

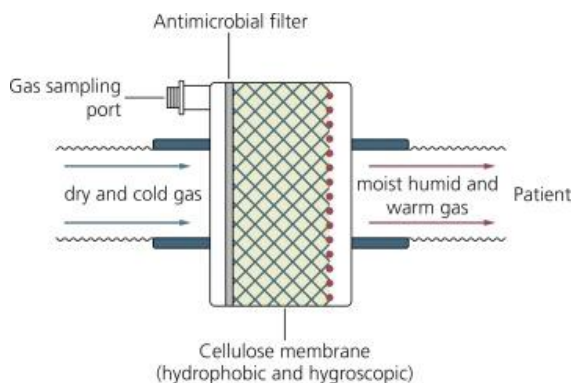
Airway filter use in paediatrics

With COVID 19 there is increasing use of airway microbiological filters to minimize the risk of infective aerosol in the clinical environment. These filters also have heat and moisture retaining properties and have been used routinely in paediatric and adult anaesthesia for many years.

What are HMEs/ HMEFs?

Heat and moisture exchangers (HMEs) are compact, inexpensive and effective humidifiers for most clinical situations. Most HMEs include viral/bacterial filtering capability (HMEF), usually with >99.9% efficiency.

HMEFs consist of: an antimicrobial filter, a heat and moisture exchanging membrane, 15/22 mm connectors for mask/LMA/ETT and a gas sampling port for side-stream capnography (if available). Paediatric and infant filters have low dead space and resistance. The infant filter is suitable for infants down to approximately 3-4 kg, especially if positive pressure ventilation is used.



Essentials of Equipment in Anaesthesia, Critical Care and Peri-Operative Medicine, Chapter 9, Fig 9.3, HME, B.Al-Shaikh and S.Stacey

What are the potential benefits and risks of HMEFs?

Benefits of HMEFs;

- Decreased infective aerosol
- Increased humidity and heat in respiratory gases with improved muco-ciliary function and temperature maintenance
- Potential for decreased ventilator associated pneumonia

Potential complications and troubleshooting;

- Increased potential for circuit disconnections/leaks with increased components.
- Increased resistance and potential blockage of filters with increased secretions and sputum production. With increasing airway pressures consider blockage of the filter and replace.
- Hypercarbia due to increased dead space. Rarely a problem except in small infants. If dead space does cause hypercarbia, increased minute ventilation usually solves the problem, or the filter can be removed.

Approximate specs for typical HMEFs	Infant	Child
Internal volume (dead space)	10 mls	29 mls
Resistance up 15 LPM	Low	Low
Filtration efficiency Viral/Bacterial	99.99%	99.99%
Relative humidity	60-70%	70%