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Phnom Penh air is dangerously polluted!

Air quality in Phnom Penh is badly polluted. A recent study conducted by the Royal University of Phnom Penh shows that harmful particulate matters in the air concentrations or PM2.5 reading was 46 $\mu g/m^3$ micrograms per cubic meter, exceeding the air quality standard recommended by the World Health Organization at 25 micrograms per cubic meters.

Phnom Penh city areas are not equally polluted. The study shows that busy road conjunctions and construction sites are more polluted than city center areas. The high polluted areas include Chroy Chang Va roundabouts, Deoum Kor Market, Diamond Island, 60th Street and AEON 2. These areas have busier road traffics, more construction activities going on, open landfilled and dusty roads. City center areas such as the river fronts and the Independence Monument are less polluted. These areas have fewer construction activities, less traffics, cleaner roads and more green space areas.

PM2.5 refers to particles in the air with a diameter of less than 2.5 micrometers, or around 3% the diameter of a hair. The small harmful particulate matters originate from many sources including emission from vehicles, dusty roads, construction sites and open landfilled areas. Recent rapid development and urbanization in Phnom Penh leads to high level of PM2.5.

High PM2.5 concentrations are dangerous because they can easily enter our lungs and respiratory systems and they can make asthma, bronchitis and other respiratory problems worse. PM2.5 is linked to early death from heart and lung disease. Children and seniors are more vulnerable to air pollution due to their weak respiratory systems. According to a 2018 Global Air report by the US-based Health Effects Institute, globally, PM2.5 contributed to 4.1 million

deaths from heart disease, stroke, lung cancer, chronic lung disease and respiratory infections in 2016. The report highlighted that PM2.5 is even more dangerous than other more well-known risk factors such as alcohol consumption, physical inactivity, or high sodium intake and equivalent number of attributable deaths as high cholesterol and high body mass index. In Cambodia, PM2.5 is responsible for 5,915 human deaths or 72.6 deaths per 100,000 people in 2016, higher than the global death rate. Globally, the average deaths from PM2.5 is 62.5 deaths per 100,000 people.

It is important that PM2.5 concentration level be kept below WHO's air quality threshold at 25 micrograms per cubic meter. To reduce PM2.5 concentrations and make the city air fresher, the study proposed four recommendations.

1. All construction sites are required to cover with blue nets to prevent small particulate matters or dusts from flying out. Big construction sites are usually covered with blue nets but small constructions sites are not.
2. Trucks that carry dirt in and out the city should be covered with net to prevent dirt from falling on the streets.
3. The city should frequently wash all streets, especially in dry season. Dusty roads affect health of road travelers. Cleaning and sweeping may not reduce PM2.5 concentrations.
4. The city should build more green space areas and grow more trees, which help absorb small particles in the air.

The study was conducted in different parts of the city including schools, parks, markets, residence areas and construction sites. It is an outdoor air pollution study. Airbeam device was used to measure air quality. The research team traveled by tuk tuk at a speed of 20-30km/h with their airbeam on to record PM2.5 concentrations in the city. The study was conducted from March to May 2018. This study was supported by the Urban Climate Resilience in South East Asia (UCRSEA) project.