

Relative contribution of driving pressure and respiratory rate to mortality in ARDS depends on age

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INTRODUCTION

- ❖ In acute respiratory distress syndrome (ARDS), two ventilatory variables strongly contributing to prediction of mortality are driving pressure and respiratory rate.
- ❖ The association between driving pressure and mortality depends on age being stronger in older than younger patients.
- ❖ There is a pathophysiological rationale that this might not be the case for respiratory rate. Given that the aging lung is adapted to high respiratory rate, one may infer that the aging lung may be resilient to the deleterious effects of high respiratory rate.

OBJECTIVES

- ❖ To examine whether a) the association between respiratory rate and mortality depends on age, and b) the relative contribution of driving pressure and respiratory rate to prediction of mortality in ARDS depends on age.

METHODS

- ❖ A secondary analysis of seven ARDS Network and PETAL Network trials, published between 2000 and 2019.
- ❖ We performed logistic regression analyses including the interaction term between respiratory rate or driving pressure and age, and dominance analysis.

RESULTS

- ❖ Of the 5367 patients with ARDS enrolled, 4561 had available data on driving pressure and respiratory rate.
- ❖ The association between respiratory rate and mortality did not depend on age ($p=0.653$ in unadjusted logistic regression model, and $p=0.968$ in adjusted model). In contrast, the association between driving pressure and mortality depended on age ($p=0.001$ in unadjusted, and $p=0.011$ in adjusted model) (Figure 1).

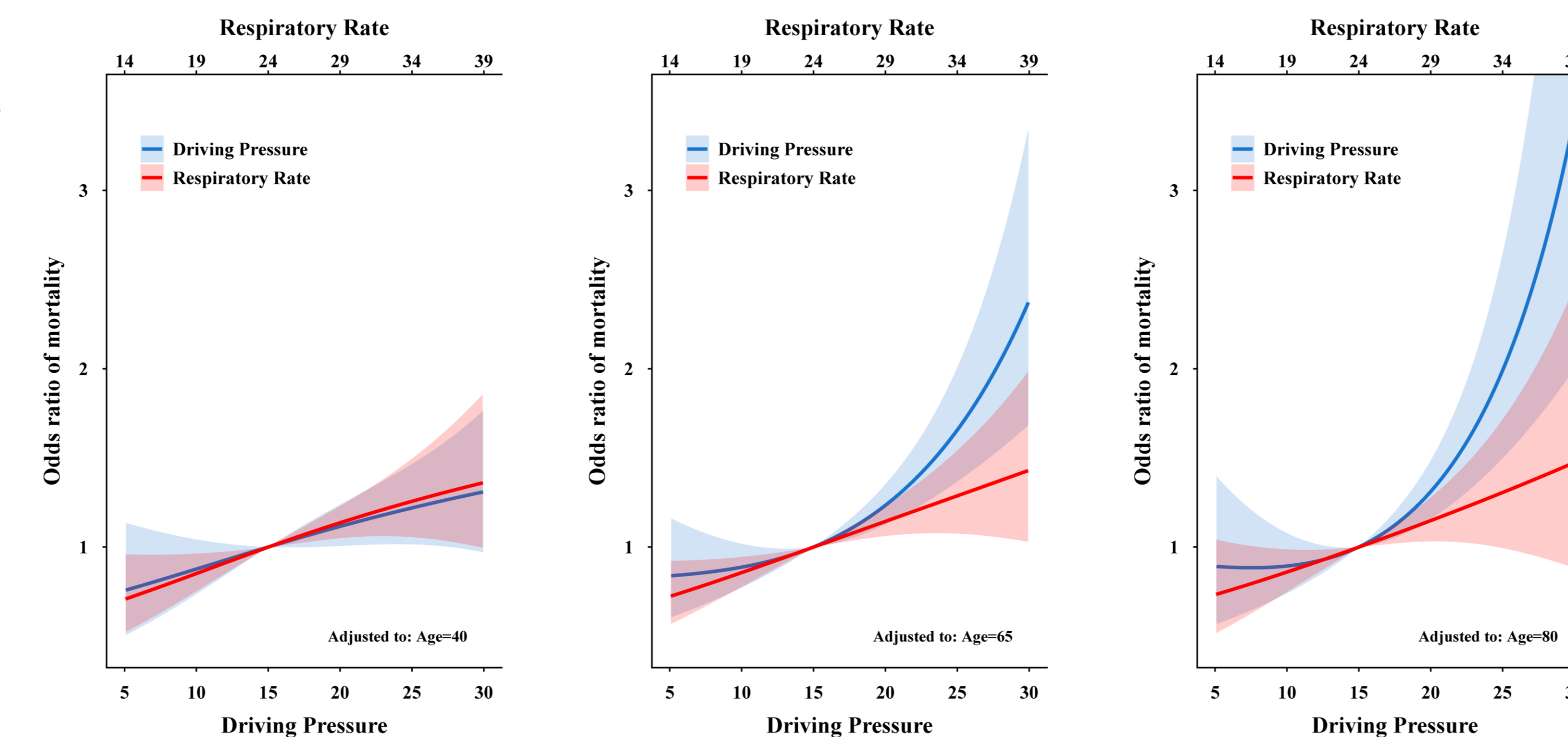


Figure 1. Modeled odds ratio of either respiratory rate (red) or driving pressure (blue) for 90-day mortality at representative ages of 40, 65 and 80 years.

- ❖ In younger patients, respiratory rate (percentage contribution=4.7%) conditionally and generally dominated driving pressure (1.4%) in predicting mortality. In older patients, driving pressure (13.3%) conditionally and generally dominated respiratory rate (7.4%) in predicting mortality (Figure 2).

CONCLUSIONS

- ❖ Our findings may help clinicians to put the tradeoffs between driving pressure and respiratory rate into the perspective of age and, therefore, if confirmed, might inform a comprehensive mechanical ventilation strategy tailored to age.

ACKNOWLEDGEMENTS

- ❖ The study was prepared by using ARMA, ALVEOLI, FACTT, ALTA, EDEN, SAILS, and ROSE research materials obtained from NHLBI BioLINCC, but does not necessarily reflect the views of the NHLBI or the researchers who performed these trials.

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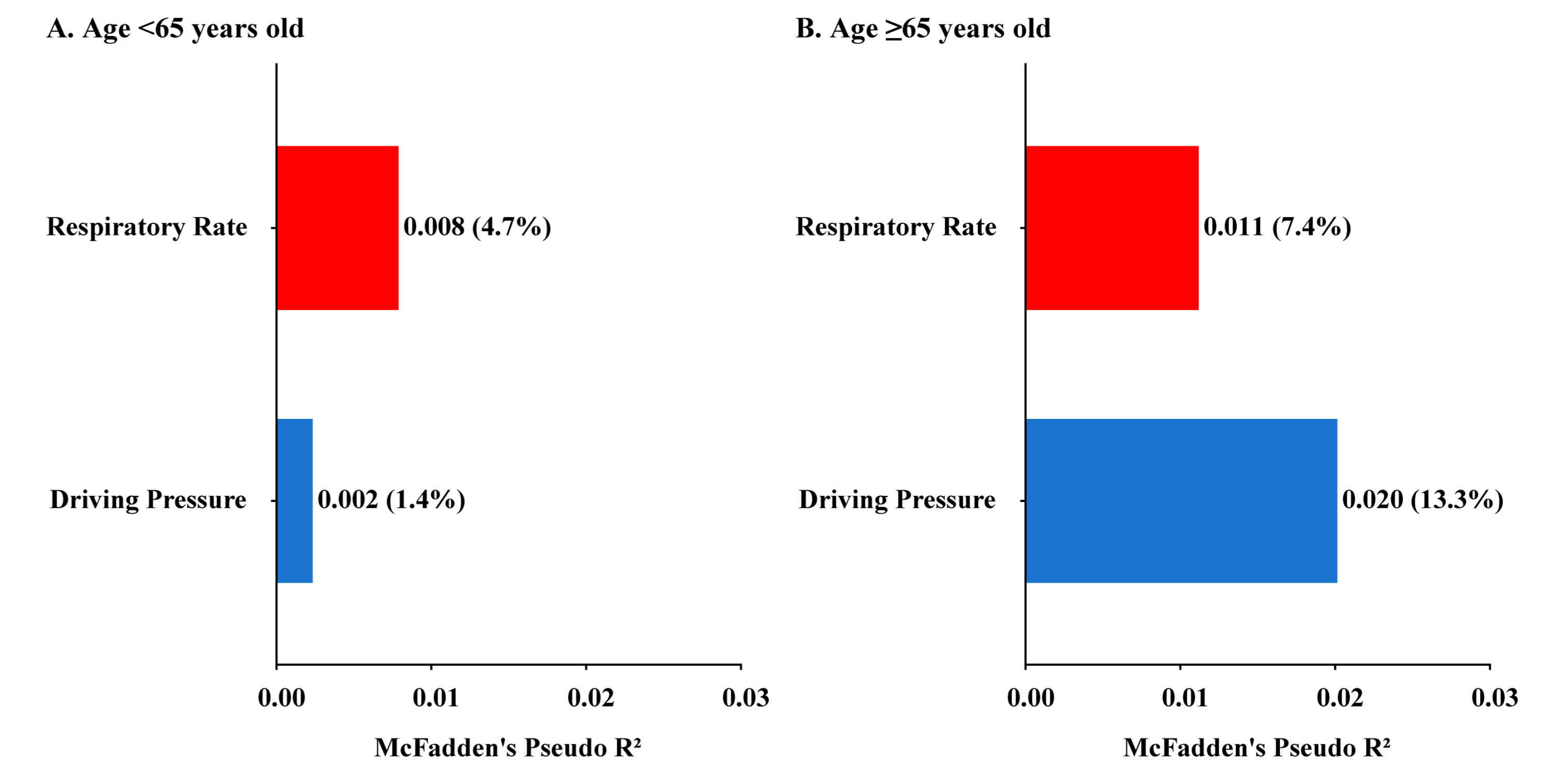


Figure 2. Relative contribution of driving pressure (blue) and respiratory rate (red) in predicting 90-day mortality in younger (<65 years old) and older (≥65 years old) patients.