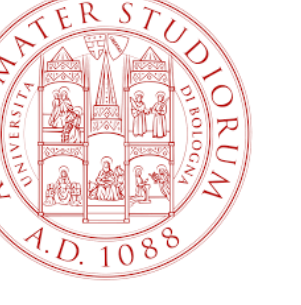


EXPOSURE ASSESSMENT TO AIR POLLUTANTS: a WFH (Working From Home) case study



F. Borghi^{1,2}; A. Spinazzè^{2*}; G. Fanti²; A. Albareda²; J. Ghiraldini²; D. Campagnolo²; A. Carminati²; M. Keller²; S. Rovelli²; C. Zellino²; G. De Vito³; A. Cattaneo²; D.M. Cavallo².

¹Department of Medical and Surgical Sciences, University of Bologna, Bologna, Italy

²Department of Science and High Technology, University of Insubria, Como, Italy

³Department of Medicine and Surgery, University of Insubria, Varese, Italy

*andrea.spinazze@uninsubria.it

1

PROBLEM STATEMENT

Working From Home (WFH) is becoming increasingly common, necessitating a careful evaluation of the health of WFH workers during this mode of work, in terms of, for example, indoor air quality, thermal comfort, visual comfort, acoustic comfort.

2

AIMS

As far as the authors know, no studies have yet been conducted specifically on the evaluation of the differences between WFO (Working from Office) WFH conditions, in terms of **exposure assessment to air pollutants**: for this reason, the main aim of this study is to **quantitatively evaluate the differences, in terms of exposure to atmospheric pollutants (different PM fractions), between these two working conditions.** More in detail, the questions this work seeks to answer are the following:

- Which working condition (WFH or WFO) most exposes the workers to the selected airborne pollutants?
- Which activities performed by workers have the greatest impact on their exposure?

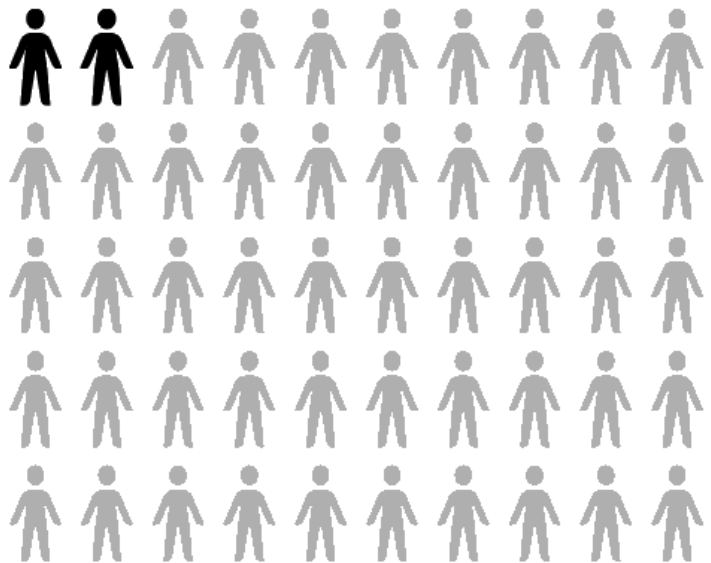
3

METHODS

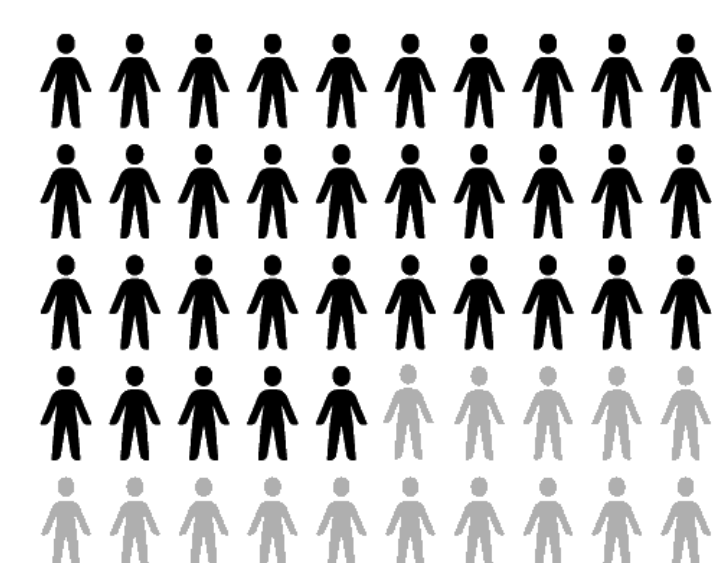
Personal exposure to size-fractionated PM through direct-reading instruments

Two different study designs [to balance (i) data quality; (ii) data N; (iii) spatial variability; (iv) temporal variability]

Long-term campaign

	2 consecutive weeks		
	Jan.	Feb.	Mar.
	Apr.	May	June
	Jul.	Aug.	Sept.
	Oct.	Nov.	Dec

Short-term campaign

	2 consecutive days		
	Jan.	Feb.	Mar.
	Apr.	May	June
	Jul.	Aug.	Sept.
	Oct.	Nov.	Dec.

4

RESULTS

Which working condition (WFH or WFO) exposes the worker most to the selected air pollutants?

- Long-term campaign: the subject in WFH mode is always more exposed to higher PM concentration, compared to the WFO subject (up to **4 times**).
- Short-term campaign: the 35 subjects who took part in the study were clearly **divided into two groups**: subjects most exposed during the WFH mode (53% of subjects) and subjects most exposed during the WFO mode (47% of subjects).

Which activities performed by workers have the greatest impact on their exposure?

- Long-term campaign: **specific activities** performed by the subjects impacted their exposure concentrations to PM (e.g., commuting for WFO subject; meal preparation for WFH subject). For both subjects, the activity that contributed most to the total exposure was desk work, due to the prolonged time spent performing this activity.
- Short-term campaign: desk work shows important **differences**, in terms of exposure concentration levels, in the two groups of subjects.

5

TAKE HOME MESSAGE

As remote work becomes more common, it is important to identify and address potential workplace-specific risk factors in these “new offices”. Thoroughly investigating the experience of workers involved in remote working mode, it would be possible to **maximize the positive aspects of this working model, minimizing the risks for employees.**