Background
- Clinical studies of mechanical ventilation (MV) are often small with large uncertainty in outcomes [1,2]
- Meta-analysis provides a method to combine data into a single estimate of efficacy
- A meta-analysis of proportional assist ventilation+ (PAV+) versus pressure support ventilation (PSV) was recently undertaken but did not report on outcomes relevant to our cost-effectiveness model [3]
- A pragmatic meta-analysis was undertaken to provide estimates of efficacy and explore how data sources used impact on outcomes.

Methods
- A Markov-model of patient care from MV in the intensive care unit (ICU) through to discharge home or death was developed for the Canadian setting (Fig. 1)
- Structured searched identified studies of PAV+ versus PSV + that were then subjected to meta-analysis
- Outcomes of interest were:
  - MV/ICU/hospital time
  - ICU/hospital mortality
- The model was populated with efficacy inputs from either Canadian trials or meta-analysis estimates
- Outcome parameters:
  - 20 years time horizon
  - Costs in 2017 CAD
  - 20 years time horizon
  - Costs in 2017 CAD
  - Quality-adjusted life years (QALYs) using EQ-5D

Results
- Seven studies comparing PAV+ with PSV were identified (Fig. 2)
- A total of 271 PAV+ patients and 253 PSV patients
- Meta-analysis included at least 4 studies for each outcome
- Heterogeneity was low (I2 ≤ 24%) and PAV+ was not cost-effective;
- Five simulations were performed
- Outcome parameters:
  - ICU/hospital mortality
  - Quality-adjusted life years (QALYs) using EQ-5D
  - A sensitivity analyses (n=2,000) was performed, using a willingness-to-pay (WTP) threshold of CAD 50,000 per QALY gained

Conclusion
- Efficacy data from individual trials as compared to meta-analysis substantially changed the numerical outcomes of the model
- However the interpretation remained the same: PAV+ is expected to be cost effective for mechanical ventilation in Canada

References

Fig. 2 [A] Clinical pathway of mechanical ventilation
[B] Hijl of the Markov model, simulating clinical practice in Canada

Fig. 3 [A] Sensitivity analysis for data from a single study
[B] Sensitivity analysis for data from a meta-analysis

The diagonal line represents the willingness to pay threshold of 10,000 per QALY gained in both graphs. X-axis: Dom, downs; Y-axis: cost-effectiveness; Y-axis: cost-effectiveness; Y-axis: Dom, downs dominant.