

# Paediatric Bag Valve Mask Ventilation

If respiratory effort is absent or inadequate, a self-inflating bag and mask can be utilised to manually ventilate an infant or child. For manual ventilation to be effective, you must ensure you are using the equipment correctly. You must attach a correctly fitted mask and obtain an air tight seal. You should also be aware of the key paediatric safety points.



## Key Points

- In an emergency the self-inflating bag can be used without oxygen. For example, if the child or infant deteriorated during a transfer and you did not have access to oxygen.
- When using with oxygen, at least 15L per minute of oxygen flow is required to ensure adequate oxygen volume in the reservoir.
- Paediatric self-inflating bags will have a pressure relief valve also known as a 'pop-off' valve. This valve prevents excess pressure being delivered to the infant or child's lungs, in turn reducing the risk of barotrauma. This valve should always remain open (see ALERT on page 5), unless there is a need for high pressure ventilation. This should be done by a senior medical officer or under their direct guidance.
- You will need to attach a correctly sized mask.
- PEEP Valves can be attached to self-inflating bags and dialled up to a specific pressure. They are used to provide positive end expiratory pressure (PEEP).



## Self-inflating bags:

There are several different brands of resuscitation self-inflating bags. They come in a variety of sizes including neonatal, paediatric and adult. Discuss with your emergency department educator, clinical nurse consultant or clinical coach as to what your department stocks, how many mLs of air are contained in the bag and what size bag to use for what weight or age range.

## Taking a closer look at a self-inflating bag:

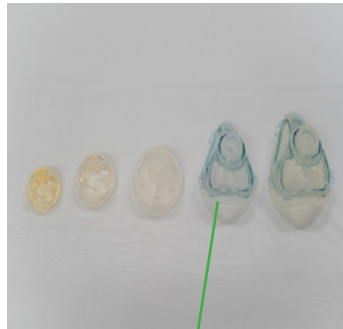
### Expiratory Valve

As you place pressure on the self inflating, bag this valve opens allowing air flow, once you release pressure on the bag this valve closes.



### Face masks

You must choose the appropriately sized face mask and attach it to the self inflating bag.



### PEEP Valve

PEEP stands for positive end-expiratory pressure. This valve can be added and used to increase PEEP during ventilation with the aim of helping to splint the lungs alveoli open. It is used for children that may be difficult to ventilate.

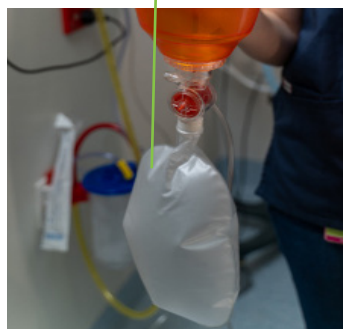


### Self-inflating Bag, Oxygen inlet and oxygen tubing

The self-inflating bag is where you apply pressure to deliver a breath and release pressure to provide time for exhalation. Connect to oxygen using the oxygen tubing ensuring it is at 15L/minute.

### Pressure release valve

This valve should be OPEN, it prevents excess pressure being delivered to the infant or child's lungs, reducing the risk of barotrauma.



### Reservoir Bag

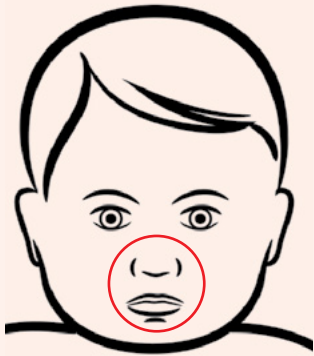
The reservoir bag fills when connected to oxygen. In an emergency situation, if no oxygen is available, you can still use the self-inflating bag to deliver respiratory support.

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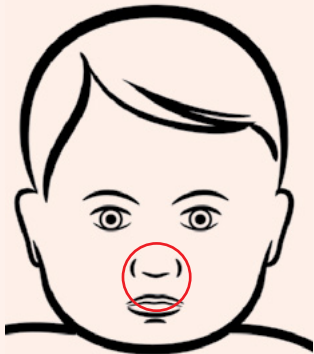
## Choosing the correct sized face-mask:

Self-inflating bags can be used to ventilate both intubated and non-intubated children. For those children who are not intubated, you will have to attach the appropriately sized face-mask. This is important as an ill-fitting mask will result in a poor seal, leading to ineffective ventilation.



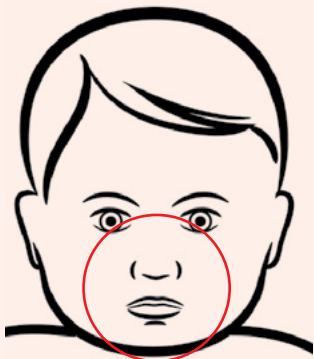
### Correct Fit

A correctly fitted mask should sit on the bridge of the nose, cover the entire mouth and finish on the cleft of the chin. It should provide an air-tight seal.



### Too Small

A mask that is too small will not fully cover the nose and mouth.



### Too Big

A mask that is too big, may cover the eyes partially or extend over the chin.

An ill-fitting mask will result in a poor seal, leading to ineffective ventilation.



## ALERT

When holding the mask to the face of an infant or child, ensure your fingers are not compressing the soft structures of the neck as this can cause compression and obstruction of the trachea.



## Face mask application techniques

When applying a face mask to an infant or child, an air tight-seal is required to ensure effective ventilation. If your seal is inadequate air will escape, resulting in ineffective ventilation. We will cover both a one-handed technique (1 person required) and a two-handed technique (2 people required).

### One handed technique - CE Grip



**Step 1:** Using your dominant hand take your thumb and index finger and hold them in the shape of the letter 'C'



**Step 2:** Hold the make on the face, with your fingers in the 'C' shape.



**Step 3:** Use your other three fingers to make an 'E' shape, lifting the mandible. This helps to lift the tongue, thus assisting in opening the airway. Your little finger should be positioned at the angle of the jaw. You can now use your non-dominant hand on the self-inflating bag to deliver breaths.



### ALERT

It is important to remember that infants and children cannot adequately self-ventilate through the expiratory valve of a self inflating bag. This means under no circumstances should the a self inflating bag and face mask be held on an infant or child's face if you are not delivering breaths.





## Two handed technique



If you are unable to obtain a good seal using the one-handed technique, move to a two-handed technique. This technique requires two people.



**Step 1:** Use both your hands in the previously described C-E grip to apply the mask and obtain an air tight seal.

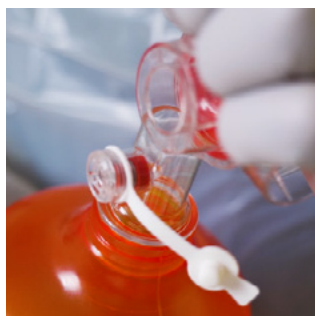


**Step 2:** Once the mask is applied to the face, the second person may operate the self-inflating bag to deliver breaths. Observe the rise and fall of the chest for feedback on the adequacy of the seal.

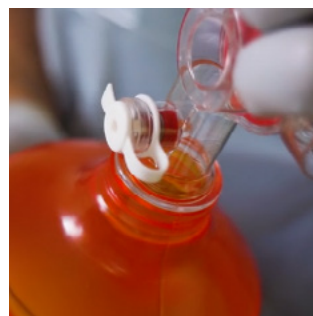


### ALERT

If the pressure relief valve is closed or occluded, the infant or child is at high risk of barotrauma.



Correct

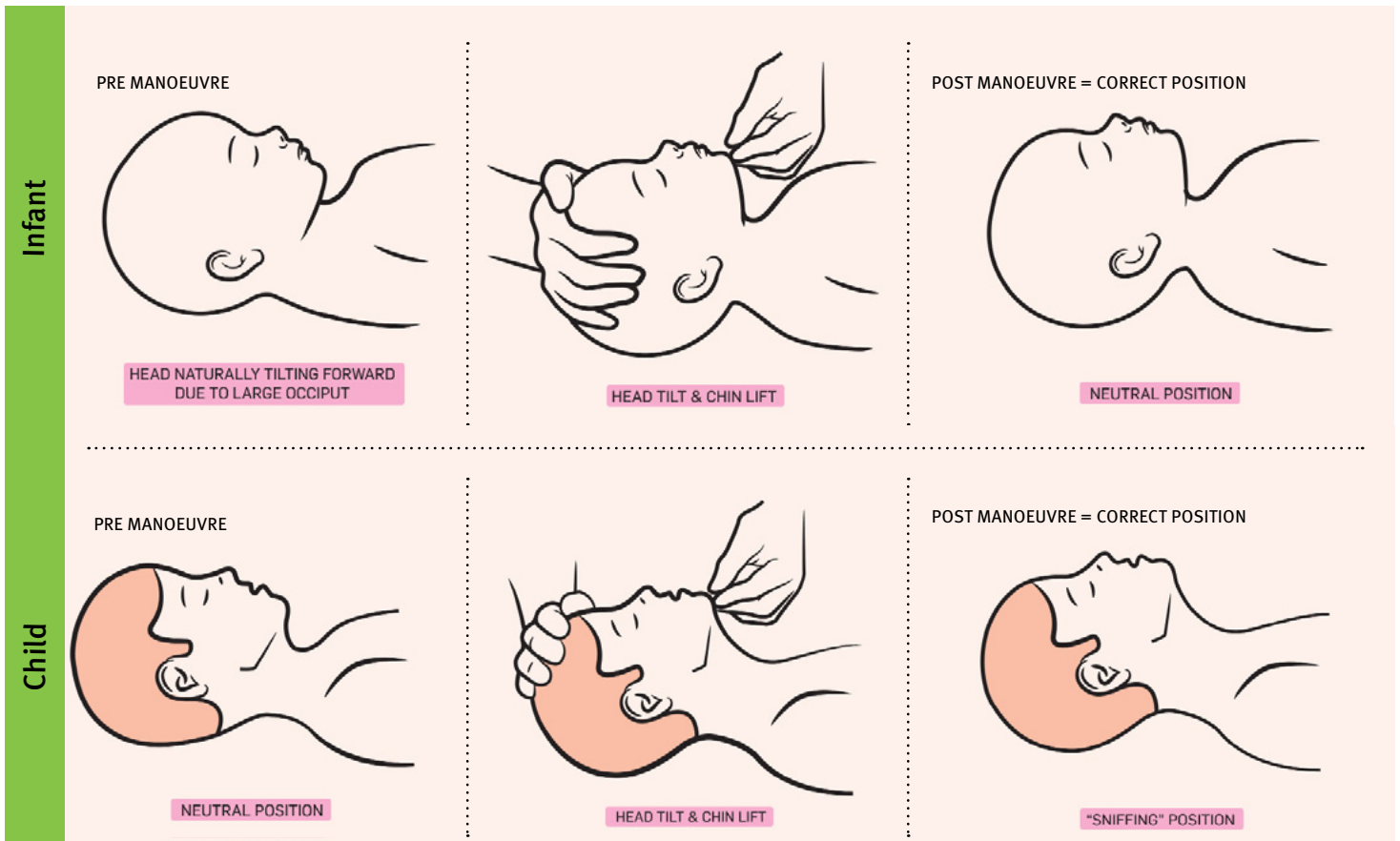


Incorrect



## Optimal airway positioning

Infants and children have different optimal airway positions. In infants, the optimal airway position is a neutral position, whereas for a child it is the sniffing position. You can achieve the optimal airway position by conducting a head tilt and chin lift manoeuvre.



## Want to learn more about paediatric airway support?

- [Airway manoeuvres](#)
- [Nasopharyngeal Airway insertion](#)
- [Oropharyngeal Airway insertion](#)
- [Nasopharyngeal airway suctioning](#)

## Tips in children

- Safety checks: Always check your bedside oxygen supply and suction are working at the beginning of each shift. Also check this before undertaking a transfer. To conduct a check, connect a self-inflating bag to oxygen, create a seal and observe the reservoir bag for any leaks. If faulty, remove from use and notify your department equipment nurse or a member of the senior nursing team. Replace immediately with a fully functioning unit.
- Ensure you have the appropriate sized mask on hand during transfers. Ensure that you are aware of where to locate different sized face masks within your department.



## For further information:

[Video: Bag Valve Mask ventilation](#)

[Video: Optimus Pulse Mini Skill station - 2 handed BVM](#)

[Video: Optimus Pulse Mini Skill station - Airway Bagging](#)

## References:

This Queensland Paediatric Emergency Nursing Skill Sheet was developed by the Emergency Care of Children working group (funded by the Queensland Emergency Department Strategic Advisory Panel) with the help of the following resources:

Queensland Ambulance Service. (2019, November). Respiratory/Bag valve mask - Mayo Health Care. Queensland Ambulance Service - Clinical Practice Procedures. [https://www.ambulance.qld.gov.au/docs/clinical/cpp/ CPP\\_BVM%20ventilation\\_Mayo.pdf](https://www.ambulance.qld.gov.au/docs/clinical/cpp/ CPP_BVM%20ventilation_Mayo.pdf)

Scaini, L., & Ellis-Cohen, E. (2016). Airway Management - Module 9. In J. Hamischfeger & I. Chang (Eds.), Children's Health Queensland Transition to Paediatric Practice: Paediatric Intensive Care Program (3rd ed., pp. 5–10). State of Queensland (Queensland Health).

Townsville Hospital and Health Service. (2020, August). Manual hand ventilation and artificial airway suctioning of the paediatric patient. Queensland Health Intranet. [https://qheps.health.qld.gov.au/\\_data/assets/pdf\\_file/0028/480565/cca-man-hand-ventilation-paed.pdf](https://qheps.health.qld.gov.au/_data/assets/pdf_file/0028/480565/cca-man-hand-ventilation-paed.pdf)

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- Providing care within the context of locally available resources, expertise, and scope of practice.
- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management.

- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary.
- Ensuring informed consent is obtained prior to delivering care.
- Meeting all legislative requirements and professional standards.
- Applying standard precautions, and additional precautions as necessary, when delivering care.
- Documenting all care in accordance with mandatory and local requirements.

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