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Smokefree policies and particulate matter air pollution in hospitals and universities in Kazan, Russia

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OBJECTIVES: Smokefree policies are an effective measure to protect people from secondhand smoke exposure; however, monitoring enforcement is a challenge. An exploratory study aimed to assess particulate matter air pollution and to evaluate additional opportunities provided by the Personal Aerosol Monitor measuring particulate matter (PM_{2,5})

METHODS: Fine particulate matter (PM_{2,5}) air pollution was assessed with the use of TSI SidePak AM510 Personal Aerosol Monitor in the premises and on the territory of three city hospitals and eight universities in Kazan, Russia. ANOVA and General Linear Model analysis was used to explore factors which account for PM_{2.5} levels.

RESULTS: In places where smoking occurred, PM_{2,5} concentrations were dangerous even for short-term presence of healthy people. Typical places of smoking were identified which included toilets and stairs in hospitals, toilets, corridors and hallways, as well as dormitory kitchens in universities.

In those premises where smoking was not happening but to which tobacco smoke penetrated from the smoking areas, PM_{2,5} concentrations measured were beyond the levels considered healthy for vulnerable groups of people.

In those universities where smoking was banned, PM_{2,5} measured at the entrances did not demonstrate excess concentrations, which shows that no compensatory outdoor smoking happens in smokefree universities.

In the wards and personnel rooms in hospitals, as well as in those auditoriums if smoking was not practiced there and no tobacco smoke air pollution was documented in neighboring premises, the air quality was close to the recommended standards.

The air on the territory of three hospitals and eight universities had different PM_{2,5} concentrations due to transport, industrial and heating sources of pollution; however, its quality influenced the inner air PM_{2,5} concentrations only in those premises where no smoking took place.

PM_{2,5} concentrations measured at upper floors were on average higher than those at lower floors, which might be accounted for both by smoking and ventilation factors.

It was shown that tobacco smell is a sensitive indicator which can be used where personal aerosol monitor is not available.

CONCLUSIONS: Smokefree workplaces have particulate matter concentrations determined by the outdoor air quality and reliably protect personnel and visitors from PM_{2,5}-associated risks. Ban of smoking within educational buildings does not cause compensatory smoking outdoors.

Implementation: Ways to assess air quality need to include measurements in the designated sets of premises on different floors. Premises which typically were used for smoking or were polluted from other premises need to be included. Outdoor air quality needs to be taken into account.

Smokefree policies in universities and hospitals should cover all premises and comprise toilets, stairs, student dormitories, personnel rooms, and territory near the entrances.

PM_{2,5} measurements are recommended to be incorporated in the complex sanitary assessment of hospitals and educational institutions.