Newborn in need of supplemental oxygen

**Target groups**: Healthcare providers with responsibilities in labor, delivery, and neonatal resuscitation **Number of participants:** 1 participant **Simulation time**: 10 minutes **debriefing time**: 15-20 minutes

# Curricular information

## Learning objectives

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

* Perform initial assessment of a newborn and identify the need to perform neonatal resuscitation per local guidelines
* Utilize warming and drying of a newborn and assess the efficacy of these actions
* Recognize persistent inadequate tissue oxygenation using both visual and diagnostic methods
* Administer oxygen therapy appropriate to the target oxygen saturation table and assess the efficacy of these actions
* Recognize the need for supplemental oxygen via CPAP, prepare and administer CPAP and assess the efficacy of these actions, providing rationale for actions if prompted.

## Scenario Focus

The scenario presents a single, full-term baby girl, delivered vaginally after an uncomplicated pregnancy. The baby is non-vigorous, and the cord should be immediately clamped, and basic stimulation performed to acquire regular breathing and a heart rate above 100/min. Following this, the learner should recognize central cyanosis, apply pulse oximeter and provide supplemental oxygen via CPAP.

## Scenario Progression

The simulation starts right after delivery where the girl appears limp with shallow breathing, and no crying at initial assessment. HR is 84/min and RR 8/min. The cord should be clamped immediately, and the baby moved to the radiant warmer for initial interventions.

Drying the baby stimulates her respiration and heart rate, and a weak cry is now heard as the baby gets vigorous over the next 10 seconds. HR rises to 130 but central cyanosis persists with an oxygen saturation at 73%, and vital signs will decline a little during the next 3 minutes to indicate the need of supplemental oxygen.

Supplemental oxygen above room air delivered by free-flow oxygen or continuous positive airway pressure (CPAP) will dissolve central cyanosis within 30 seconds, but the oxygen saturation will only increase to 76%. Supplemental oxygen should be delivered by CPAP and concentration should be set to 35% to rise the saturation to target range.

At any time during initial assessments, the instructor can use the event “No timely treatment” to prompt the participants to intervene. This event will start a deterioration trend of the vital signs until the needed interventions are performed.

**Note**: If your department does not have equipment for CPAP, use a simple mask, loosely held above the baby’s mouth.

## 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 time spent on central interventions
* Different methods of providing supplemental oxygen
* Indications for titrating oxygen concentration

## 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>

# Setup and Preparation

## Equipment

* Baby hat
* Blankets
* Bulb syringe
* Oxygen blender
* Patient monitor
* Pulse oximeter
* Radiant warmer
* Segment of simulated umbilical cord
* Stethoscope
* Target oxygen saturation table
* Towels
* T-piece resuscitator or simple mask
* Umbilical cord clamp

## Preparation before simulation

* Setup the room to look as a normal delivery room with all equipment ready and the radiant warmer plugged in.
* 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.*

You have just assisted a 26-years-old woman in delivering a single, full-term girl at gestation week 39, and you are responsible for the care of the newborn. The pregnancy was uncomplicated, the mother has not been pregnant before and has followed the local prenatal care. The pregnancy was normal with no signs of gestational diabetes or other comorbidities. Delivery was vaginally without any remarkable events after membranes rupturing 12 hours ago. You are now about to assess the newborn baby who is still in your arms.

Before the start of the simulation, please orient yourself to the setting 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 objective** | **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. |
| Include learning objectives on team training | This scenario could support team training for 2 participants by changing the patient story to indicate risk factors; for instance, changing the status of the amniotic fluid from clear to meconium-stained when membranes ruptured in the patient story. Remember to change the Learner brief and add your desired events for logging team-related actions. |
| Include learning objectives on communication | If you wish to train in communication with relatives during resuscitation, you can add a standardized patient or fellow participant to act as a relative who ask questions during simulation. Remember, to add the needed information in the Learner brief and add your desired events for logging of communication-related actions. |
| Include 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. |