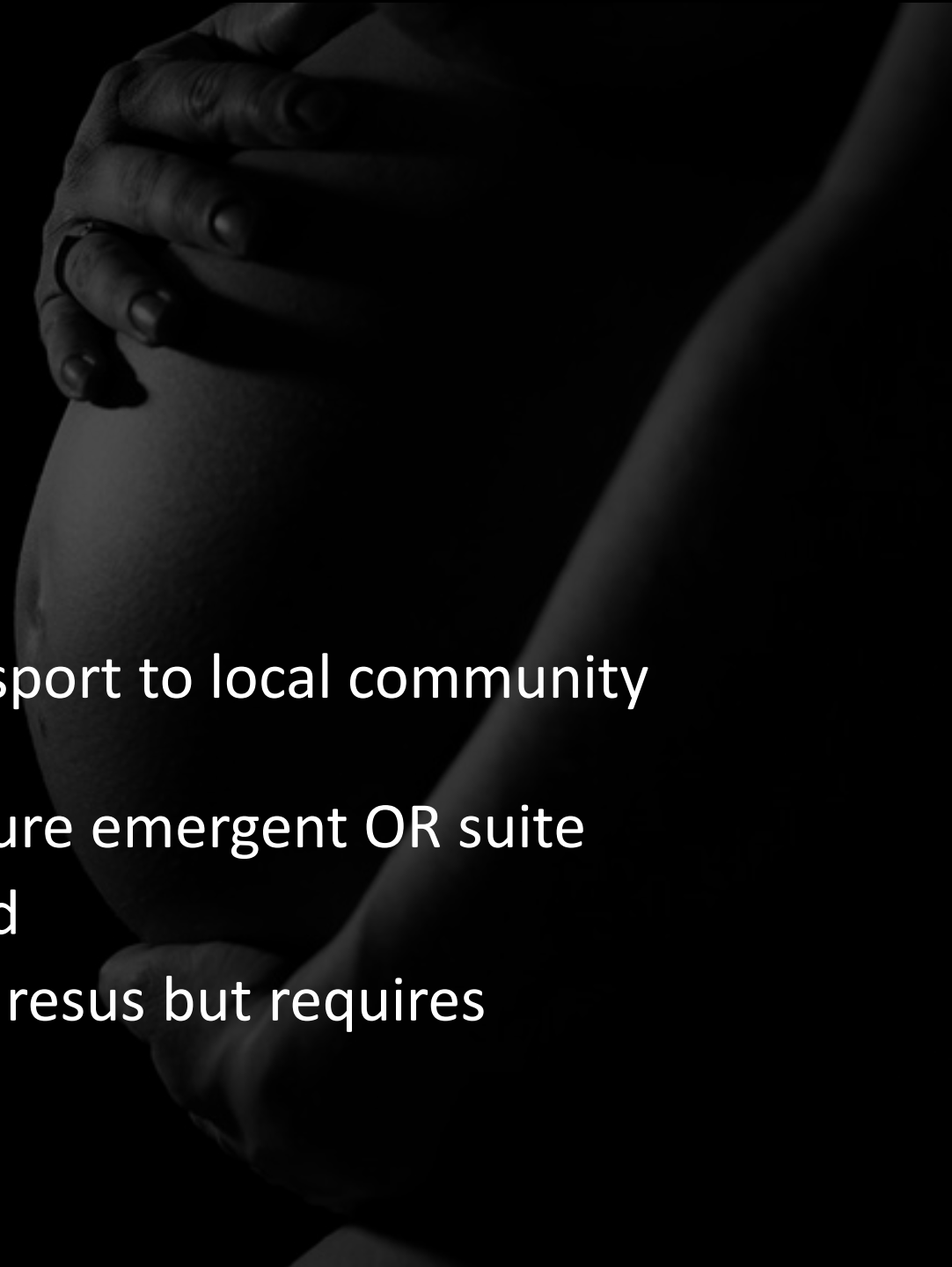
Assessment:

- Crepitus was found to the back of pt's head
- Significant step-off noted to cervical spine
- Blood and CSF noted to be expelled with every ventilation
- Fundal assessment confirms suspected pregnancy



Treatment

- ACLS measures initiated
 - IO: 2 rounds of EPI
 - **BLS Airway**
- Crew decides to begin rapid ground transport to local community hospital
- Crew communicates with hospital to secure emergent OR suite
- On arrival to OR fetus is rapidly extricated
- NRP algorithms are followed and fetus is resus but requires ventilatory support.



Outcome:

- Mom showed no improvement in condition upon extracting the fetus and was pronounced in the OR
- Infant is transported to level 1 NICU with specialty team requiring only ventilatory support.
 - Remember perimortem C-section is recommended within 4 minutes of initial arrest- this case was 35 minutes
- Maternal Grandmother opted against further neurological testing and chooses to remove all life support measures for the infant 36 hours later, because of the uncertainty in long term care of an infant at the grandmothers age and stage of life.

Takeaways:

- Remember moms' physiological changes
- Remember modifications to CPR
- Keep the ER/OR in the loop
- Crew mental health after the event



"Cardiopulmonary Resuscitation"

-uttered his colleague!

For the first time the white coat feared a rescue!!

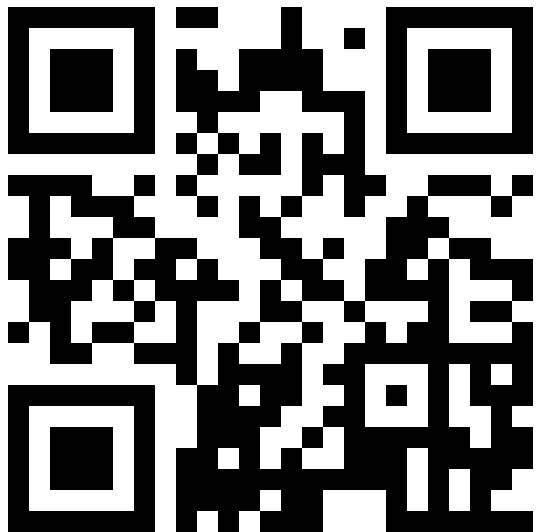
After all it was the fight of her superhero!!

_Shefali Sachar

Citations

- American Heart Association Emergency Cardiovascular Care Committee. (2015, October). Cardiac Arrest in Pregnancy. Retrieved from <https://www.ahajournals.org/doi/full/10.1161/cir.0000000000000300>
- Battaloglu, E., & Porter, K. (2017, May 1). Management of pregnancy and obstetric complications in prehospital trauma care: prehospital resuscitative hysterotomy/perimortem caesarean section. Retrieved from <https://emj.bmj.com/content/34/5/326>
- FastStats. (2019, July 22). Retrieved from <https://www.cdc.gov/nchs/fastats/births.htm>
- Franco, D. M., & Maya, M. V. (2017, December 6). Resuscitation of Obstetric Patient. Retrieved from <https://www.intechopen.com/books/resuscitation-aspects/resuscitation-of-obstetric-patient>
- Palmer, C. (2015, February). Tilting at Aortocaval Compression. Retrieved from <https://anesthesiology.pubs.asahq.org/article.aspx?articleid=2091844>
- Sharan, R., Madan, A., Makkar, V., & Attri, J. P. (2016). Case report on effective cardiopulmonary resuscitation in a pregnant woman. *Anesthesia, essays and researches*, 10(1), 122–124. doi:10.4103/0259-1162.164679
- SOGC CLINICAL PRACTICE GUIDELINE. (2015, June). Guidelines for the Management of a Pregnant Trauma Patient. Retrieved from [https://www.jogc.com/article/S1701-2163\(15\)30232-2/pdf](https://www.jogc.com/article/S1701-2163(15)30232-2/pdf)
- U.S. Census Bureau QuickFacts: United States. (2018, July 1). Retrieved from <https://www.census.gov/quickfacts/fact/table/US/LFE046217>

Black Cloud



Rich Mosher
Flight Paramedic

