

## **The Effect of COVID-19 Preventive Policy and Epidemic Status on Carcinogenic Metal Exposure Levels Around Taiwan's Special Industrial Parks**

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**Introduction:** During the COVID-19 pandemic, economic activities have undergone significant changes due to the pandemic itself or preventive policies. This study primarily investigated whether the concentrations of carcinogenic metals around special industrial parks in Taiwan have experienced any changes because of lockdown policy and epidemic status. **Methodology:** This study selected five air monitoring stations closest to Taiwan's five special industrial parks, collecting daily concentrations of four carcinogenic metals including As, Cr(VI), Ni, and Pb from 2019 to 2022. Use ANOVA analysis to compare the carcinogenic metal concentrations in different lockdown periods in 2021 (pre: 3/12-5/18, during: 5/19-7/25, post: 7/26-10/1) and different pandemic states (pre-pandemic: 2019, early-pandemic: 2020, lockdown-period: 2021, outbreak-period: 2022). **Result:** As to the lockdown period, only Cr(VI) showed a significant decrease of 12.9% compared to the pre-alert period, and its concentration only rebounded by 0.9% after the alert. From different pandemic states, data of the same lockdown period for each year from 2019 to 2022 were analyzed. Compared to the pre-pandemic, only the concentration of Cr(VI) significantly decreased by 13.5% in lockdown-period. As to early-pandemic, the concentrations of As, Ni, and Cr(VI) showed a significant decrease in lockdown-period, with As having the most reduction of 22%. In addition, the concentrations of Pb and Cr(VI) showed a significant increase in outbreak-period when compare to lockdown-period, with Pb increasing by up to 11%. **Conclusion:** Exposure to some carcinogenic heavy metals has indeed been affected by changes in epidemic prevention policies or status. The different changes of each pollutant need to be further explored in terms of the types and emission conditions of each industry area. **Significance of the study:** This study applied carcinogenic metals to conduct in-depth observation on the changes in the health risks of surrounding residents under different epidemic prevention policies and changes in the epidemic.

**Keywords:** Carcinogenic Metal, Special Industrial Parks, COVID-19, Lockdown, Pandemic