

# Assessment of seasonal airborne resistome dynamics in response to air pollution exposure in the Belgrade metropolitan area (AirPollRes)

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Antimicrobial resistance (AMR) and air pollution have been identified as one of the most serious threats to human health worldwide. The scarce data demonstrating their interdependence indicates a need to obtain evidence from a broader global area, especially from regions exposed to high air pollution. Considering that Serbia is a country struggling with excessive antibiotics use and misuse, a high percentage of multidrug-resistant bacterial isolates, and poor air quality, the Serbian capital Belgrade has been recognized as an interesting research model for the effects of air pollution on the airborne transmission of AMR. After optimization of air sampling and DNA extraction protocol, the air samples will be collected at nine locations in the Belgrade metropolitan area selected according to air pollution level during four seasons. The state-of-the-art shotgun metagenomic sequencing and bioinformatic analysis of obtained sequences will provide information about microbial community composition of airborne metagenomes. In addition, sequenced airborne metagenomes will be analyzed for the abundance and diversity of resistomes (antibiotic and biocide/metal resistance genes) and mobilomes using several databases and tools. Correlation analyses will offer us insight into the effect of air pollution and seasonal variations on abundance and diversity of airborne pathogens, resistome and mobilome in the Belgrade metropolitan area. In-depth approach of the AirPollRes project will provide the first insights into intersection of AMR and air pollution in the Belgrade metropolitan area, which is highly vulnerable to these health threats. As the AirPollRes is a pioneering project in this field, the expected short-term impact is the introduction of routine monitoring of pathogenic microbes and resistance determinants in the air in Belgrade, while the longer-term impact will be reflected in the improvement of human and animal health, allowing for a longer life with higher quality.