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Measurements of the distal airspaces in children using the novel AiDA technique

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Motivation

To better *understand particle deposition* in the respiratory tracts of children and adolescents—and their *susceptibility to health effects caused by air pollution*—more knowledge about the distal lung development of these groups is needed.

Conclusions

- Age dependent trend of distal airspace radius for the groups 9–15, 15–18 year-olds and adults
- Distal airspaces grow from childhood through adolescence to adulthood

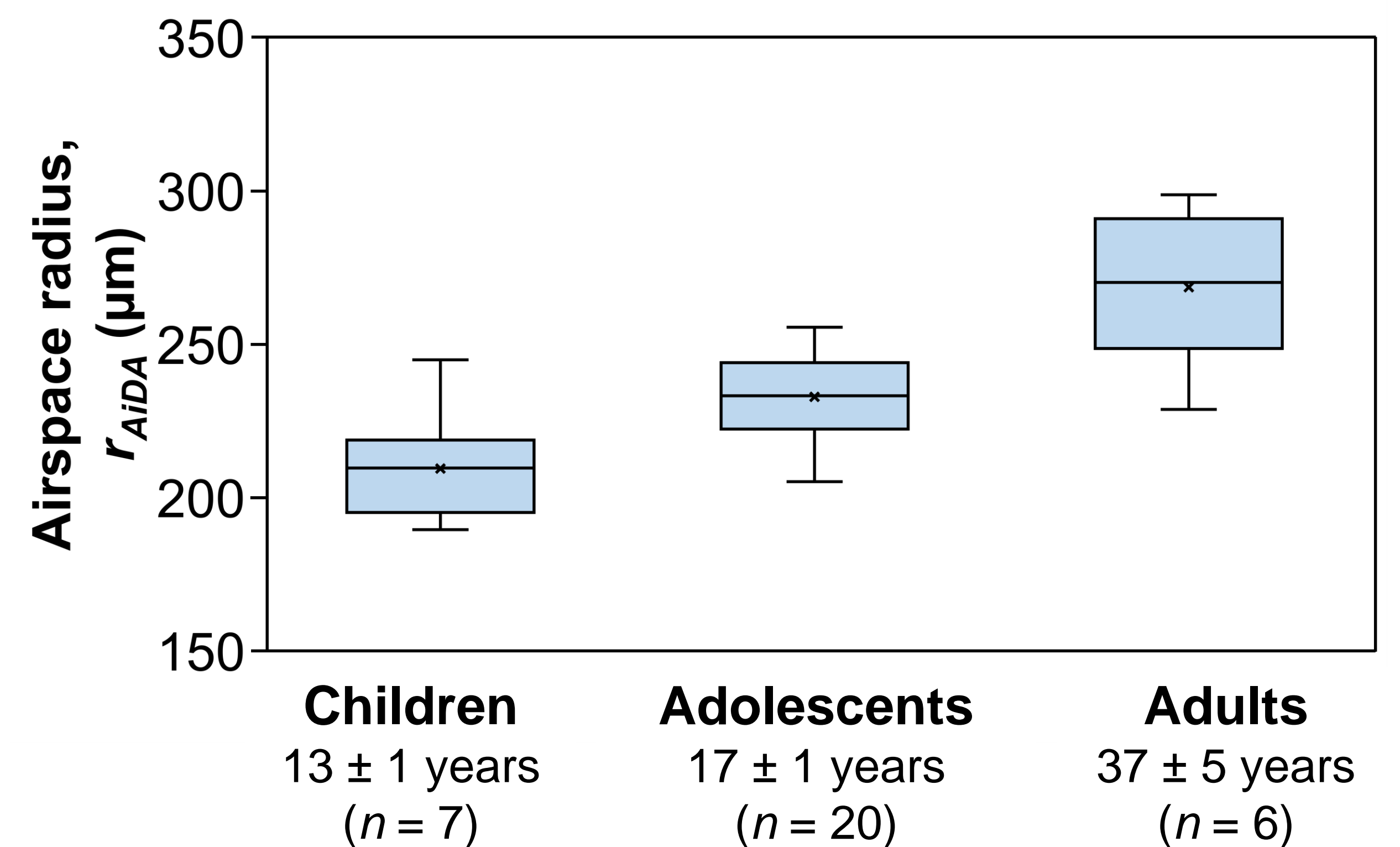


Fig. 2. Airspace radii for children, adolescents and an adult reference group. Box limits, 1st and 3rd quartiles; line in box, median; X, mean; whiskers, maximum and minimum.

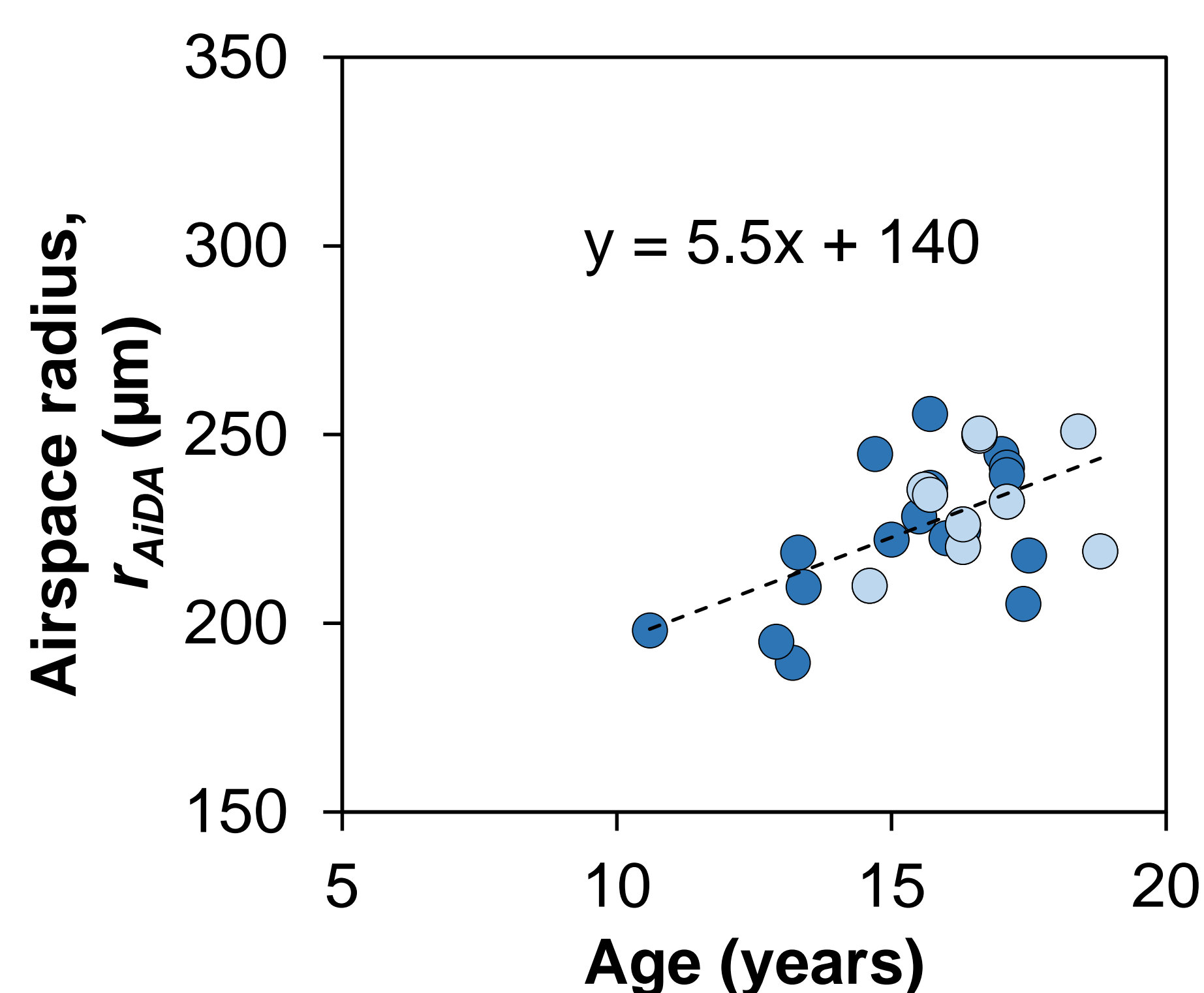
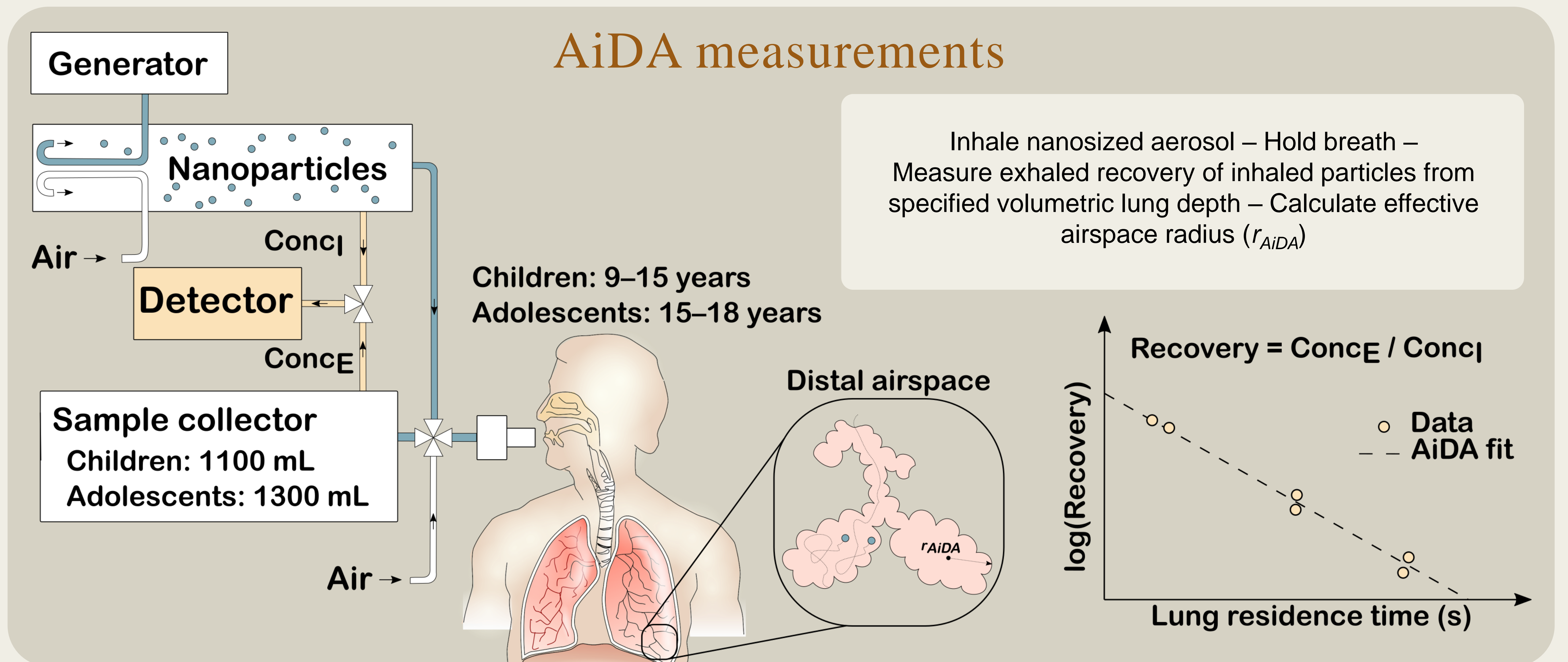


Fig. 1. Age-dependence of the airspace radii for children and adolescents. Both males (light blue) and females (dark blue) are included.

Results

An age-dependent trend of r_{AiDA} (Pearson's $r = 0.57$; $p = 0.002$) was found for subjects in the ages 9–18 years (Fig. 1).

The r_{AiDA} were (mean ± standard deviation):

- 209 ± 17 μm for children,
- 233 ± 13 μm for adolescents
- 267 ± 23 μm for an adult reference group.

These results suggest that the distal lung structure and alveoli are developed at a young age, and that distal airspaces grow from childhood, through adolescence, to adulthood (Fig. 2).

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