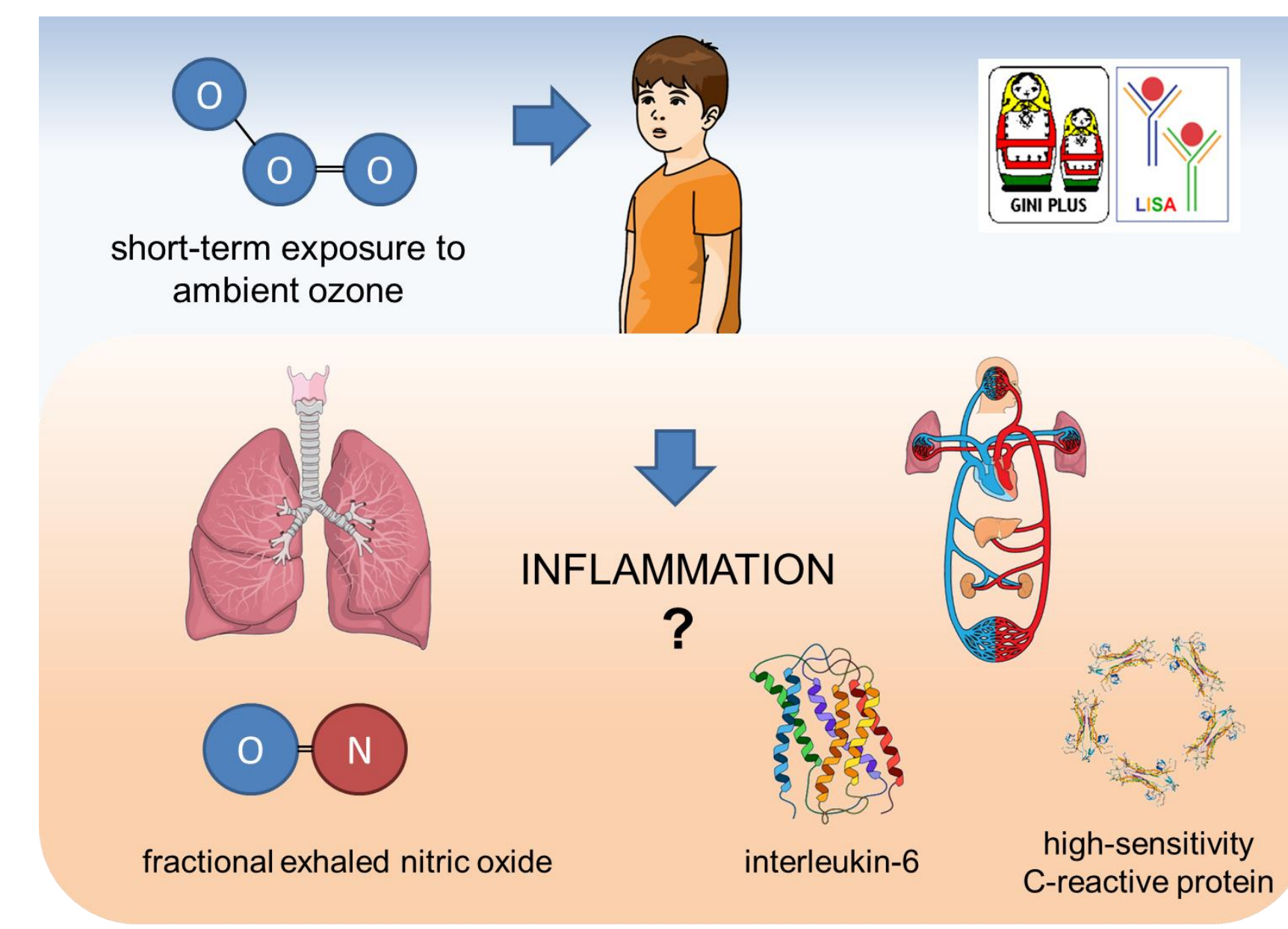


# Short-term exposure to ambient ozone and inflammatory biomarkers in children and adolescents

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## Conclusions:

Exposure to higher levels of ambient ozone in adolescents was associated linearly with higher FeNO, and J-shaped with hs-CRP, but not with IL-6.



Free access:



## Background:

- Ambient ozone exposure and health is under-investigated
- Inflammation may link ozone with adverse health effects
- Only few studies are in children or adolescents

## Methods:

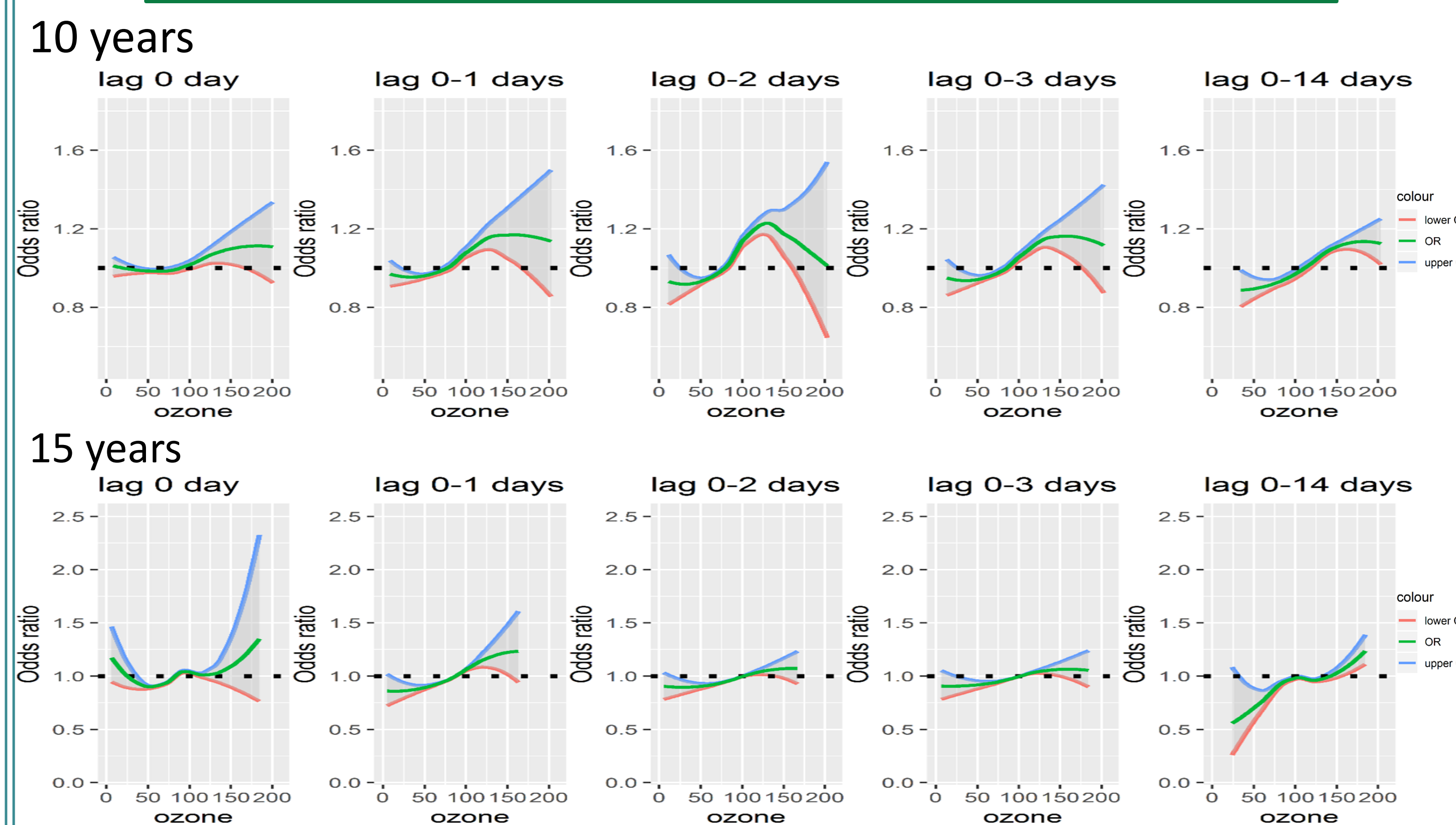
- Design:** Cross-sectional study
- Participants:** GINIplus and LISA cohorts  
1330 children aged 10 and 1591 adolescents aged 15 years from Munich and Wesel, Germany
- Exposures:** Pollutants data from monitoring sites  
Ozone, max of 8-hour average  
Co-pollutants (PM<sub>10</sub>, NO<sub>2</sub>), daily averages  
Lags, lag 0 day to lag 0-14 days
- Confounders:** Age, sex, season and daytime of a test, time spent outside, physical activity, income, cohort and area
- Outcomes:** Inflammatory markers from airways or blood  
Fractional exhaled nitric oxide (**FeNO**) - continuous  
High-sensitivity C-reactive protein (**hs-CRP**),  
Interleukin-6 (**IL-6**) - detectable or not
- Analyses:**  
Linear regression models for FeNO  
Logistic regression models for hs-CRP and IL-6  
Generalized additive models (**GAMs**) for hs-CRP

## Results:

**Table 1.** Percent changes and 95% CIs for ozone exposure and FeNO

Lags	10 years	15 years
Lag 0 day	-2.28 (-7.91, 3.68)	<b>5.69 (1.22, 10.34)</b>
Lag 0-1 days	-2.17 (-8.21, 4.27)	<b>7.34 (2.39, 12.54)</b>
Lag 0-2 days	-0.59 (-6.86, 6.10)	<b>7.78 (2.76, 13.05)</b>
Lag 0-3 days	-1.96 (-8.06, 4.55)	<b>6.04 (1.06, 11.25)</b>
Lag 0-14 days	-1.83 (-7.91, 4.66)	3.87 (-1.32, 9.33)

**Figure 1.** Odds ratios and 95% CIs for ozone exposure and hs-CRP (J-shaped) from the GAMs



No significant associations between ozone and IL-6

## Discussion:

- Associations with FeNO support the notion that ozone causes lung inflammation in adolescents
- Associations between ozone and systemic inflammation are not definite
- J-shaped association between ozone and hs-CRP is supported by evidence from clinical ozone therapy studies