Newborn in need of Cpr and medication

**Target group**: Healthcare providers with responsibilities in labor, delivery, and neonatal resuscitation **Number of participants**: 3-5 participants **Simulation time**: 10-15 minutes **Debriefing time**: 20-30 minutes

# Curricular Information

## Learning objectives

After completion of the simulation and debriefing session, the participants will be able to:

* Recognize low heart rate in a newborn and identify the need to perform neonatal resuscitation according to local guidelines
* Provide immediate positive-pressure ventilation and assess the efficacy of these actions
* Recognize the need for chest compressions and provide high-quality CPR
* Recognize the need of a vasopressor to stimulate the blood flow to the heart

## Scenario focus

The scenario presents a single, full-term, apneic, newborn girl, delivered vaginally by an obese 35-years-old woman. The girl was delivered vacuum-assisted after prolonged labor with IV oxytocin, a pathological ECG-curve, and discussion of acute cesarean section. The participants should immediately clamp the cord and perform initial steps at the radiant warmer. Following this, the participants should recognize low heart rate, and immediately start positive-pressure ventilation (PPV), followed by compressions and administration of epinephrine to resuscitate the newborn. A volume expander after ROSC will stabilize the girl.

## Scenario progression

The simulation starts right after delivery where the newborn appears apneic and limp at initial assessment with a heart rate at 47/min. The cord should be clamped immediately, and the newborn moved to the radiant warmer for initial interventions.

Suctioning and drying the newborn has no effect, and the team should start PPV immediately. Ventilation will not increase the heart rate, and the team should initiate chest compressions, insert an umbilical venous catheter, and perform endotracheal intubation. Compressions with continuous ventilation will not increase the heart rate until epinephrine is administered. The heart rate will increase to 110/min and the newborn will get tone. The saturation will increase during the next 4 minutes. A volume expander can be given after ROSC to stabilize the newborn.

At any time during resuscitation, the instructor can use the event “No timely treatment” to prompt the participants to intervene. This event will result in the newborn going into asystole until the participants perform correct treatment.

## Debriefing

When the simulation is over, it is recommended that a facilitator-led debriefing be completed to discuss topics related to the learning objectives. The Event Log in Session Viewer provides suggested debriefing questions. Central discussion points could be:

* The signs and symptoms of this baby needing resuscitation
* Indications for the need of a vasopressor
* Indications for administration of volume expander

## References

Wyllie J, Perlman JM, Kattwinkel J, Wyckoff MH, Aziz K, Guinsburg R, Kim H-S, Liley HG, Mildenhall L, Simon WM, Szyld E, Tamura M, Velaphi S, on behalf of the Neonatal Resuscitation Chapter Collaborators. Part 7: Neonatal resuscitation: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. Resuscitation 2015;95:e169–e201, at [https://www.resuscitationjournal.com/article/S0300-9572(15)00366-4/fulltext](https://www.resuscitationjournal.com/article/S0300-9572%2815%2900366-4/fulltext)

# Setup and preparation

## Equipment

* Baby hat
* Blankets
* Bulb syringe
* CO2 detector
* ECG-leads
* Endotracheal tubes (sizes 2.5, 3.0, 3.5)
* Epinephrine (0.1 mg/mL)
* Flowmeter
* Laryngeal mask (size 1) and 5-ml syringe
* Laryngoscope with size 0 and 1 straight blades
* Measuring tape
* Normal saline
* Oxygen blender
* Patient monitor
* Pulse oximeter
* Radiant warmer
* Scissors
* Segment of simulated umbilical cord
* Stethoscope
* Supplies for medication administration through umbilical venous catheter
* Target oxygen saturation table
* Towels
* T-piece resuscitator or simple mask and equipment for providing PPV
* Umbilical cord clamp
* Umbilical venous catheter
* Waterproof tape or tube-securing device

## Preparation before simulation

* Setup the room to look as a normal delivery room with all equipment ready and the radiant warmer plugged in.
* Place medication and supplies for administration on an emergency cart.
* Insert the standard umbilical cord segment into the abdomen of SimNewB, unclamped.

## Learner Brief

*The learner brief should be read out loud to the learners before the simulation starts:*

The simulation starts when the baby has been born. Please, take a moment to appoint a team leader and agree on your designated roles.

You have just assisted a 35-years-old obese woman in delivering a single full-term girl. The newborn was delivered vacuum-assisted after prolonged labor with IV oxytocin and a pathological ECG-curve for the last hour, which led to discussion of an acute cesarean section due to the mother’s exhaustion. The vacuum device has just been removed and you are now ready to make your initial assessment of the newborn girl.

Before simulation starts, please orient yourself to the birthing room and the available equipment.

# Customization of the scenario

The scenario may form the basis for creating new scenarios with other or additional learning objectives. Making changes to an existing scenario requires careful consideration of what interventions you expect the learners to demonstrate, and what changes you will need to make to learning objectives, progression of scenario, programming and support material. It is, however, a quick way to increase your pool of scenarios because you can reuse much of the patient information and several elements in the scenario programming and support material.

For inspiration, here are some suggestions to how this scenario can be customized:

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| **New learning objectives** | **Changes to the scenario**  |
| Adding to the fidelity | To create a more realistic setting, you can add extra props like: * Bloodstained towels
* Gloves
* Simulated amniotic fluid
* Simulated blood

You can also add a mother giving birth or a relative acted by standardized patients or fellow participants. This person should be instructed to play nervous and attentive without taking over the simulation with too much disturbance. |
| Including learning objectives on timing  | If you wish to train in strict timing of your team training, you can replace the instructor-led event “No timely intervention” with a “Time in State” event and set the time without proper interventions for going into asystole per your local algorithm for neonatal resuscitation. |
| Including learning objectives on need for repeated dose of epinephrine | If you wish to train your team in recognizing the need for a repeated dose of epinephrine to gain resuscitation, you can change the programming accordingly. |
| Including learning objectives on recognizing underlying causes | If you want to train your team in considering and treating underlying causes, you can add a tension pneumothorax to your programming of the baby’s additional symptoms. Remember to add your desired assessments and interventions events. |
| Including Learning objectives on team communication | If you wish to train in team communication during resuscitation, you can add your desired events for logging of team communication in the programming. |
| Including learning objectives on prenatal preparation | For training in prenatal preparation, you can add time before the delivery for the participant to gather information to help anticipate any risk factors, to brief any additional team members if needed, and to check equipment. Remember to change the Learner Brief accordingly and add a pre-birth state to the programming with your desired preparation-events. |