

# A Prospective Study of Cough Response to Nebulised Citric Acid after Extubation for Elective Cardiac Surgery

Molly Kallesen,<sup>1,2,3</sup> Alex Psirides<sup>3</sup> and Maggie-Lee Huckabee<sup>1,2</sup>

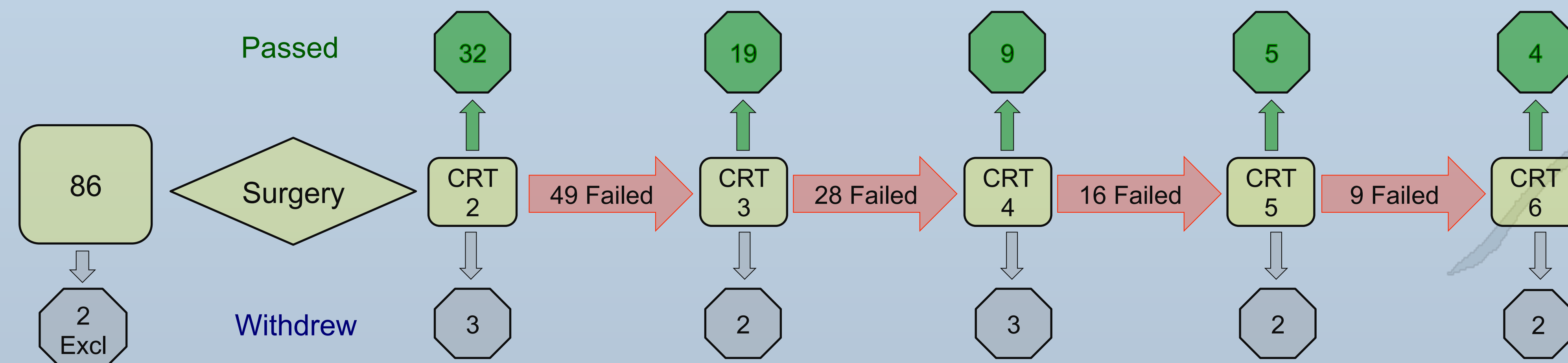
<sup>1</sup>Department of Communication Disorders, The University of Canterbury, <sup>2</sup>Van der Veer Institute for Parkinson's and Brain Research, <sup>3</sup>Capital & Coast District Health Board

## Aim

Intubation is a known contributor to dysphagia in the ICU population. El Solh and colleagues (2003) found that 19% of elderly ICU patients silently aspirate after intubation and Leder and colleagues (1998) found a similar proportion amongst extubated trauma patients. Both studies suggest that reflexive cough is impaired in extubated patients. The purpose of this project was to evaluate the effect of intubation on the cough reflex and to track the recovery of cough post-extubation.

## Methods

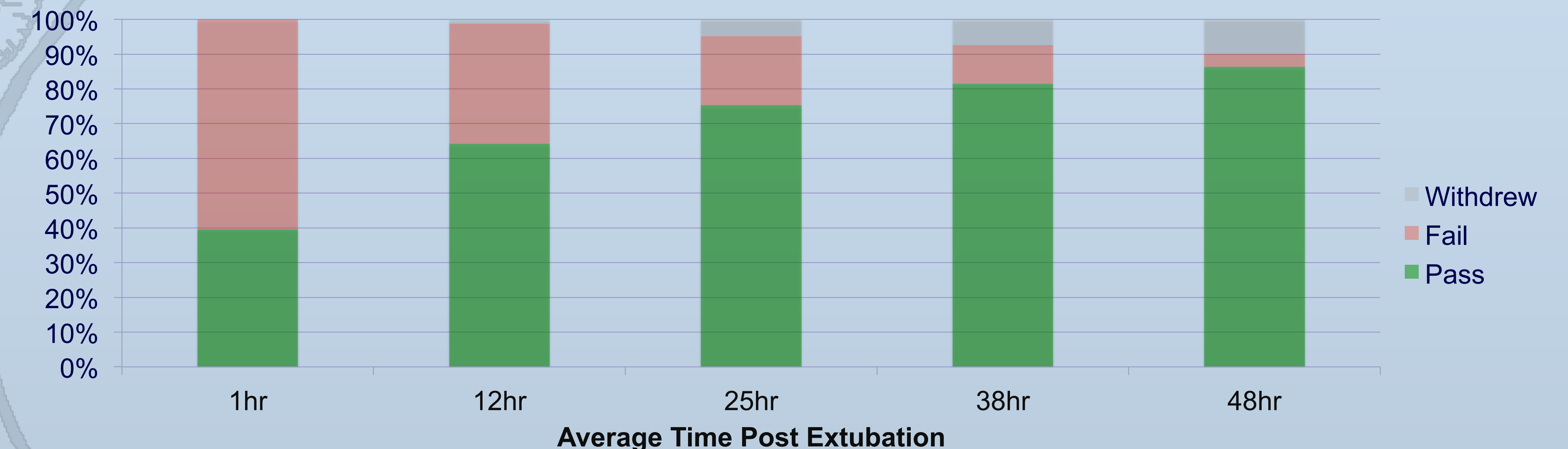
Eighty-six participants (73 male) undergoing elective coronary artery bypass surgery were enrolled. This group was chosen as they were able to be assessed prior to intubation & were likely to be intubated in an ICU for several hours. No participants had any history of dysphagia, head and neck cancer or neurological disease. Each participant underwent cough reflex testing (CRT) prior to intubation for surgery. Baseline assessment established each participant's threshold for reflexive cough to be 0.4, 0.8 or 1.2 mol nebulised citric acid. Two participants were excluded from the study due to absent cough on baseline and three withdrew before first follow-up. CRT was repeated within two hours of extubation (CRT2) and every morning and evening thereafter (CRT3-CRT6) until the participant coughed at baseline level, withdrew or was discharged from hospital.



## Results

Frequency tables below represent results of CRT at each follow-up point. By the fifth follow-up, all but one participant had recovered a reflexive cough. Kaplan-Meier survival curves were created for each of the variables and log rank tests performed to evaluate for significance. Neither age, gender, length of intubation, length of stay in ICU, length of stay in hospital, bypass time nor APACHE III score correlated with cough recovery ( $p > 0.3$ ). Morphine dose did correlate significantly with cough recovery ( $p < .001$ ), where patients with higher doses of morphine coughed sooner after extubation. This is likely because participants who passed the cough test at CRT2 (post-extubation) had recent large doses of morphine in and immediately post theatre, while participants who passed at later points had weaned to lower doses of morphine.

Results of Cough Reflex Test After Extubation



## Conclusion

Patients who are intubated for coronary artery bypass surgery often take several hours after extubation to recover their reflexive cough. This may impact their ability to eat and drink safely. More research is needed to determine if cough reflex is affected in the wider ICU population post-extubation and if the cough reflex test is a valid tool for detecting silent aspiration in this population.

## REFERENCES

(1) El Solh, et al. (2003). *Intensive Care Medicine*, 29(9), 1451-1455. (2) Leder, et al. (1998). *Dysphagia*, 2(4), 216-219.