

OK-AIR: 2X2 RANDOMIZED TRIAL TO IMPROVE INDOOR AIR QUALITY AND REDUCE ABSENCES IN HEAD START

DIANE HORM, CHANGJIE CAI, CRAIG VAN PAY, ELNAZ GHORBANI, STEPHANIE FARRIS, MINGZE ZHU, KRISTEN SHELTON, JASON VOGEL, BUKUNMI AKANJI, AND THE OK-AIR RESEARCH TEAM

INTRODUCTION

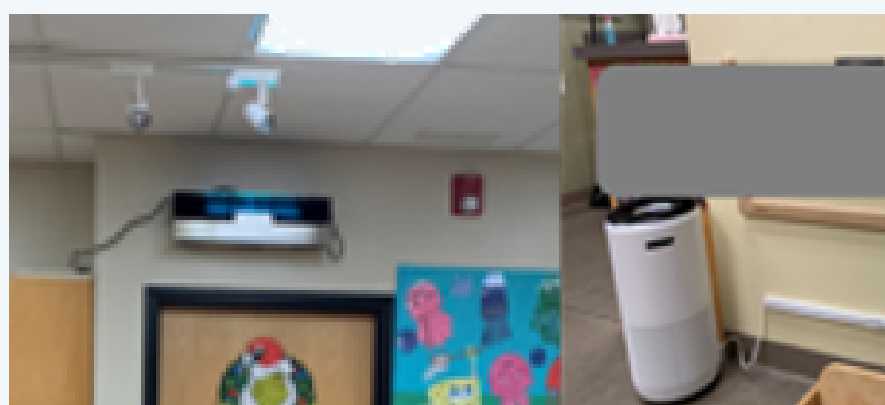
OK-AIR is an evaluation of the potential for low-cost and low-burden interventions (e.g., air purifiers) to have significant and meaningful impacts on teachers' and children's health and development.

- Air quality in early care and education (ECE) settings is under-researched with young children being the most vulnerable.
- Positive health is crucial for children's growth and learning; and for them to reap the benefits of ECE.
- The current teacher shortages highlight the importance of teacher health and their perceptions about their work environment.
- Indoor air quality is another important aspect of classroom/program quality, especially for ensuring all children have access to healthy learning environments.

EQUIPMENT



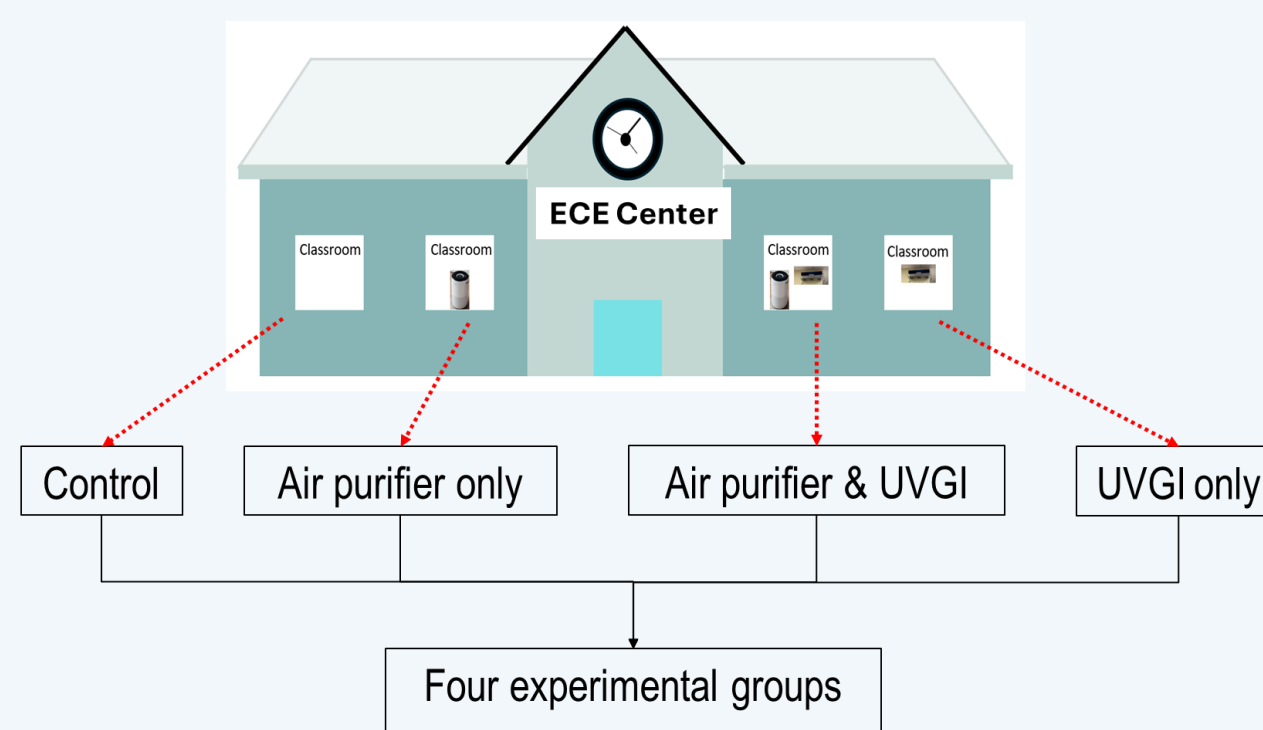
(A) Continuous air quality monitoring via wireless sensor



(B) Upper-Room Ultraviolet Germicidal Irradiation (UVGI) for Upper Air

(C) Portable Air Purifier for Lower Air

RCT STUDY DESIGN



Participating sites (for 2023-25) include 5 Head Start/Early Head Start Programs:

- Rural areas: two sites
- Semi-rural/sub-urban: one site
- Urban areas: two sites

Across these 5 participating sites, we consented/enrolled:

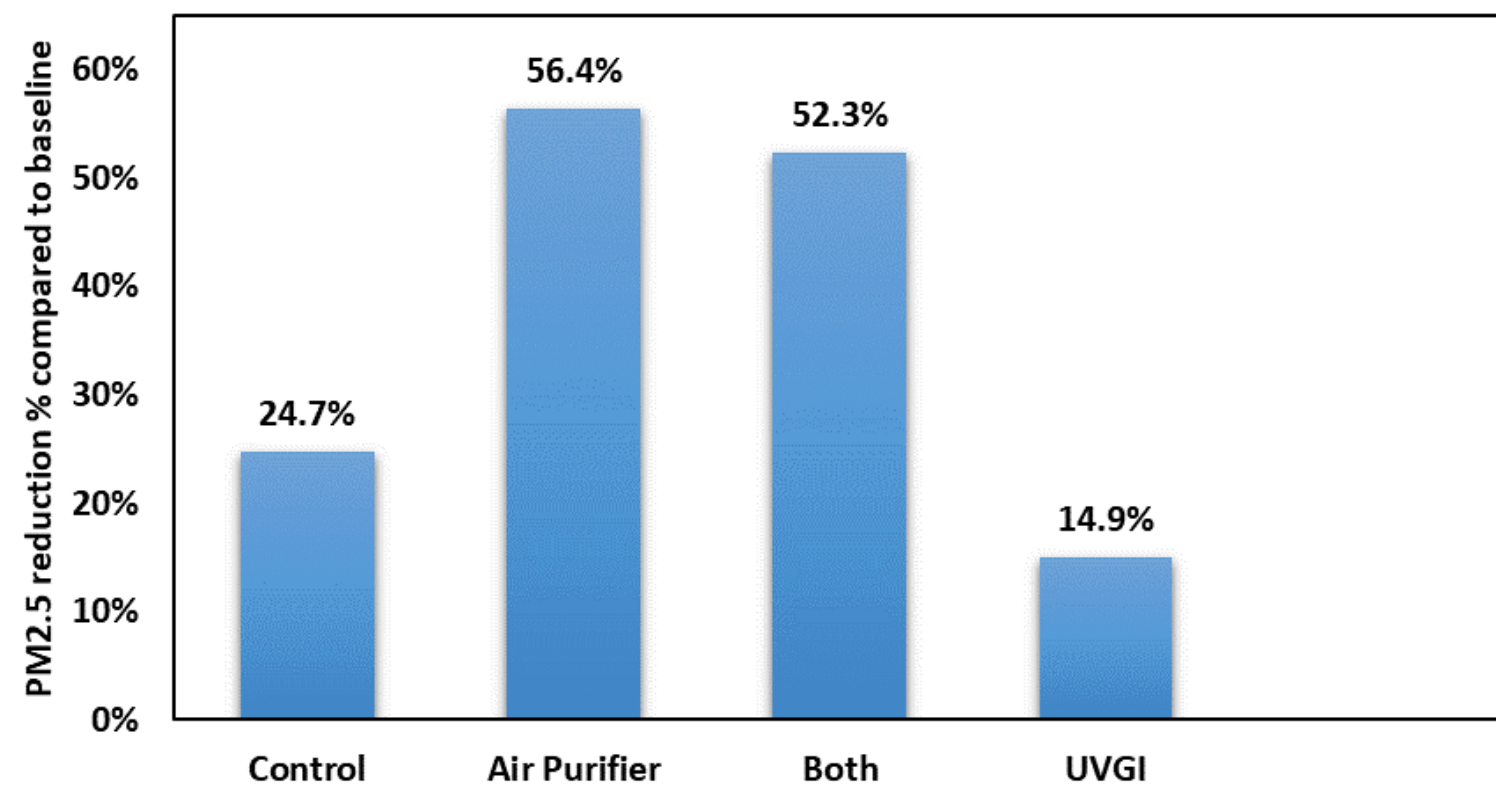
- 336 children between the ages of 1 and 4
- 67 teachers
- 5 site directors

CONCLUSIONS

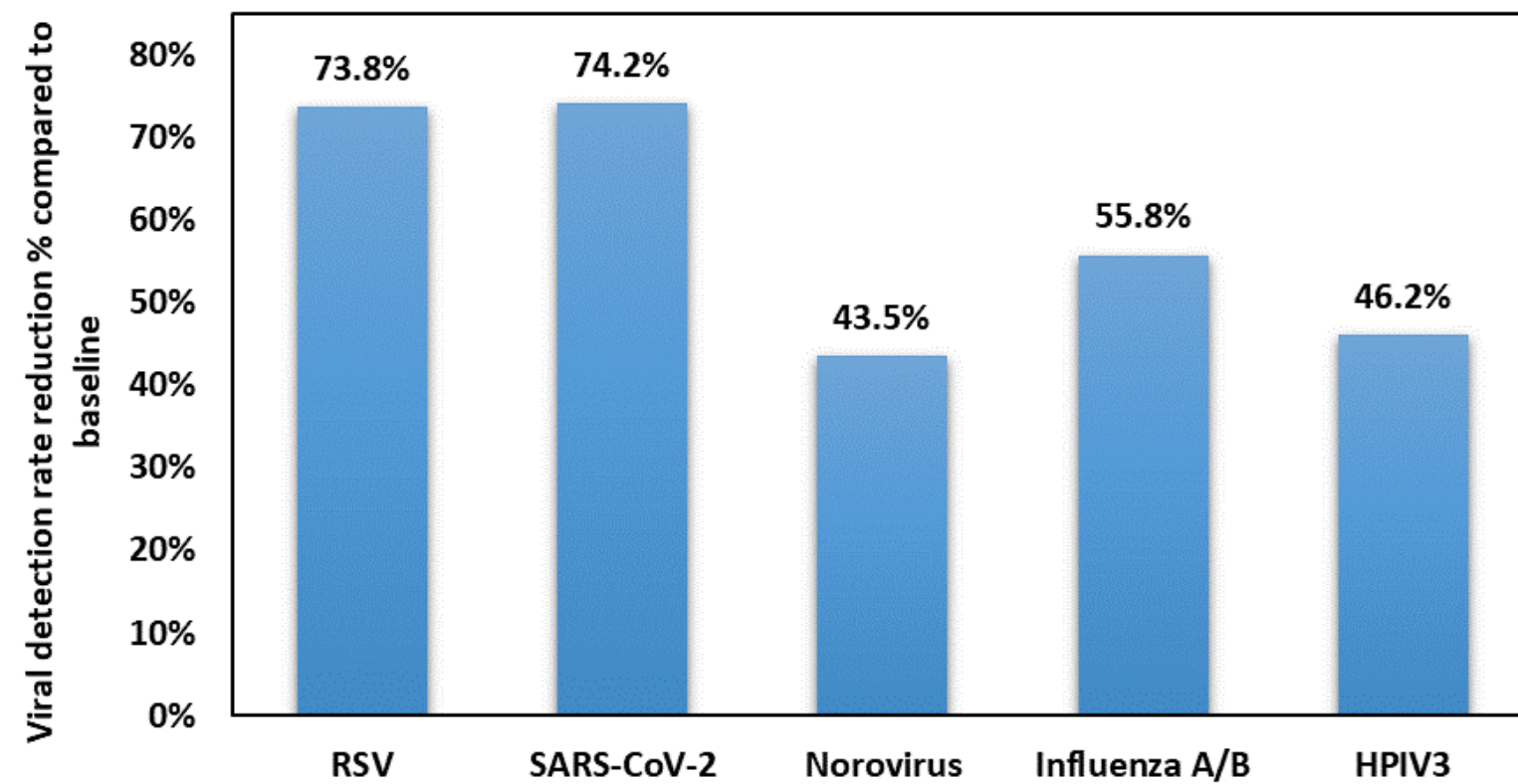
- Air purifiers significantly improved indoor air quality in ECE classrooms by reducing over 50% of PM_{2.5} particles.
- The overall virus detection rates during intervention time periods are significantly lower than during baseline. In which, 73.8% significant reduction in Respiratory Syncytial Virus (RSV), 74.2% reduction in SARS-CoV-2, 43.5% in Norovirus, and 55.8% in Influenza A & B.
- Sick-related absences were significantly lower during the intervention period than during baseline. Children had about 36% lower odds of missing school due to illness during the intervention period.
- Infants are more vulnerable to illness than toddlers and preschools.
- Early childhood educators and the field at large lack research and information about air quality.

DETAILED RESULTS

PM2.5 Concentration Reductions Compared to Baseline



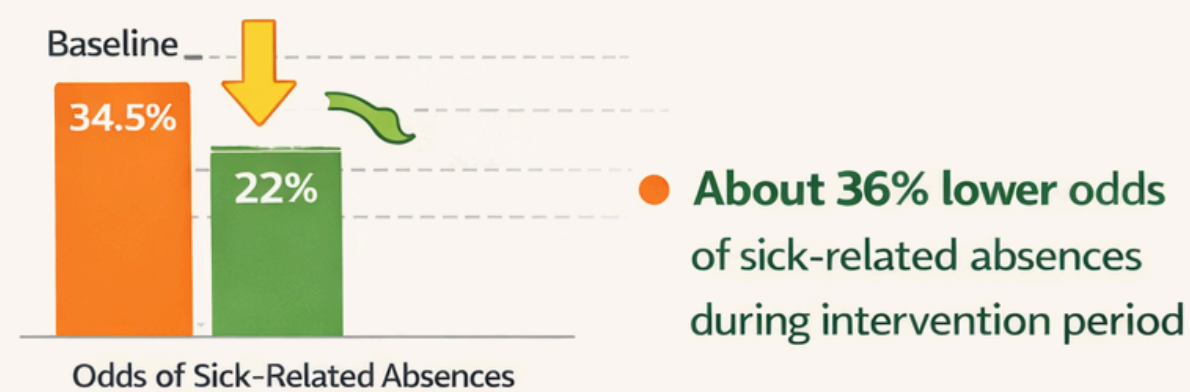
Virus Detection Rate Reductions Compared to Baseline



Sick-Related Absenteeism Reductions Compared to Baseline

Sick-related absences were significantly lower during the intervention period than during baseline.

After adjusting for age, school, and calendar month, children had **about 36% lower odds of missing school due to illness** during the intervention period. Older children also had fewer **sick-related absences**.



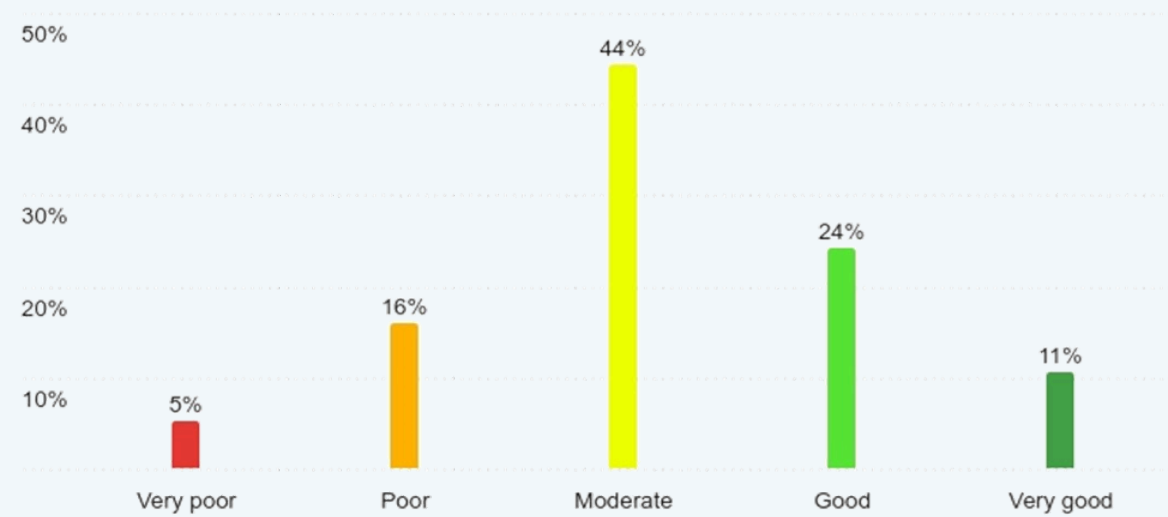
Infants are more vulnerable to illness than toddlers and preschoolers.

Infants had approximately **2X higher odds of illness** compared to preschoolers.

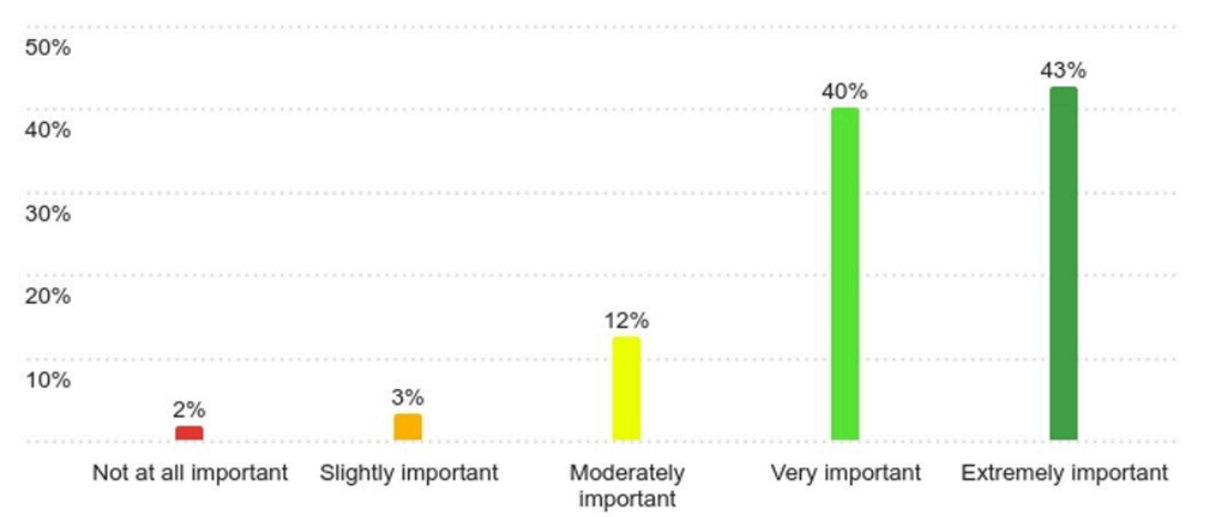


RESULTS - Teachers' Knowledge and Perceptions

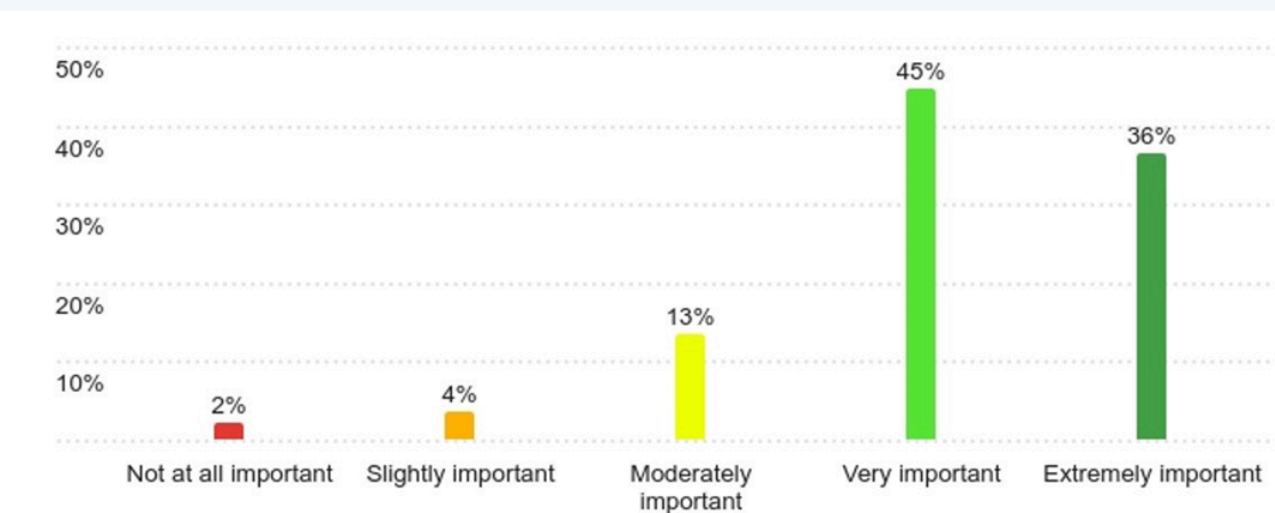
Teachers' self-ratings of their IAQ knowledge



Teachers' Perspective on IAQ's Impact on Children's Well-Being



Teachers' Perspective on IAQ's Impact on staff Well-Being



Teachers' Report of Formal IAQ Training

