

Availability of Aerosol under Different Inspiratory Dual Limb Tubing Arrangements during Mechanical Ventilation of a Simulated Adult Patient

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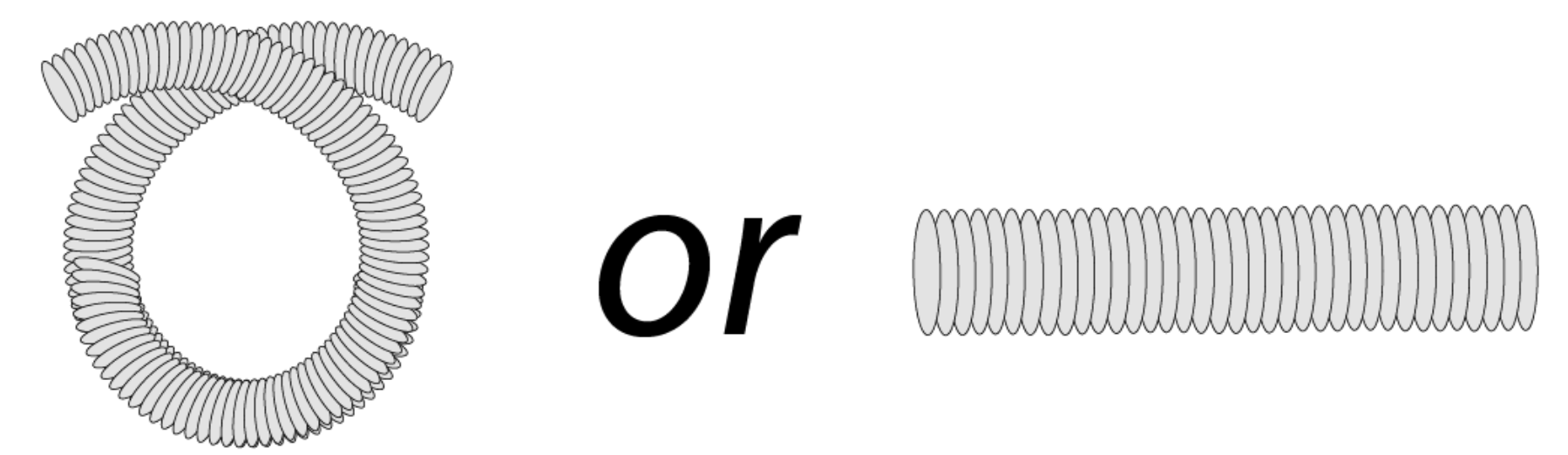
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Background

- Medical aerosols are often delivered to mechanically ventilated patients in the treatment of respiratory illness.
- For patient safety, manufacturer guidance is to arrange the humidifier below the level of the patient's chest, keeping the tubing uncoiled.
- However, in clinical settings this is not always feasible.

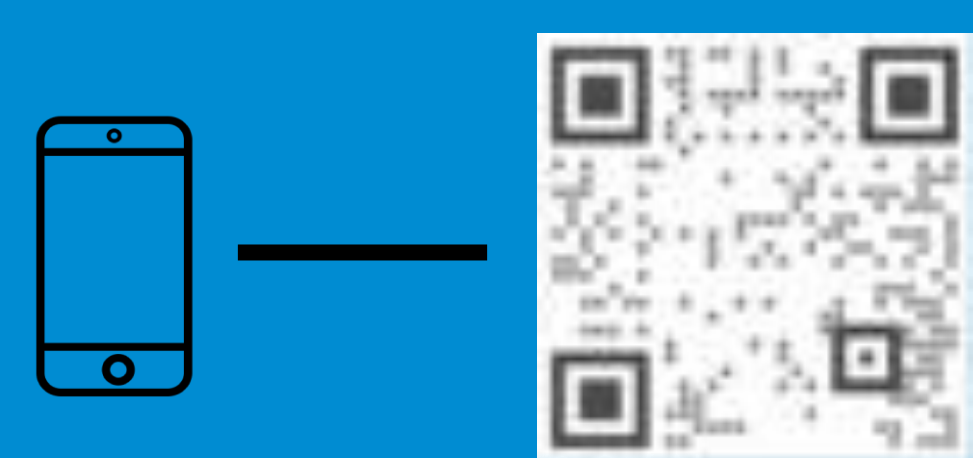
Hypothesis

- Does inspiratory limb tubing arrangement, coiled or uncoiled, affect the availability of aerosol to be delivered to a simulated mechanically ventilated adult patient?



Uncoiled tubing arrangement during mechanical ventilation increases aerosol available for delivery to the patient

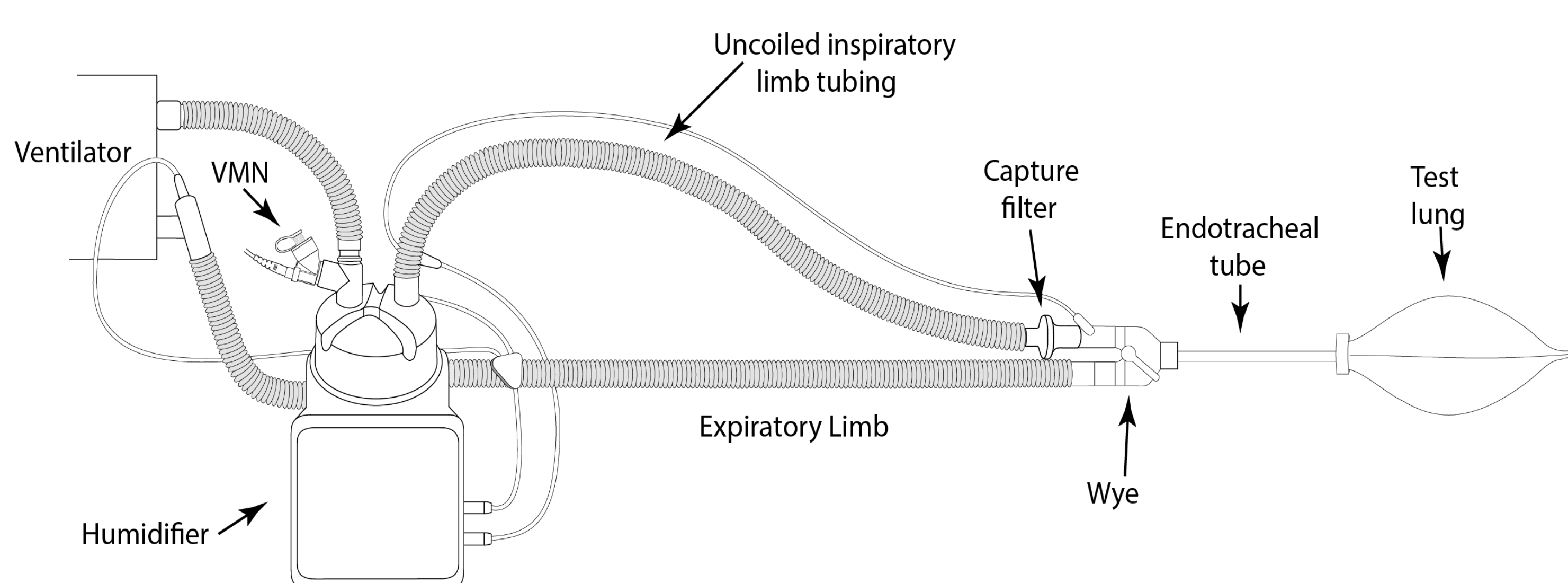
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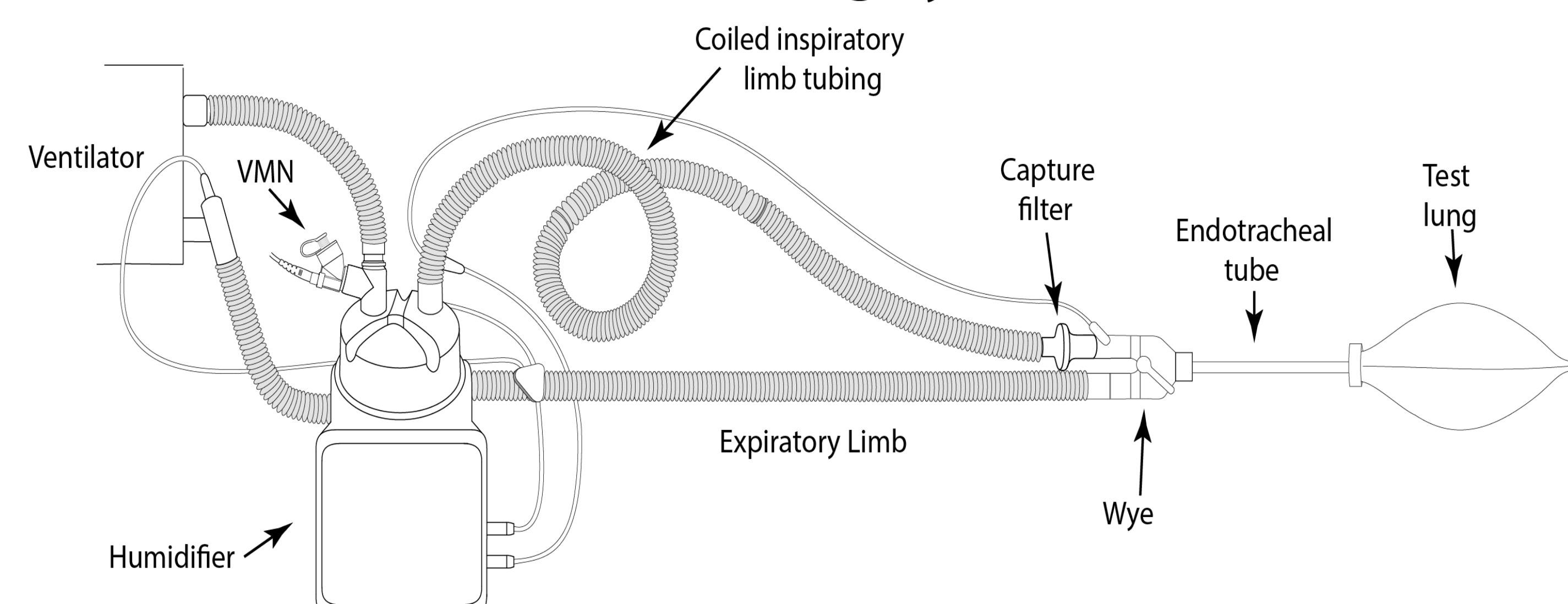
Study Design

- Breathing pattern: BR = 15 BPM, $V_t = 500$ mL, I:E: 1:1

Uncoiled Tubing System



Coiled Tubing System



Results

Inspiratory Tubing Arrangement	Available Aerosol Dose (%) Average \pm SD	P-Value
Coiled	30.39 \pm 2.41	0.006
Uncoiled	40.12 \pm 1.13	

Conclusions

- Inspiratory tubing arrangement in a dual limb mechanical ventilation circuit was found to have a significant effect on the quantity of aerosol available for delivery to a simulated adult patient.
- Health care professionals should follow manufacturers guidelines on ventilator circuit tubing arrangement.
- The findings indicate that the inspiratory tubing should be arranged without coiling to ensure maximum aerosol availability for delivery to the patient.