

## General Guidelines for Life Pulse HFV

1. HFV  $\Delta P$  (PIP - PEEP) is the primary determinant of PaCO<sub>2</sub>. HFV rate is secondary.
2. Resting lung volume (FRC supported by set PEEP) and mean airway pressure are crucial determinants of PO<sub>2</sub>.
3. Avoid hyperventilation and hypoxemia by using optimal PEEP. (See When to Raise PEEP below.)
4. Minimize IMV at all times, using very low rates (typically 0 – 3 bpm), unless IMV is being used to dilate airways or *temporarily* recruit collapsed alveoli. In general, keep IMV PIP 20 – 50% < HFV PIP.
5. To overcome atelectasis, IMV rates up to 10 bpm can be used for 10 – 30 minutes. Thereafter, IMV rate should be dropped back to 0 – 3 bpm. In general, keep IMV I-time = 0.4 – 0.6 sec.
6. If lowering IMV rate worsens oxygenation, PEEP is probably too low. Higher PEEPs and lower IMV rates reduce the risk of lung injury.
7. Lower FiO<sub>2</sub> before PEEP when weaning until FiO<sub>2</sub> is less than 0.3.

SETTING	USUAL	WHEN TO RAISE	WHEN TO LOWER
<b>HFV PIP</b>	whatever produces desired PCO <sub>2</sub>	To lower PCO <sub>2</sub> .	To raise PCO <sub>2</sub> . (Raise PEEP simultaneously to keep MAP and PO <sub>2</sub> constant.)
<b>HFV Rate</b>	420 bpm (neonates) 300 bpm (peds)	To decrease PCO <sub>2</sub> in <u>smaller</u> patients; <u>or</u> To increase MAP and PO <sub>2</sub> .	To eliminate inadvertent PEEP by lengthening exhalation time <u>or</u> To increase PCO <sub>2</sub> when weaning.
<b>HFV I-Time</b>	0.02 sec	To enable Jet to reach PIP at low HFJV rates in <u>larger</u> patients (> 15 kg).	Keep at the minimum of 0.02in almost all cases.
<b>IMV Rate</b>	0 – 3 bpm	To reverse atelectasis or dilate restricted airways (5-10 bpm)	To minimize volutrauma, especially when air leaks are present, <u>or</u> To decrease hemodynamic compromise.
<b>IMV PIP</b>	PIP necessary to get adequate chest rise	To reverse atelectasis or dilate airways; PIP may be > or < HFJV PIP.	To minimize volutrauma, especially when air leaks are present, <u>or</u> To decrease hemodynamic compromise.
<b>IMV I-Time</b>	0.4 sec	To reverse atelectasis or dilate airways.	To minimize volutrauma, especially when air leaks are present, <u>or</u> To decrease hemodynamic compromise.
<b>PEEP</b>	7 – 12 cm H <sub>2</sub> O (Neonates) 10 – 15 cm H <sub>2</sub> O (Peds)	To improve oxygenation <u>and</u> decrease hyperventilation. <u>To find optimal PEEP:</u> Raise PEEP until SaO <sub>2</sub> stays constant when switching from IMV to CPAP.	<u>Lower PEEP only:</u> – when it appears that cardiac output is being compromised; <u>or</u> – when oxygenation is adequate <u>and</u> – when lowering PEEP doesn't decrease PaO <sub>2</sub> .
<b>FiO<sub>2</sub></b>	< 0.60	Raise as needed <u>after</u> optimizing PEEP.	Lower FiO <sub>2</sub> in preference to PEEP when weaning until FiO <sub>2</sub> < 0.3.

### Special Air Leak Considerations

1. Minimize IMV by using HFV + adequate CPAP.
2. If oxygenation is compromised, raise PEEP, *even if the lungs are overexpanded on xray.*  
(Rationale: you are going to have to raise something, and PEEP is less hazardous than IMV breaths. It may also help interstitial gas find its way out of the lungs via more patent airways.)