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Title: Heart rate and ventilation in a group of burned sugar cane cutters (Brazil): Estimative of particulate matter (PM_{2,5}) exposure load

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Body: Introduction: The sugar cane harvesting exposes workers to pollutants released by sugar cane burning held hours before. The workers earn per ton cut, what carries considerable physical effort with consequent increase in heart rate (HR) and ventilation (Ve). The HR keeps a good correlation with oxygen uptake and consequently with Ve. Its measurement is a useful method to estimate Ve, which allows estimating the exposure load of pollutants. Objectives: Develop an equation of the linear correlation between HR and Ve and apply it to estimate the pollutant exposure load in sugar cane cutters. Methods: Was developed an equation of the regression line, through data from HR and Ve obtained in ergoespirometry tests of 26 sugar cane cutters. The equation was used to estimate the exposure load in another group of 84 cutters, after registration of HR (using POLAR), during a working day, with concomitant registration of PM_{2,5} environmental concentration. Results: The PM_{2,5} average concentration was 61 µg/m³ (IIQ: 41.3-86.8 µg/m³). The individual equations obtained from the 26 workers, showed a high correlation with average R²=0.9. The general equation (26) =0.97548+0.01965-LogVe5xCF, showed lowest correlation: R²=0.78. The estimation of exposure/ workday in the group of 84 workers ranged from 282.5 to 1140.1 µg/m³ (677.4 ± 190.7 µg/m³). Discussion/Conclusion: Exposure to pollutants was high and there was great variation in daily load exposure among workers. Although the general equations are less suitable than the individual equation to estimate the pollutants load inhaled by an individual, it can help in exposure estimation in population groups.