# 2. COVID-19 in Neonates

NB The information below is taken from a new paper currently **in press** in *The Journal of Maternal-Fetal and Neonatal Medicine* and is provided by the kind permission of the Editor-in-Chief and the Publishers as a special and generous concession because of the urgency in addressing the current COVID-19 epidemic. It is entitled:

**COVID-19 in Neonates**

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*To read the full paper when it is published* **click here**

Mode of delivery in a suspected or confirmed COVID positive pregnant women should be guided by her obstetric assessment and COVID-19 itself is not an indication for induction of labor and operative delivery.

Ideally, neonatal resuscitation should be done in a separate room adjacent to the delivery room or operation theater which is designated for this purpose. In situations where this is not feasible, the resuscitation corner should be at least 2 meter away from the delivery table or a curtain can be used to physically separate these areas. The health personnel attending the delivery should wear a full set of PPEs including N95 masks. Until further evidence, skin to skin contact immediately after the birth should be avoided and umbilical cord should be clamped immediately. Resuscitation should follow standard NRP guidelines and in case of any positive pressure ventilation requirement, self-inflating bag with mask should be preferred to T-piece resuscitator.

### Postnatal management of a stable neonate born to a suspected COVID-19 positive mother

Mother and the newborn should be kept together in a designated isolation room. A caretaker who is not COVID positive and not a contact should be allowed in the room to take care of the baby (Figure 2). Mother should be explained to use surgical mask and maintain respiratory hygiene while caring the baby. During the time while mother is not giving direct care at least 2 meter distance should be maintained between mother and the baby. Mother can breast feed her baby after proper hand and breast hygiene. Newborn should be monitored regularly for vitals and routine examination by health care personnel with adequate PPE should be done. Routine blood tests and swabs for COVID are not recommended. If the mother's swabs are positive for COVID, then swabs from neonate should be collected as per protocol. Newborn can be discharged along with mother and birth vaccination should be completed prior to discharge.

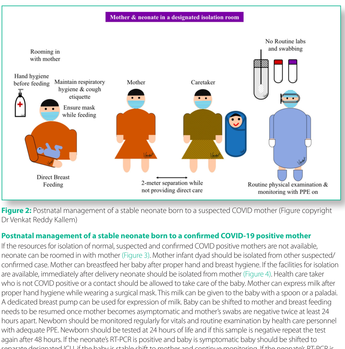


**Figure 1:** Delivery room management (Figure copyright Dr Venkat Reddy Kallem)

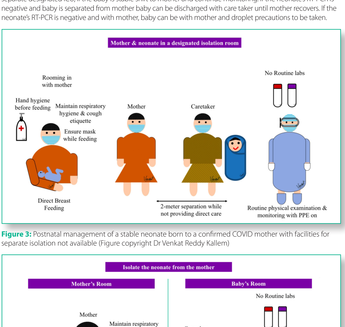


**Figure 2:** Postnatal management of a stable neonate born to a suspected COVID mother (Figure copyright Dr Venkat Reddy Kallem)

### Postnatal management of a stable neonate born to a confirmed COVID-19 positive mother

If the resources for isolation of normal, suspected and confirmed COVID positive mothers are not available, neonate can be roomed in with mother (Figure 3). Mother infant dyad should be isolated from other suspected/ confirmed case. Mother can breastfeed her baby after proper hand and breast hygiene. If the facilities for isolation are available, immediately after delivery neonate should be isolated from mother (Figure 4). Health care taker who is not COVID positive or a contact should be allowed to take care of the baby. Mother can express milk after proper hand hygiene while wearing a surgical mask. This milk can be given to the baby with a spoon or a paladai. A dedicated breast pump can be used for expression of milk. Baby can be shifted to mother and breast feeding needs to be resumed once mother becomes asymptomatic and mother's swabs are negative twice at least 24 hours apart. Newborn should be monitored regularly for vitals and routine examination by health care personnel with adequate PPE. Newborn should be tested at 24 hours of life and if this sample is negative repeat the test again after 48 hours. If the neonate's RT-PCR is positive and baby is symptomatic baby should be shifted to separate designated ICU. If the baby is stable shift to mother and continue monitoring. If the neonate's RT-PCR is negative and baby is separated from mother baby can be discharged with care taker until mother recovers. If the neonate's RT-PCR is negative and with mother, baby can be with mother and droplet precautions to be taken.

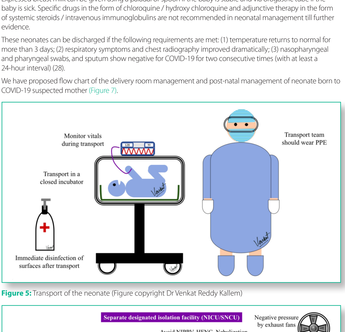


**Figure 3:** Postnatal management of a stable neonate born to a confirmed COVID mother with facilities for separate isolation not available (Figure copyright Dr Venkat Reddy Kallem)

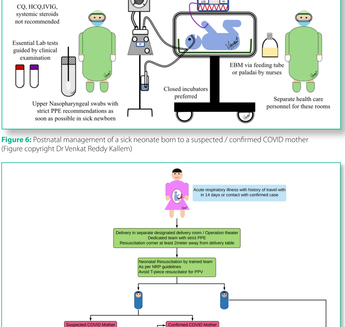


**Figure 4:** Postnatal management of a stable neonate born to a confirmed COVID mother with facilities for separate isolation available (Figure copyright Dr Venkat Reddy Kallem)

### Postnatal management of a sick neonate born to a suspected / confirmed COVID-19 positive mother

Neonate should be transported preferably in a closed incubator by transport team after wearing adequate PPE (Figure 5). Ideally should be managed in a separate isolation facility, if facilities are not available the suspected and confirmed cases should be separated by some distance (Figure 6). These rooms should be negative air borne isolation rooms or this negative pressure can also be created by using 2-4 exhaust fans which can drive air out of the room[24]. Adequate ventilation of these rooms should be ensured with at least 12 air changes/hour. Health care personnel involved in the care of these babies should be dedicated to them only and should not involve in the care of the other babies. The samples should be collected from the symptomatic neonates as soon as possible and if negative they should be repeated after 48 hours. Confirmed cases should be managed preferably in closed incubators and all the supportive care (fluids, inotropes and empirical antibiotics) should be as per unit protocol.

Respiratory support in the form of NIPPV and HHHFNC should be avoided in view of aerosol generation. Though CPAP support also has the potential of aerosol generation, as it has many its own benefits especially in preterm neonates CPAP can be used with lowest possible flows.

Expressed breast milk can be given using a paladai or spoon if the baby is stable and via orogastric tube if the baby is sick. Specific drugs in the form of chloroquine / hydroxy chloroquine and adjunctive therapy in the form of systemic steroids / intravenous immunoglobulins are not recommended in neonatal management till further evidence.

These neonates can be discharged if the following requirements are met: (1) temperature returns to normal for more than 3 days; (2) respiratory symptoms and chest radiography improved dramatically; (3) nasopharyngeal and pharyngeal swabs, and sputum show negative for COVID-19 for two consecutive times (with at least a 24-hour interval) [28].

We have proposed flow chart of the delivery room management and post-natal management of neonate born to COVID-19 suspected mother (Figure 7).

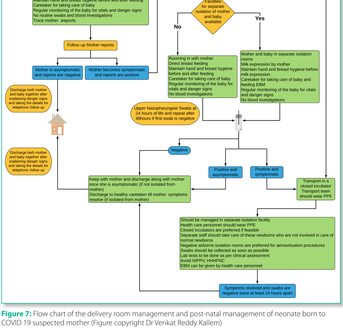


**Figure 5:** Transport of the neonate (Figure copyright Dr Venkat Reddy Kallem)

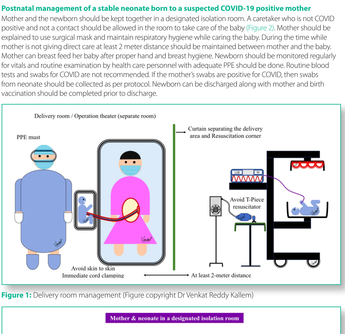


**Figure 6:** Postnatal management of a sick neonate born to a suspected / confirmed COVID mother (Figure copyright Dr Venkat Reddy Kallem)




**Figure 7:** Flow chart of the delivery room management and post-natal management of neonate born to COVID-19 suspected mother (Figure copyright Dr Venkat Reddy Kallem)