



## General Meeting and Air Quality Conference

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### Spatio-temporal trends of air quality in Kampala City, 2020–2022

**Background:** Fine particulate matter (PM<sub>2.5</sub>) has been recommended as the best measure of air quality. We assessed the spatio-temporal trends of air quality based on PM<sub>2.5</sub> concentrations in Kampala City.

**Methods:** PM<sub>2.5</sub> concentrations generated by 25 Clarity Node Solar-Powered monitors from January 1, 2020–June 30, 2022 were abstracted from the Clarity dashboard. We computed 24-hour average PM<sub>2.5</sub> concentration at city and division levels. Average PM<sub>2.5</sub> concentrations were compared by hour of the day to understand the variations in air quality throughout the day. Seasonal Mann-Kendall statistical test was applied to assess the trend of 24-hour average PM<sub>2.5</sub> concentrations.

**Results:** Overall, the 24-hour average PM<sub>2.5</sub> from January 1, 2020–June 30, 2022 was 59 µg/m<sup>3</sup> (range: 18–182 µg/m<sup>3</sup>) in Kampala City. High PM<sub>2.5</sub> concentrations were observed in all divisions of the city: Kawempe (63 µg/m<sup>3</sup>), Central (61 µg/m<sup>3</sup>), Rubaga (60 µg/m<sup>3</sup>), Nakawa (55 µg/m<sup>3</sup>) and Makindye (52.7 µg/m<sup>3</sup>). Two PM<sub>2.5</sub> concentration peaks were observed from 10am–midday (73.2–72.9 µg/m<sup>3</sup>) and 8pm–9pm (73.3–77 µg/m<sup>3</sup>). There was a negligible but significant decreasing trend from January 2020 to June 2022 ( $r = -0.27$ ,  $p < 0.001$ ). PM<sub>2.5</sub> increased during April–June throughout all evaluation years [2020 ( $r=0.56$ ,  $p=0.006$ ), 2021 ( $r=0.26$ ,  $p=0.030$ ), and 2022 ( $r=0.37$ ,  $p=0.030$ )]. Significant decreasing trends were observed during July–September, 2021 ( $r=-0.43$ ,  $p=0.008$ ) and January–March, 2022 ( $r=-0.41$ ,  $p=0.011$ ).

**Conclusion:** Unhealthy air quality evidenced by PM<sub>2.5</sub> concentrations exceeding the WHO targeted “safe” level was observed even during times of less traffic and economic activities in Kampala City.

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