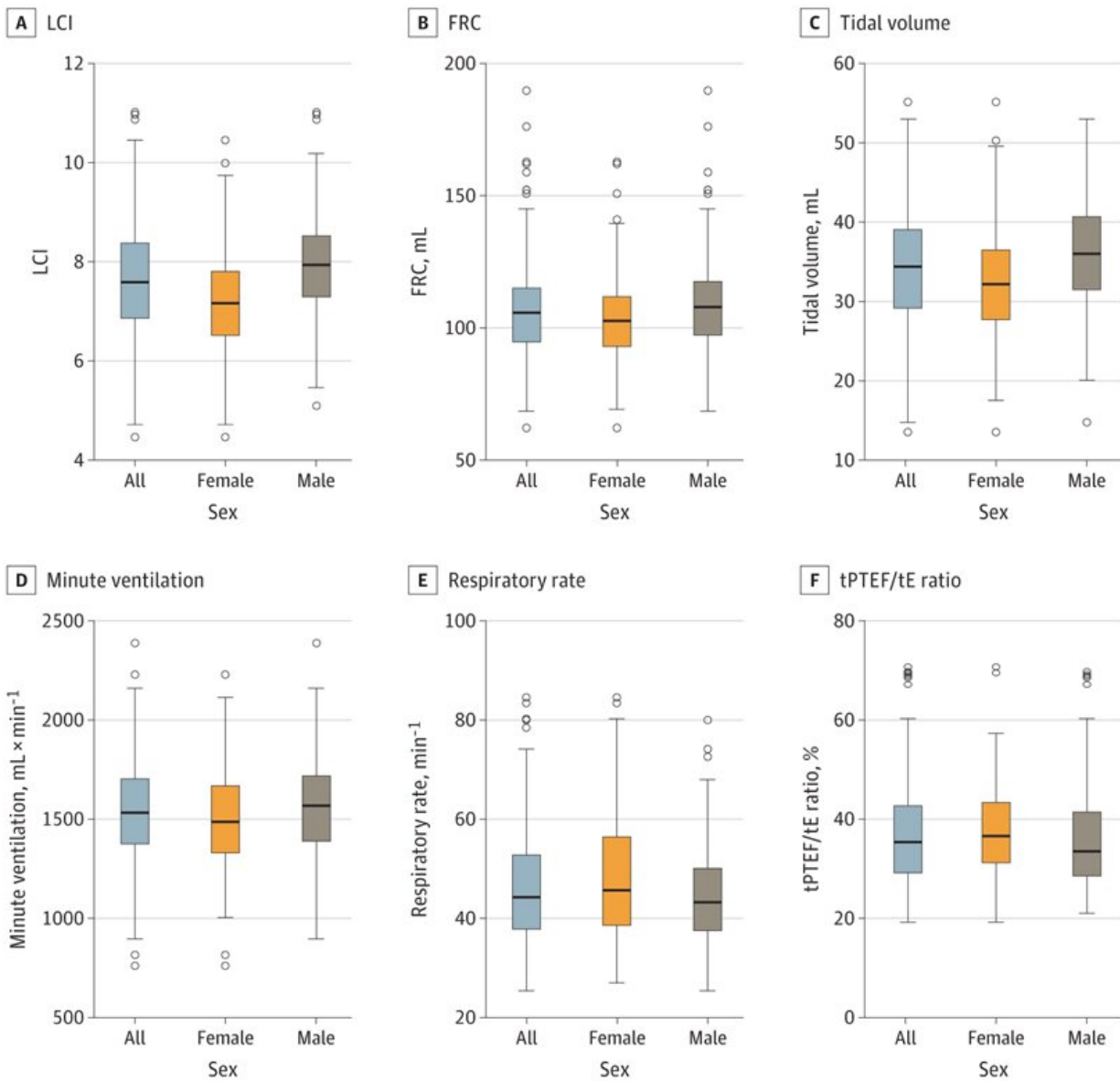


Study shows correlation between outside temperature and lung function in Grenoble newborns

March 21 2023, by Justin Jackson



Distribution of Lung Function Measurements at 2 Months. The bottom and the top of the boxes show the 25th and the 75th percentiles, respectively; the middle line inside the box indicates the median; the whiskers display the minimum and maximum values within 1.5 times the IQR from the first and third quartiles; and the small circles represent the outliers. FRC indicates functional residual capacity; LCI, Lung Clearance Index; and tPTEF/tE, time to peak tidal expiratory flow to total expiratory time. Credit: *JAMA Network Open* (2023). DOI: 10.1001/jamanetworkopen.2023.3376

Researchers in France suggest an association between ambient outdoor temperatures and human female newborn respiratory systems. The research was led by the Institute for Advanced Biosciences, Université Grenoble Alpes. In the research report, 343 newborns were analyzed for lung function in the weeks after birth. Data was then correlated to the ambient outdoor temperatures their home neighborhoods were exposed to at various timeframes.

The study, "Association of Prenatal and Postnatal Exposures to Warm or Cold Air Temperatures With Lung Function in Young Infants," is published in the journal *JAMA Network Open*.

The Grenoble [metropolitan area](#), where all participants reside, sits in a picturesque valley surrounded by Alpine mountains with a contrasted climate of continental, oceanic, Mediterranean, and mountain influences. The [coldest temperature](#) recorded during the three year study was -2°C (28.4°F), and the highest was 32°C (89.6°F). While no specific data is reported on the homes, it is recorded and noted that "72% of mothers and/or fathers held at least a master's degree," at least implying that many of the homes had functioning heating and cooling systems.

Two measurements of [lung](#) function were used, tidal breathing analysis

(respiratory rate) and nitrogen multiple-breath washout test (for lung volume and ventilation), taken at two months of age. The tests were recorded over 10 minutes during sleep using an infant face mask and excluding from analysis the first 20 to 30 breaths to allow stabilization of the newborn's breathing pattern.

The results of the sleeping infant [lung function](#) tests were compared with two time periods of residence exposure to outside cold or heat. Long-term exposure data included the first 35 weeks of pregnancy and the four weeks after birth, ignoring the messy part in between (not all pregnancies being precisely 40 weeks). Analyses were not adjusted for gestational age at birth. Short-term exposure considered outdoor [temperature](#) in the week before the tests were conducted.

Of the newborns, 183 (53%) were male and showed no association with their home's previous exposures to outside heat or cold.

Among the 160 female newborns (47%), long-term residential heat exposure was associated with decreased functional residual capacity (using 24°C vs. 12°C at gestational weeks 20–35 and weeks 0–4 after delivery) and increased respiratory rate (using 24°C vs. 12°C at gestational weeks 14–35 and weeks 0–1 after delivery).

Long-term cold exposure to the residence of females was associated with lower functional residual capacity (using 1°C vs. 12°C at gestational weeks 15–29) and lower tidal volume (using 1°C vs. 12°C at gestational weeks 14–35 and weeks 0–4 after delivery).

While the researchers point out several limitations to the current study, it may be enough to suggest that further research is needed.

More information: Ariane Guilbert et al, Association of Prenatal and Postnatal Exposures to Warm or Cold Air Temperatures With Lung

Function in Young Infants, *JAMA Network Open* (2023). [DOI: 10.1001/jamanetworkopen.2023.3376](https://doi.org/10.1001/jamanetworkopen.2023.3376)

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