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Sociedad Española
de Neonatología

Recommendations for management of newborns for SARS-CoV-2 infection.

Version 6.0

Date 13/04/2020

This document is being continuously reviewed and updated based on emerging evidence and in line with the Ministry of Health.

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VERSION CONTROL AND CHANGE LOG		
Version N°	Date	**Description of changes**
1	06/03/2020	Initial version
2	08/03/2020	The section on breastfeeding changed (page 8) The case criterion ruled out for cases under investigation of children of mothers positive for the virus changed (page 6)
3	12/03/2020	The accommodation regime in confirmed cases with asymptomatic mothers changed (page 6) The accommodation regime in cases of asymptomatic newborns and asymptomatic mothers under investigation specified (page 8) Specified that it is not necessary to perform PCR on asymptomatic newborns if the maternal PCR is negative (page 8) An algorithm for the management of newborns born to mothers with suspected COVID-19 is included as Annex 1. (page 11)
3.1	12/03/2020	SIN recommendations added in the section on breastfeeding (page 8)
4.0	15/03/2020	Skin-to-skin may be allowed if strict mother-child isolation measures are guaranteed (page 7) The type of hospital accommodation for perinatal cases specified (page 8). The possibility of continuing home isolation in mild cases is considered (page 8) WHO recommendations for breastfeeding included (page 9) New Annex 1 (page 11)
4.1	16/03/2020	Breastfeeding recommendations modified (page 9)
4.2	17/03/2020	Case and close-contact criteria adapted to the Ministry update of 15/03 (page 4). For symptomatic newborns, two negative PCRs are considered necessary to consider the case as discarded and lift isolation (page 6) The criteria for discharge of confirmed cases changed (page 7). Algorithm modified (page 11)
5.0	20/03/2020	Criteria for case under investigation expanded. (page 4) A new option added to the individual accommodation during admission (page 8) Family support section added (page 10) Annexes 2 and 3 added (pages 14 and 15) Other minor changes
6.0	13/04/2020	The structure of the document was changed for better understanding An operational overview was included (page 4) Data from recent publications on peri/neonatal cases updated (page 5) Discarded Case criteria updated (page 6) Recommendations for child of mother with COVID + updated (page 7) Recommendations for health personnel updated (page 12) Algorithm 1 updated

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1. Summary

1. There is no clear evidence of vertical transmission (before, during or after birth through breastfeeding) of SARS-CoV-2, although all children of mothers with COVID-19 should have virological tests and clinical follow-up.
2. There is a possibility of postnatal transmission (most frequent) through respiratory and/or contact routes.
3. In mothers with COVID-19, separation of the newborn from the mother after birth should be avoided, although the decision to maintain joint accommodation must be made on an individual basis, taking into account the clinical situation of the mother and child and hospital logistics, and always maintaining contact and droplet isolation measures between the two.
4. Breastfeeding is recommended from birth, provided that the clinical conditions of the newborn and mother allow it.
5. Symptomatic neonates should be admitted to the Neonatal Units with strict isolation measures, taking into account that if there is a possibility of aerosol formation, the staff must take special precautions.
6. Although the data currently available is limited, infected neonates do not appear to show severe forms of the disease.
7. There is no specific neonatal treatment for SARS-CoV-2; the measures to be applied should be the usual symptomatic treatments/care.
8. Discharge criteria will depend on the clinical situation of the newborn and the results of the virological tests.
9. In asymptomatic children (both negative and positive) born to mothers positive for COVID-19, hospital discharge can be assessed after 48 hours and they can continue under an arrangement of home isolation with telephone/in-person follow-up.
10. Information and family support are important both during hospitalisation and after discharge.

2. Premises based on current knowledge of this infection

- There is no clear evidence of vertical transmission (before, during, or after birth due to breastfeeding) of SARS-CoV-2. Thus far, the few neonates tested born from mothers infected in the third trimester (no data from other trimesters), have been negative at birth, as have studies of the amniotic liquid, placenta, vaginal exudate and breast milk. There has been one reported case of a full-term infant born by Caesarean section to a mother with pneumonia, who tested positive in a pharyngeal exudate sample taken 36 hours after birth, while being asymptomatic. *(Wang S et* al), three cases with pneumonia with positive virological test at 2 days of age (*Zeng L et* al) and three other cases with positive Ig M at birth but with negative virological tests (*Zeng H et al*).

- It is not clear whether the clinical situation presented at birth by children of infected mothers is related to foetal infection, since the virological tests performed on the infants were negative, or to the severity of the infection of the mother. In one of the publications on the outbreak in China, which includes 9 infants, 4 were late preterm, but the prematurity was not attributable to infection and all of children remained asymptomatic. *(Chen H. et al.*). In the second study, also in China, 10 infants were described as premature in 6 cases (5 of them with respiratory distress at birth and 2 with thrombopenia) and 4 cases at term, one asymptomatic and 3 with mild clinical symptoms and without complications. One of the premature newborns died, 5 children were discharged without problems and 4 were still hospitalised but stable at the time of publication. *(Zhu H et. al*).

Current knowledge therefore does not support intrauterine transmission of SARS-CoV-2, and diagnosed neonatal cases appear to be acquired postnatal via airway or contact.

- The risk of horizontal transmission (via droplets, contact or faecal-oral), usually from a close relative who is infected, is the same as in the general population. So far, several cases have been described whose principal symptom was fever in two cases, accompanied in one case by vomiting and in the other by cough. The cases were mild (several asymptomatic). One paediatric series of 2,143 cases (90% mild/moderate symptoms) comments that nursing infants were at greater risk of more severe respiratory forms (hypoxemia) and digestive symptoms. *(Dong Y et al.*)

3. Glossary

- SARS-CoV-2: novel coronavirus identified in 2019 in Wuhan (China).
- COVID-19: disease caused by the SARS-CoV-2 virus

4. Case definitions

- **Case under investigation:**
  - Newborn born to a mother with confirmed SARS-CoV-2 infection.
  - Newborn with a history of **close contact*** with a probable or confirmed case
  - Newborn with fever and/or acute respiratory/digestive symptoms (symptomatic case under investigation).

  For the purposes of case definition, **close contact*** is classified as:

  - Any person who has provided care while the case was showing symptoms: healthcare workers who have not used appropriate protective measures, family members or persons who have another similar type of physical contact

  - Households, family members, and persons who have been in the same location as a case while the case was symptomatic, at a distance of less than 2 metres for at least 15 minutes.

- **Confirmed case**: a case that meets laboratory criteria (positive PCR screening and confirming PCR test on an alternative gene to one in the positive screening). The samples of at least confirmed patients with an atypical course of the disease or with a particularly severe course will be sent to the National Centre for Microbiology (CNM).
- **Probable case**: case under investigation with inconclusive laboratory results for SARS-CoV-2. These cases will be sent to the CNM for confirmation.
- **Discarded case**: a case under investigation whose laboratory results for SARS-CoV-2 are negative. In the cases under investigation, children of mothers with confirmed (highly suspected) infection who are symptomatic and require admission, in order to be considered a discarded case and lift isolation measures, two negative PCR controls are recommended (First 24 hours and ≥48 h.). In the rest of the cases under investigation, a negative PCR may be sufficient, although in Spain, there have been cases of children of asymptomatic COVID-19 mothers with a negative initial PCR and a positive result in a later control (24-48h), so if there is availability, the virological test should be repeated in these children in the first week of life.

5. Recommended samples for diagnosis

Respiratory tract samples*

- Upper: nasopharyngeal and/or oropharyngeal exudate
- Lower: preferably bronchoalveolar lavage, and/or endotracheal suctioning in patients with severe respiratory illness (intubated).

*a positive result in one would suffice

Other samples:

- Blood, stool/rectal swab and urine: samples will be collected to confirm or rule out the excretion of the virus by routes other than via respiration.

In confirmed cases, the following will be collected:

-Serums: two serum samples, the first in the acute phase and the second after 14- 30 days to confirm the presence of antibodies.

6. Recommendations for perinatal management of infants of mothers with suspected COVID-19. (Annex I):

- Fluid communication with the obstetrics team is important in order to adequately prepare the actions in the delivery room/operating room and the transport of the newborn if necessary.

- If the clinical situation of the mother is good and adequate isolation between mother and child (mask, hand hygiene) can be guaranteed, delayed cord clamping and skin-to-skin contact after birth may be considered. Nevertheless, currently, and in light of the lack of evidence of vertical transmission, we still recommend assessing the pros and cons of these measures in each case.

- In the case of mothers under investigation, if COVID-19 is ruled out in the mother, no virological study of the newborn is necessary.

- In mothers with confirmed COVID-19, virological samples will be taken from the newborn (see section 4) and depending on this result, the newborn will be classified as a confirmed or discarded case (see section 3).

Accommodation and hospital discharge

A. Asymptomatic newborn:

- In ***pauci or asymptomatic mothers with confirmed infection or under investigation,*** we recommend, whenever possible, rooming-in accommodation under a regime of

contact and droplet isolation between mother and child (hand hygiene, face mask and cradle at least 2 m from the mother's bed) and avoiding the separation of the mother from her newborn. See informative brochure available on our website (https://)www.seneo.es/images/site/noticias/home/DIPTICO_COVID19_.pdf). Nevertheless, the decision of whether or not to separate the mother from her newborn child should be made on an individual basis, taking into account the mother's informed decision, hospital logistics and the epidemiological situation of the pandemic.

Clinical follow-up and basic monitoring will be applied with these infants in rooming-in accommodation. The length of the hospital stay will depend on the virological results and the recommendations of the hospital's epidemiological surveillance service. Based on these premises, in both positive and negative newborns, hospital discharge may be assessed after 48 hours of life, with continuation under home isolation with telephone/in-person follow-up by a qualified health professional, within approximately two/three weeks after discharge.

In centres in which joint accommodation cannot be provided, they will be admitted in isolation (until the result of the test) and with care and basic monitoring, facilitating the maintenance of breastfeeding.

- In ***symptomatic mothers with confirmed infection or under investigation,*** the newborn should be admitted in isolation and separated from its mother only when the clinical conditions of the mother make this advisable. The duration of the isolation measures and mother-child separation should be analysed individually in relation to the virological results of the child and the mother, the clinical conditions of both, and always according to the recommendations of the hospital's epidemiological surveillance team.

B. Symptomatic newborn:

- These infants should be admitted to Neonatology and managed as indicated in Algorithm 1.

7. Recommendations for the management of Postnatal Cases Under Investigation.

Asymptomatic case

- Admission to a single room[1] with contact and droplet isolation measures (the use of an incubator is recommended).
- Monitoring of vital signs and clinical monitoring.

- In regard to feeding (see section on breastfeeding).
- Virological samples will be taken (see recommended samples for diagnosis). Blood count and C-reactive protein will be considered.
- Visits will be limited, with the exception of the mother/father or primary caregiver and provided they are free of COVID-19 disease. They will use contact and droplet isolation measures to access the room.
- If the test for SARS-CoV-2 is negative and infection is ruled out, isolation may be lifted (nosocomial cases) or the infant may be discharged with routine care (home isolation measures if the contact is a cohabitant).

Symptomatic case

- Admission to a single room[1] with contact and droplet isolation measures (the use of an incubator is recommended).
- Monitoring of vital signs (HR, RR, Temp., BP and O_2 Sat.) and clinical monitoring.
- In regard to feeding (see section on breastfeeding).
- The virological sampling (see recommended diagnostic samples) and analytical controls deemed necessary will be carried out. Imaging tests, especially chest x-ray and/or ultrasound, will be considered.
- Clinical management is no different from that of any other newborn with the same symptoms, applying the necessary support measures.
- Visits will be limited, with the exception of the mother/father or primary caregiver and provided they are free of COVID-19 disease. They will use contact and droplet isolation measures to access the room.
- If SARS-CoV-2 infection is ruled out, home discharge will conform to the usual clinical criteria.

8. Recommendations for Management of Confirmed Postnatal Cases

Asymptomatic case:

- Admission separate from the infectious contact to a single room[1] with contact and droplet isolation measures (the use of an incubator is recommended).
- Monitoring of vital signs and clinical monitoring.
- In regard to feeding (see section on breastfeeding).

- Analytical tests will be carried out as appropriate. Imaging tests, especially chest x-ray and/or ultrasound, will be considered.
- Visits will be limited, with the exception of the mother/father or primary caregiver and provided they are free of COVID-19 disease. They will use contact and droplet isolation measures to access the room.

Symptomatic case:

- Admission separate from the infectious contact to a single room[1] with contact and droplet isolation measures (the use of an incubator is recommended).
- Monitoring of vital signs (HR, RR, Temp., BP and O_2 Sat.) and clinical monitoring.
- In regard to feeding (see section on breastfeeding).
- The analytical controls deemed necessary will be carried out, always including blood count, C-reactive protein, kidney and liver function tests and cardiac biomarkers. Imaging tests, especially chest x-ray and/or ultrasound, will be considered.
- Clinical management is no different from that of any other newborn with the same symptoms, applying the necessary support measures. In cases of severe acute respiratory distress, the use of surfactant at usual doses, high frequency ventilation and/or inhaled nitric oxide will be assessed.
- There is currently no aetiological treatment for coronavirus. It is advisable to avoid the inappropriate use of antibiotics, limiting it to cases of confirmed bacterial infection.
- Visits will be limited, with the exception of the mother/father or primary caregiver and provided they are free of COVID-19 disease. They will use contact and droplet isolation measures to access the room.

[1]there should be separate rooms for cases under investigation and confirmed cases. In confirmed cases, especially if there is a risk of aerosol production, rooms with negative pressure are recommended. These rooms may have intermediate or intensive care equipment, depending on the patient's needs.

The criteria for discharge of confirmed cases

- Asymptomatic cases: Negative PCR in nasopharyngeal exudate.
- Mild cases: absence of fever in the previous 3 days, clinical improvement and negative PCR in nasopharyngeal exudate.

- Severe cases: absence of fever in the previous 3 days, clinical improvement and improvement of pulmonary x-ray and negative PCR (upper and lower airway).

A clinical follow-up after discharge, of the confirmed cases, in a period of time of approximately two weeks, is highly recommended. This follow-up can be done without physical contact (telephone follow-up).

9. Breastfeeding

- Even though there is insufficient data to make a firm recommendation about breastfeeding in the case of women with COVID-19, it is important to insist that breastfeeding provides many benefits, in addition to the potential mother-to-child transfer of antibodies against SARS-CoV-2. Therefore, and in light of the current evidence, the Spanish National Society of Neonatology recommends that breastfeeding be maintained from birth, provided that the clinical conditions of the newborn and the mother allow it.
- The Italian Society of Neonatology and the UENPS, for cases of pauci- or asymptomatic positive mothers or mothers under investigation in joint accommodation with the newborn, recommends breastfeeding with contact and drop isolation measures.
- WHO, UNICEF and the Academy of Breastfeeding Medicine, among others, recommend that breastfeeding be maintained for both positive mothers and mothers under investigation, following measures to control the infection; in cases of mothers with severe illness, breast milk should be pumped.
- The CDC considers separate management of the mother and baby and feeding the baby with pumped milk as the first option. In the case of joint accommodation and nursing, maintain strict contact isolation measures.
- The recommendations for cases of breastfeeding mothers outside the immediate postnatal period who become infected or are suspected to be infected with SARS-CoV-2 are the strict application of isolation measures (hand hygiene and face mask) and continuation of breastfeeding, or pumping breast milk taking maximum isolation precautions (hand hygiene and face mask), with breast milk administered to the infant by a healthy caregiver.
- The pumped milk does not need to be pasteurised before being administered to the infant.

- In admitted premature infants born to COVID-19 mothers, bank milk should be used whenever the safe use of their own mother's milk cannot be guaranteed (infection by professionals involved in handling the milk).
- These recommendations may vary from day to day according to the instructions given by the health authorities.

10. Family support

During hospitalisation and after discharge, in addition to providing a detailed explanation of all the isolation guidelines, a **thorough explanation** of the hygiene guidelines for the mother and the exposed newborn and emotional support for the family are also recommended. See the informational brochure on our website (https://www.seneo.es/images/site/noticias/home/DIPTICO_COVID19_.pdf).

11. Transport

Both intra and inter-hospital transport of the newborn will be done in a transport incubator and the healthcare personnel in charge of the transport will follow the isolation measures recommended in the Technical Document for the Clinical Management of Patients with Novel Coronavirus Disease (COVID-19).

12. Healthcare personnel, general measures and disinfection measures

- Isolation measures for healthcare personnel are the same as those recommended in the **Technical Document from the Ministry**, with special emphasis on actions that could produce aerosols (manual ventilation, intubation, non-invasive ventilation), especially in the delivery room/operating room and in patients who require mechanical ventilation.

- Given the possibility of the necessity of practising neonatal resuscitation measures in the delivery room and the existence of asymptomatic pregnant carriers, it would be highly advisable to know the woman's status with respect to COVID-19 before delivery.

- In general, it is recommended that the healthcare personnel caring for these infants be restricted as much as possible to reduce the risk of transmission.

- In general, restriction of visits to Neonatal Units and maternity wards to parents only is recommended.

- Likewise, the measures for disinfecting spaces and materials are generic, in accordance with the hospital's protocols for these cases. Emphasizing the vital importance of disinfection of surfaces (especially incubators).

13. Bibliography:

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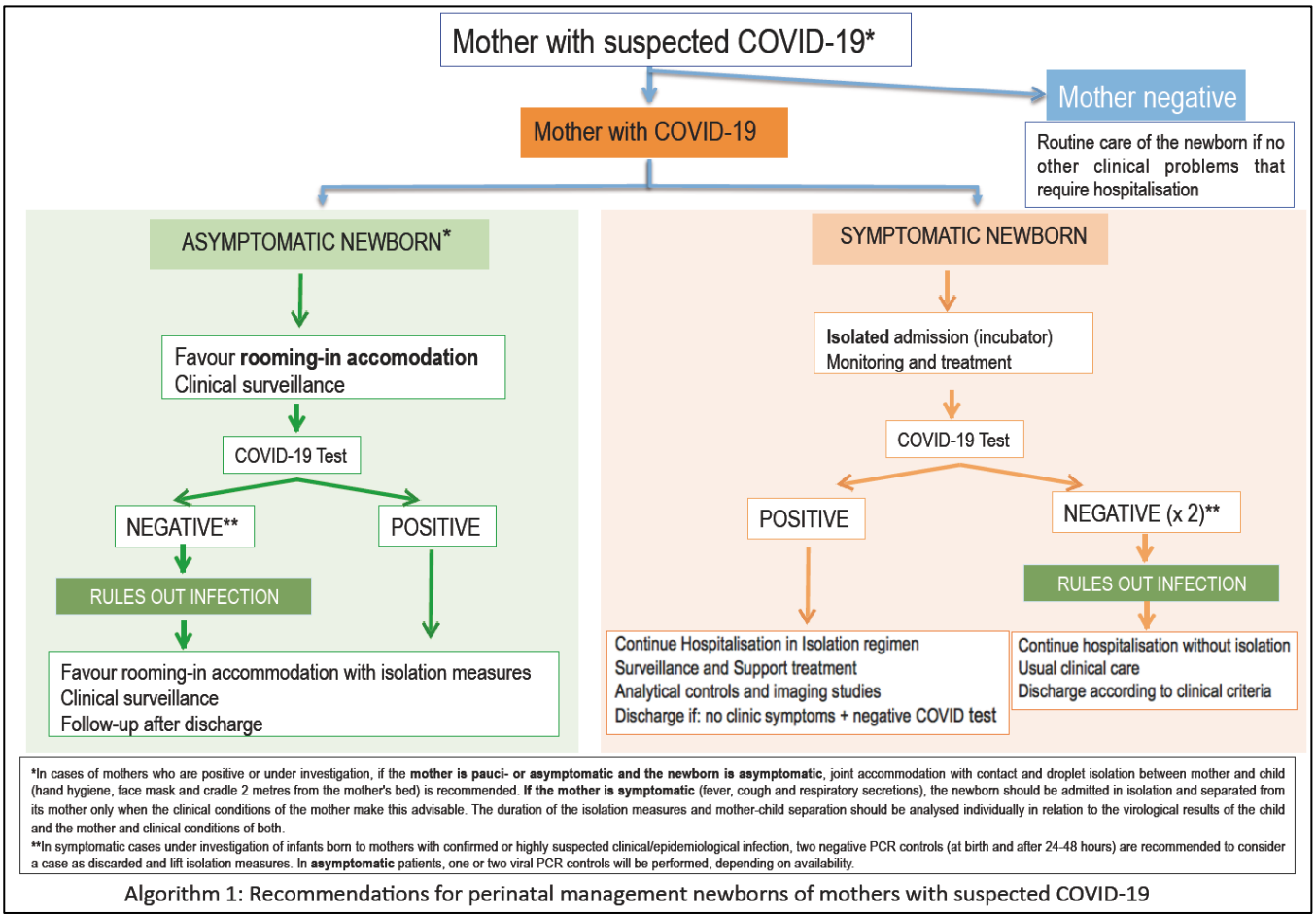
Note: A more extensive Bibliography section that is updated weekly is available on the SENeo website. https://www.seneo.es/index.php/bibliografia-covid-seneo

14. Annexes

Annex 1. Algorithm 1: Recommendations for perinatal management newborns of mothers with suspected COVID-19.



Algorithm 1: Recommendations for perinatal management newborns of mothers with suspected COVID-19

Annex 2. Respiratory support in the newborn with suspected or confirmed COVID-19 infection

General Guidelines

- Avoid manual ventilation with a mask and self-inflating bag. If ventilation is necessary, the use of the manual T-piece resuscitator is preferable.
- In both devices a high efficiency antimicrobial filter between the device and the mask must be used. Ventilation will be applied with an adequate seal to prevent leakage.
- The transport of the newborns with ventilation support will be carried out in a closed incubator, with adequate ventilation equipment and filter systems as indicated above. The guidelines or transport and health care personnel will be those indicated by the Ministry of Health and the protocol of each centre.
- If the newborn requires ventilatory treatment in the NICU, isolation will be implemented according to the Ministry's guidelines applied in each centre. Preferably in rooms with negative pressure with the following recommendations:

Non-Invasive Ventilation (NIV)

- Preferably, NIV with a dual-limb (closed system) with a high efficiency antimicrobial filter on both branches, avoiding systems with tubes to the air.
- It is important to choose the interface that achieves an adequate seal to prevent leakage.

Invasive Ventilation

- If endotracheal intubation is necessary, it is recommended that it be performed by the most experienced airway management professional available with the protective measures recommended by the Ministry. Avoid manual ventilation before intubation as much as possible. If necessary, the mask should be properly sealed to prevent leakage. Use of an anaesthesia bag with an antimicrobial filter on the expiratory branch is recommended. (Figure 1)
- For the mechanical ventilation circuit, two high efficiency antimicrobial filters will be used in inspiratory and expiratory branches. (Figure 2). Watch for possible condensation on the expiratory filter (hot, humid air), which will require it to be replaced.
- Aspiration of secretions should be minimised and should be carried out with closed suction systems.
- The staff present during the use of the ventilation devices will provide assistance using the recommended personal protective equipment and following the established rules for placement and removal.
- The number of exposed staff must be the minimum possible.

Annex 3. Urgent transport of a newborn with suspected or confirmed COVID-19 infection.

- The patient will be transported in an ambulance with the driver's cab physically separated from the patient transport area.
- Personnel involved in transport must be informed in advance and must wear appropriate personal protective equipment.
- As a general rule, procedures that could generate aerosols should be avoided (Aerosol therapy and nebulisation, aspiration of respiratory secretions, manual ventilation)
- If respiratory support is required, invasive ventilation should be prioritised, or in the case of non-invasive ventilation, it should be administered with dual-limb equipment and high efficiency filters, in order to avoid aerosolisation.
- High efficiency filters will be used for the transport ventilator circuit and will be installed at the outlets of the inspiratory and expiratory branches.
- Once the transport has been completed, the vehicle will be disinfected immediately and all waste produced will be properly managed. The transport incubator must be cleaned with the usual disinfectants.
- The bedding used by the newborn, as well as the restraint system, should be placed in a bag for the exclusive use of this patient, which will be closed and sent for washing. The rest of the waste generated will be disposed of in a type III waste container.

Figure 1.

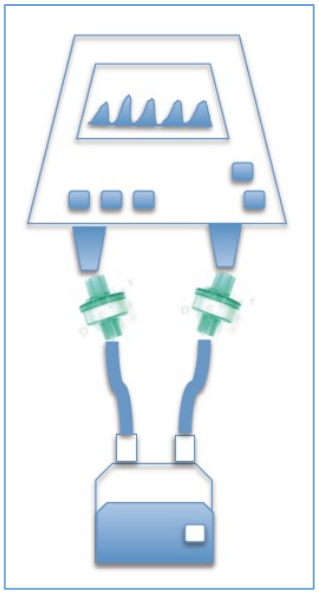


Figure 2.