

# METEOROLOGICAL FACTORS AND POPULATION HEALTH IN SOUTH OF RUSSIA

Elena Evstafeva, Vladimir Lapchenko\*, Olga Zalata, Svetlana Tymchenko, Anna Bogdanova

V.I. Vernadsky Crimean Federal University, Simferopol;

Federal State Budget Scientific Institution «Karadag Scientific Station T.I. Vyazemsky, Nature Reserve of RAS», Feodosia

## Introduction

Numerous researchers have suggested that climate change affects the public health, but its impact on cardio-respiratory system remains relatively unexplored.

Possible effects of meteorological factors on population health were assessed based on daily fluctuations of meteorological parameters related to the incidences of a life threatening conditions, such as cardiovascular or respiratory emergencies in April, July, October 2017 and January 2018 in Simferopol, Crimea.

**The aim of this study** was to assess the influence of meteorological factors on population health based on the daily fluctuations of meteorological parameters compared to the number of ambulance call-outs on cardiovascular or respiratory emergency incidents.

## Methodology

Spearman correlation analysis was used to explore the association between the meteorological factors and the number of ambulance call-outs for the cardiovascular or respiratory emergencies and selected physiological parameters.

### Conflict of interest.

The authors declare that there is no conflict of interest regarding the publication of this article.

## Results and discussions

Daily ground level ozone concentrations in the air along the coast of the Crimean peninsula on average significantly exceeded the maximum permissible values ( $30 \mu\text{g}/\text{m}^3$ ) and absolute daily values were ranging from 8 to  $135 \mu\text{g}/\text{m}^3$  in different seasons throughout 2017.

Significant correlations were revealed between the number of ambulance call-outs due to bronchial asthma attacks, acute coronary syndrome, stroke, hypertensive crisis and daily ground level ozone concentrations, temperature, humidity of the atmospheric air (Fig. 1).

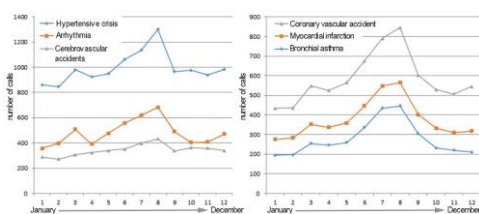


Fig. 1. Annual dynamics of emergency ambulance calls

Associations were also determined between arrhythmia and wind velocity ( $0.55 < r < 0.82$ ,  $p < 0.05$ ) with the maximal number of ambulance call-outs recorded in July when the highest temperature and daily ground level ozone concentrations were observed (Fig. 2, 3).

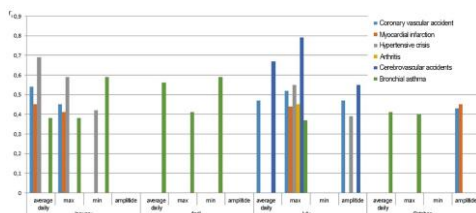


Fig. 2. Correlations between emergency ambulance calls and ground-level ozone concentration

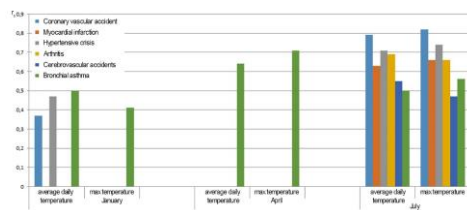


Fig. 3. Correlations between temperature indicators and the number of emergency ambulance calls in different seasons of the year

## Results

### and discussions

Examination of the functional parameters in patients with cardiovascular diseases and in healthy individuals showed significant correlations between the number of ventricular extrasystoles and wind velocity ( $0.56 < r < 0.64$ ,  $p < 0.05$ ).

Stress index used to assess the cardiac regulation was associated with temperature ( $0.26 < r < 0.46$ ,  $p < 0.01$ ), atmospheric pressure ( $r = -0.35$ ,  $p = 0.02$ ), air humidity ( $r = -0.49$ ,  $p = 0.0006$ ) and daily ground level ozone concentrations ( $r = -0.38$ ,  $p = 0.02$ ) suggesting decreased parasympathetic activity in healthy people.

## Conclusions

Correlations between meteorological factors such as temperature, atmospheric pressure and daily ground level ozone concentrations play the most significant role for the functional parameters and are associated with a higher rate of life threatening conditions, such as cardiovascular or respiratory emergencies in population on the south of Russia.

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