

## **Air pollution patterns may modify the effect of weight gain on lung function among adolescents.**

Wu TT<sup>1</sup>, Chen LH<sup>1</sup>, Ho WC<sup>1</sup>, Lin MH<sup>1</sup>, Pan SC<sup>1</sup>, Fan KC<sup>1</sup>, Caffrey JL<sup>2</sup>, Lin YS<sup>3</sup>, Chen PC<sup>4</sup>, Wu TN<sup>1</sup>, Sung FC<sup>1</sup>, Lin RS<sup>5</sup>

<sup>1</sup> Institute of Public Health, China Medical University, Taichung, Taiwan

<sup>2</sup> University of North Texas Health Science Centre, Department of Integrative Physiology and Cardiovascular Research Institute Fort Worth, TX

<sup>3</sup> National Center for Environmental Assessment, Office of Research and Development, U.S. Environmental Protection Agency, Washington, DC

<sup>4</sup> Institute of Occupational Medicine and Industrial Hygiene, National Taiwan University College of Public Health, Taipei, Taiwan

<sup>5</sup> Institute of Epidemiology and Preventive Medicine, National Taiwan University College of Public Health, Taipei, Taiwan

### ***Abstract:***

Lung function is a very important index of respiratory health. Weight gain and air pollution both can have adverse effect on lung function. The objective of this study is to assess the modifying effect of air pollution patterns on weight gain related to reducing lung function. The study design was a retrospective birth cohort through linking birth registry record (birth weight and gestational age) and nation-wide junior high school student respiratory health survey database in central Taiwan. The study subjects were based on 10% of random sampling. For robust exposure assessments, we excluded the subject who had ever moved during the follow up in the analysis. Air pollution data including SO<sub>2</sub>, CO, O<sub>3</sub>, NO<sub>2</sub> and PM<sub>10</sub> were collected by high-density Taiwan Environmental Protection Administration monitoring stations. Multiple regressions were used, the adjusted variables including sex, age, height, weight, parental education level, family smoking, incense burning, exercise and temperature. Obesity was related to reducing lung function. Low birth weight had the similar effect. Obese adolescents who were born with low birth weight might have the most adverse effect on lung function. Furthermore, air pollution patterns might modify the effect. It is necessary to protect public from the adverse effect of weight gain, especially considering the potential interaction with air pollution patterns.