

Nasal symptom responses to cat dander exposure are comparable in the RMT Mobile and Fixed Naturalistic Exposure Chambers™ (NEC)

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Rationale

- The RMT Mobile Naturalistic Exposure Chamber™ (Mobile NEC) is a portable alternative to fixed chambers for controlled allergen exposure.
- It consists of a pop-up tent (Fig 1A), in which allergens are aerosolized using a modified robot-vacuum (Fig 1B).
- We compared the allergic response to cat allergen in the Mobile NEC, to the previously validated Fixed NEC [1] that housed cats.

Methods

- Cat-allergic subjects (skin-prick test $\geq 5\text{mm}$) were randomized to undergo 2-hr challenges in the Mobile or Fixed NEC, followed by a challenge in the other chamber ≥ 28 days later.
- Allergen was aerosolized from milled cat hair in the Mobile NEC and from resident cats in the Fixed NEC. Fel d 1 was sampled and quantified by ELISA.
- Nasal (TNSS), ocular (TOSS) and chest symptoms (RSS) were measured every 10 minutes, and spirometry every 20 minutes.

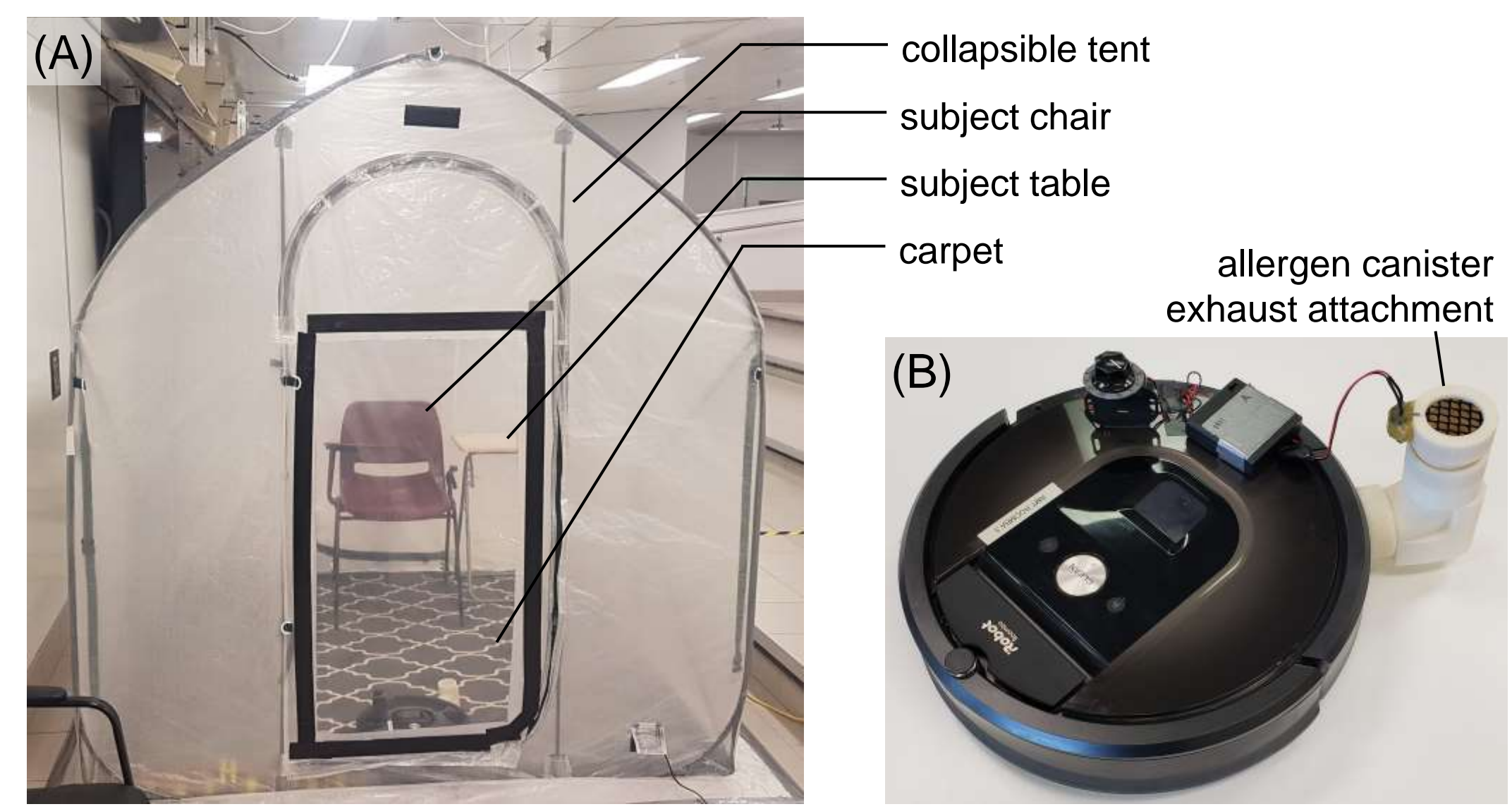


Fig 1. (A) Mobile NEC (patent pending) and (B) Modified robotic vacuum cleaner for allergen aerosolization, used in both chambers.

A portable chamber for
cat allergen exposure
 provokes nasal symptoms
 comparable to a fixed
 chamber with cats.

This model could benefit
multi-site clinical trials.

SEM image x500 of milled cat hair and dander

Results

- 15 subjects completed at least one challenge in either chamber:
 - 12 in Mobile, 11 in Fixed; 60% male; mean age 40, range (19-63 yrs).
- Air concentration of Fel d 1 was equivalent between chambers, mean (SD):
 - Mobile: 55 (20) ng/m³; Fixed: 54 (33) ng/m³.
- Neither nasal (TNSS) or ocular symptoms (TOSS) differed between chambers (Figs 2A, and 2B, respectively).
- Mean RSS was higher in the 2nd hour in the Mobile vs. the Fixed NEC (Fig 2C), but the fall in FEV₁ was similar in both NECs (Fig 2D).

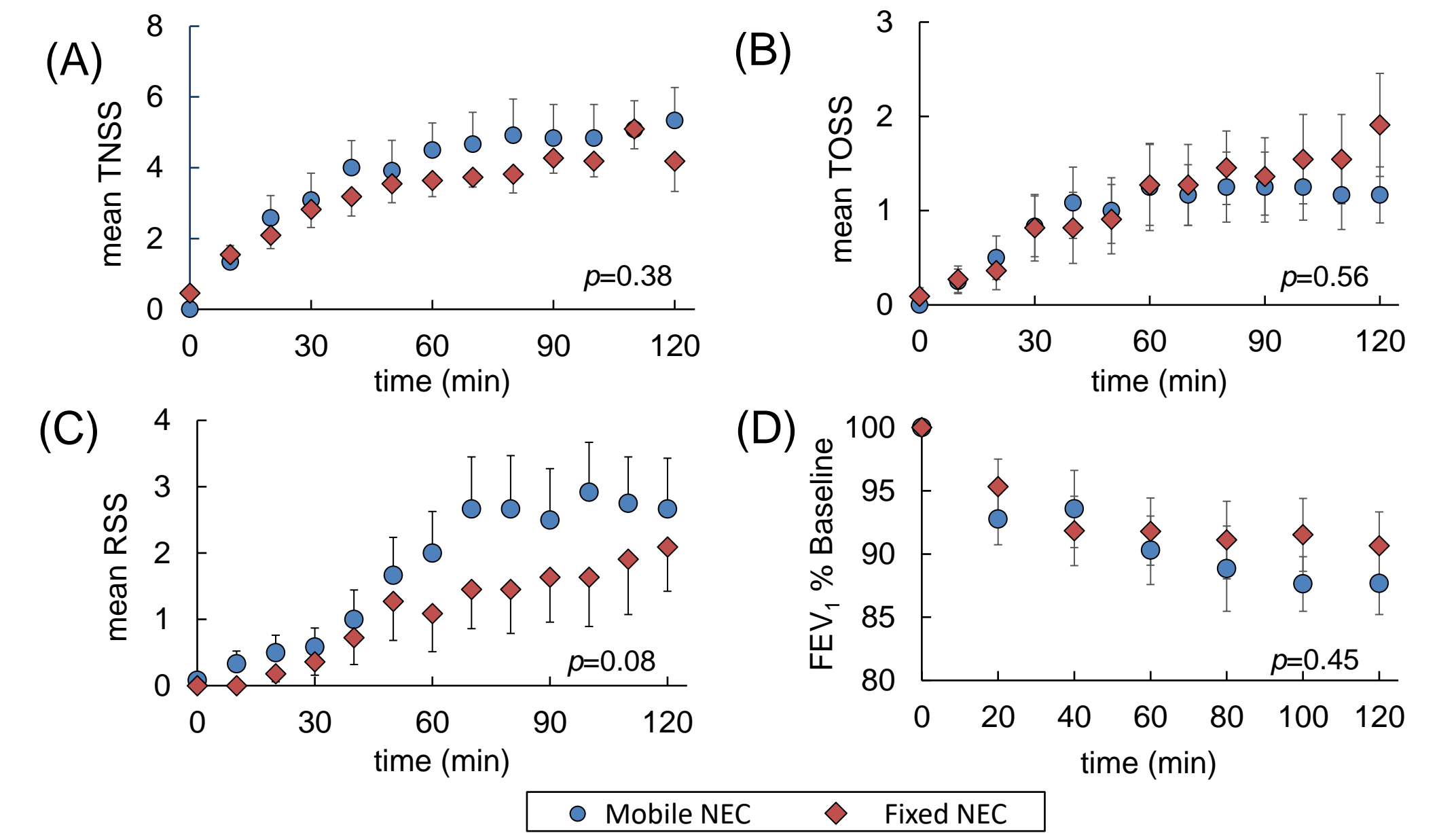


Fig 2: Symptom scores for all subjects over 2-hr exposures (mean \pm SE): (A) Total nasal symptom score; (B) Total ocular symptom score; (C) Respiratory symptom score and (D) FEV₁ (% baseline).

Conclusions

Exposure to cat allergen in Mobile and Fixed NECs generated comparable symptoms in cat allergic subjects. Both are good models for development of therapies for cat-specific allergic rhinoconjunctivitis.

References: [1] Yang, W. *et al.* Cat allergen exposure in a naturalistic exposure chamber: A prospective observational study in cat-allergic subjects. *Clin. Exp. Immunol.* 2022; 52(2); pp 265-75.