



# UFIREG

Ultrafine particles –  
cooperation with environ-  
mental and health policy

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Issue 10 / September 2014

## 10<sup>TH</sup> NEWSLETTER

SOCIO-DEMOGRAPHICAL AND EPIDEMIOLOGICAL DATA OF THE FIVE UFIREG CITIES /  
SOCIODEMOGRAFSKI IN EPIDEMIOLOŠKI PODATKI V PETIH SODELUJOČIH MESTIH

UFIREG investigates the association between ultrafine particles, mortality and morbidity in five Central European cities: Dresden and Augsburg (Germany), Prague (Czech Republic), Ljubljana (Slovenia) and Chernivtsi (Ukraine). In order to do so, during the course of the UFIREG project partners have been measuring ultrafine particles and other air pollutants in these cities. In addition, project partners have collected and prepared socio-demographic and epidemiological data of their cities for the analyses.

The 5<sup>th</sup> UFIREG Newsletter (October 2012) introduced hospital admission and mortality statistics as the two main national databases for obtaining information on cause-specific morbidity and mortality. The present newsletter provides a brief description of socio-demographical and epidemiological data of the UFIREG cities.

Projekt UFIREG raziskuje povezavo med ultrafinimi delci, umrljivostjo in obolezlostjo v petih srednjeevropskih mestih: v Dresdnu (Nemčija), Augsburgu (Nemčija), Pragi (Češka), Ljubljani (Slovenija) ter Černivcih (Ukrajina). V teh mestih so projektni partnerji merili ultrafine delce in druga onesnažila v zraku. Poleg meritev so projektni partnerji, za namene raziskave, v vseh sodelujočih mestih zbirali tudi sociodemografske in epidemiološke podatke

V petem glasilu projekta UFIREG (oktober 2012) so bili, kot glavni uradni statistični podatkovni bazi za pridobivanje informacij o vzrokih specifičnih obolenj in umrljivosti, predstavljeni podatki o hospitalizaciji in umrljivosti. V tem glasilu pa so na kratko predstavljeni socialno-demografski in epidemiološki podatki za mesta, ki sodelujejo pri projektu UFIREG.

## SOCIO-DEMOGRAPHICAL DATA/

## SOCIODEMOGRAFSKI PODATKI

Socio-demographical data such as number of inhabitants, population density or number of newborns and deceased persons is used to describe the population in the cities involved in the project. Socio-demographical information for all five cities is available on a yearly basis (Table 1).

Prague is the largest of the five UFIREG cities with about 1.2 million inhabitants and an area of almost 500 km<sup>2</sup>. Dresden is the second largest city in the UFIREG project with about 500,000 inhabitants within an area of more than 300 km<sup>2</sup>. The number of inhabitants in Augsburg, Ljubljana and Chernivtsi is comparable and ranged from about 260,000 to 280,000 inhabitants during the study period. Ljubljana, however, is larger than Augsburg and Chernivtsi with an area of 275 km<sup>2</sup>. In all cities, except Augsburg, the number of newborns was higher than the number of deceased persons during the respective study periods. The percentages of women and men are similar in all cities with about 52% women and 48% men. In Chernivtsi 11% of the population are 65 years or older, whereas in the other cities the number of people who are 65 years or older ranges from 18% in Prague and Ljubljana to 20% and 22% in Augsburg and Dresden, respectively.

The project partners also collected information on lifestyle factors such as smoking which might be important for the interpretation and discussion of the results of the UFIREG analyses. According to the WHO Report on the Global Tobacco Epidemic 2013, the Czech Republic showed the highest prevalence of tobacco smoking of countries within the study with 36.9% followed by the Ukraine with 28.8% in 2012. The prevalence of cigarette smoking was similar in both countries (Czech Republic: 29.0%; Ukraine: 28.6%). In the same year, the prevalence of tobacco smoking in Germany was 25.7% and in Slovenia 25.4%. For these two countries, the prevalence of cigarette smoking was the same as the prevalence of tobacco smoking.

Za opis populacije v sodelujočih mestih so bili uporabljeni socialno-demografski podatki, kot so število prebivalcev, gostota prebivalstva ter število smrti in rojstev. Sociodemografski podatki za vseh pet mest, ki sodelujejo pri projektu UFIREG, so na voljo na letni ravni (Tabela 1).

Največje mesto izmed petih sodelujočih mest je Praga z 1,2 milijona prebivalcev in površino skoraj 500 km<sup>2</sup>. Dresden je z 500.000 prebivalci in površino več kot 300 km<sup>2</sup> drugo največje mesto. Število prebivalcev v Augsburgu, Ljubljani in Černivcih je primerljivo. V času raziskave je bilo število prebivalcev v teh mestih med 260.000 in 280.000. Ljubljana pa je kljub temu, s površino 275 m<sup>2</sup>, večja od Augsburga in Černivcev. V vseh mestih, razen Augsburgu, je število rojstev v obdobju raziskave preseglo število umrlih oseb. Odstotek žensk in moških je podoben v vseh mestih, in sicer 52% žensk in 48% moških. Delež prebivalcev, ki so stari najmanj 65 let je v Černivcih 11%. V ostalih mestih je ta delež malo višji, v Pragi in Ljubljani 18%, v Augsburgu 20% in v Dresdnu 22%.

Projektne partnerji so pridobili tudi podatke o dejavnih življenjskega sloga, kot je kajenje. Ti podatki bi lahko bili pomembno pri interpretaciji in razpravi o rezultatih raziskave projekta UFIREG. Glede na poročilo Svetovne zdravstvene organizacije o Svetovni tobačni epidemiji 2013 je bila na Češkem v letu 2012 razširjenost kajenja tobaka najvišja z 36,9%. Takoj za Češko je Ukrajina z razširjenostjo kajenja tobaka 28,8%. Razširjenost kajenja cigaret je podobna pri obeh državah tj. 29,0% na Češkem in 28,6% v Ukrajini. V istem letu je bil delež razširjenosti kajenja tobaka v Nemčiji 25,7% in v Sloveniji 25,4%. V obeh državah je bila razširjenost kajenja tobaka enaka razširjenosti kajenja cigaret.

Mesto	Leto	Št. prebivalcev	Površina mesta (km <sup>2</sup> )	Gostota prebivalcev*	Rojstva	Smrti
Augsburg	2011	266 647	146.9	1815.8	2253	2820
	2012	272 699	146.9	1857.0	2465	2950
Dresden	2011	517 765	328.3	1577.1	5907	4772
	2012	525 105	328.3	1599.4	6001	5040
Ljubljana	2012	280 607	275.0	1020.4	3084	2272
	2013	282 994	275.0	1029.1	2982	2242
Praga	2012	1 246 780	496.2	2512.7	14176	12411
	2013	1 243 201	496.2	2505.4	13867	12149
Černivci	2013	258 371	153.0	1688.7	2751	2447

\* Inhabitants/km<sup>2</sup>

\* Prebivalcev/km<sup>2</sup>

**Table 1: Socio-demographical information of the five UFIREG cities**

**Table 1: Sociodemografski podatki petih sodelujočih mest**

## DESCRIPTION OF EPIDEMIOLOGICAL DATA / OPIS EPIDEMIOLOŠKIH PODATKOV

With regard to the epidemiological data used for the analyses in UFIREG, daily counts of (cause-specific) deaths and hospital admissions were obtained from official statistics for all cities other than Chernivtsi. In Chernivtsi data on hospital admissions was collected directly from the hospitals.

The main diagnosis and cause of death, respectively, are based on the International Statistical Classification of Diseases and Related Health Problems (ICD-10). Deaths due to natural causes (ICD-10: A00-R99), and deaths and hospital admissions due to cardiovascular (ICD-10: I00-I99) and respiratory diseases (ICD-10: J00-J99) are investigated as primary outcomes. Moreover, hospital admissions due to diabetes (ICD-10: E10-E14) are examined.

To date, mortality data for the following periods is available from official statistics (Table 2):

- Augsburg and Dresden: 2011-2012
- Ljubljana: 2012-2013
- Prague; 2012
- Chernivtsi: 2013

Osnova za epidemiološke raziskave v okviru projekta UFIREG je število smrti in hospitalizacij zaradi specifičnega vzroka. Ti podatki so za vsa mesta na voljo na dnevni osnovi preko statističnih uradov, le v Černivcih so bili podatki o hospitalizaciji pridobljeni neposredno iz bolnišnic.

Opis glavne diagnoze ali vzroka smrti temelji na mednarodni klasifikaciji bolezni in drugih, z zdravjem povezanih stanj (ICD-10). Glavni predmet analize so smrti zaradi naravnih vzrokov (MKB-10: A00-R99), smrti in hospitalizacije zaradi bolezni srca in ožilja (ICD-10: I00-I99) in bolezni dihal (ICD-10: J00-J99). V raziskavo so vključene tudi hospitalizacije zaradi sladkorne bolezni (ICD-10: E10-E14).

Uradni statistični podatki so na voljo za naslednja obdobja (Tabela 2):

- Augsburg in Dresden: 2011-2012
- Ljubljana: 2012-2013
- Praga: 2012
- Černivci: 2013

City	Year	Mortality due to					
		Total natural mortality		Cardiovascular diseases		Respiratory diseases	
		N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
Augsburg	2011	2510	6.9 (2.5)	1114	3.1 (1.7)	186	0.5 (0.8)
	2012	2620	7.2 (2.8)	1142	3.1 (1.7)	133	0.4 (0.6)
Dresden	2011	4564	12.5 (3.6)	2066	5.7 (2.4)	261	0.7 (0.9)
	2012	4808	13.1 (3.8)	2116	5.8 (2.5)	258	0.7 (0.9)
Ljubljana	2012	2112	5.8 (2.5)	832	2.3 (1.5)	136	0.4 (0.6)
	2013	2081	5.7 (2.4)	848	2.3 (1.5)	114	0.3 (0.5)
Praga	2012	9939	27.2 (5.7)	5018	13.7 (4.1)	565	1.5 (1.3)
Černivci	2013	2310	6.3 (2.7)	1556	4.3 (2.1)	45	0.1 (0.4)

N: number of cases / Število primerov

SD: standard deviation / Standardni odklon

natural causes / naravni vzroki: ICD-10: A00-R99

cardiovascular diseases / Bolezni srca in ožilja: ICD-10: I00-I99

respiratory diseases / bolezni dihal: ICD-10: J00-J99

**Table 2: Description of city-specific (cause-specific) mortality outcomes**

**Tabela 2: Umrljivost v sodelujočih mestih**

There were about 2,500 deaths due to natural causes in Augsburg, 4,500 in Dresden, 2,000 in Ljubljana, 10,000 in Prague and 2,300 in Chernivtsi per year. In Augsburg, Dresden and Ljubljana 40% to 45% of deaths were due to cardiovascular diseases in the respective study periods. In Prague 50% of deaths occurred because of cardiovascular causes in 2012. With 67% most of the natural death cases in the year 2013 were due to cardiovascular diseases in Chernivtsi. In all cities, except Chernivtsi, 5% to 7% of natural mortality was attributed to respiratory diseases. In Chernivtsi the proportion of deaths due to respiratory diseases was only 2% in 2013.

V proučevanem obdobju je bilo naravnih smrti na leto v Augsburgu 2.500, 4.500 v Dresdnu, 2.000 v Ljubljani, 10.000 v Pragi in 2.300 v Černivcih. V enakem obdobju je bilo v Augsburgu, Dresdnu in Ljubljani 40% do 45% smrti zaradi bolezni srca in ožilja. V Pragi je bil delež smrti zaradi bolezni srca in ožilja 50%, najvišji pa je bil v Černivcih in sicer 67%. V vseh mestih, razen v Černivcih, je bilo 5% - 7% smrti zaradi bolezni dihal. V Černivcih je bil ta delež v letu 2013 le 2%.

Mesto	Leto	Hospital admissions due to					
		Cardiovascular diseases		Respiratory diseases		Diabetes	
		N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
Augsburg	2011	7127	19.5 (8.5)	4162	11.4 (6.3)	785	2.2 (1.8)
	2012	7199	19.7 (8.8)	4130	11.3 (6.4)	806	2.2 (1.7)
Dresden	2011	12414	34.0 (12.6)	5216	14.3 (5.8)	1123	3.1 (2.1)
	2012	12569	34.3 (13.3)	5168	14.1 (6.3)	1148	3.1 (2.2)
Praga	2012	8176	22.3 (8.7)	2893	7.9 (4.0)	521	1.4 (1.2)
	2013	8860	24.3 (8.1)	3573	9.8 (4.8)	552	1.5 (1.3)
Ljubljana	2012	5256	14.4 (7.2)	3013	8.2 (4.6)	225	0.6 (0.8)

N: number of cases / Število primerov

SD: standard deviation / Standardni odklon

cardiovascular diseases / Bolezni srca in ožilja: ICD-10: I00-I99

respiratory diseases / bolezni dihal: ICD-10: J00-J99

diabetes / Sladkorna bolezen: ICD-10: E10-E14

**Table 3: Description of city-specific cause-specific hospital admissions**

**Tabela 3: Hospitalizacije v sodelujočih mestih**

So far, hospital admissions data is available for Augsburg (2011-2012), Dresden (2011-2012), Prague (2012-2013) and Ljubljana (2012) (Table 3). During the respective study periods, there were about 7,000 cardiovascular hospital admissions in Augsburg, 12,500 in Dresden, 8,500 in Prague and 5,000 in Ljubljana per year. Respiratory diseases accounted for roughly 4,000 hospital admissions in Augsburg, 5,000 in Dresden, 3,200 in Prague and 3,000 in Ljubljana.

The associations between ultrafine and fine particles and mortality or hospital admissions are currently investigated for each city separately by use of Poisson regression models allowing for overdispersion. A basic confounder model was set up a priori for all cities. Models are adjusted for time trend (count of study days), day of the week, feast, vacation periods, influenza epidemics, air temperature and relative humidity. Single time lags from lag 0 (same day of the event) up to lag 5 (five days prior to the event) are investigated. Moreover, cumulative lags chosen a priori are examined in order to represent immediate effects (2-day average: lag 0-1), delayed effects (average of lag 2-5) and prolonged effects (6-day average: lag 0-5). City specific effect estimates are then pooled using meta-analyses methods.

Podatki o hospitalizacijah so na voljo za Augsburg (2011-2012), Dresden (2011-2012), Prago (2012-2013) in Ljubljano (2012) (Tabela 3). V času proučevanja je bilo letno zaradi bolezni srca in ožilja okoli 7.000 hospitalizacij v Augsburgu, 12.500 v Dresdnu, 8.500 v Pragi in 5.000 v Ljubljani. Zaradi bolezni dihal je bilo v bolnišnico sprejetih približno 4.000 ljudi v Augsburgu, 5.000 v Dresdnu, 3.200 v Pragi in 3.000 v Ljubljani.

Trenutno poteka raziskava o povezavi med ultrafinimi ter finimi delci in umrljivostjo ter hospitalizacijo za vsako mesto posebej. Pri analizi se uporabljajo Poissonovi regresijski modeli, ki omogočajo proučevanje zelo razpršenih podatkov. Za ta namen, je bil določen osnovni model za obvladovanje motečih dejavnikov, enak za vsa mesta. Model proučevanja je prilagojen glede na časovni trend (število preiskovanih dni), dan v tednu, praznike, čas počitnic, epidemijo gripe, temperaturo zraka in relativno vlažnost. Preiskujejo se časovni zamiki od 0 (isti dan kot dogodek) do zamika 5 (pet dni pred pojavom smrti ali hospitalizacije). Poleg tega so bili izbrani kumulativni časovni zamiki, z namenom vrednotenja tudi takojšnjih učinkov (2-dnevno povprečje: zamik 0-1), učinkov z zakasnitvijo (povprečje: zamik 2-5) in dolgotrajnih učinkov (6-dnevno povprečje: zamik 0-5). Ocene učinkov za vsako mesto posebej so nato združene z metodami metaanalize.

Currently, UFIREG analyses of short-term health effects of ultrafine particles on mortality and morbidity in the cities participating in the project are ongoing. Within the next months, UFIREG project partners are due to present the results at national conferences in their respective countries.

In addition, UFIREG project partners will hold an [International Conference on Ultrafine Particles and Health](#) on 28 November 2014 in Dresden, Germany. More information, an option for registration and a poster abstract submission form are available on the project website: [www.ufireg-central.eu](http://www.ufireg-central.eu).

Trenutno je v teku analiza kratkoročnih učinkov ultrafinih delcev na umrljivost in obolevnost v mestih, ki sodelujejo pri projektu. V naslednjih mesecih bodo partnerji projekta UFIREG predstavili rezultate projekta na nacionalnih konferencah v svojih državah.

Projektne partnerje projekta UFIREG pa bodo organizirali tudi [mednarodno konferenco o ultrafinih delcih in zdravju](#), ki bo potekala 28.11.2014 v [Dresdnu, Nemčija](#). Več informacij, možnost za registracijo in obrazec za oddajo povzetkov plakatov so na voljo na spletni strani projekta: [www.ufireg-central.eu](http://www.ufireg-central.eu).

### References / Reference

Augsburg: Statistical yearbook of Augsburg (socio-demographic data); Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Death Statistics 2011-2012 (mortality); Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Hospital Statistics 2011-2012 (hospital admissions)

Dresden: 2011 census, Statistical Office of the Free State of Saxony (socio-demographic data); Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Death Statistics 2011-2012 (mortality); Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, Hospital Statistics 2011-2012 (hospital admissions)

Ljubljana: Statistical Office of the Republic of Slovenia (socio-demographic data, hospital admissions); National Institute of Public Health (NIJZ) (mortality)

Praga: Institute of Health Information and Statistics of the Czech Republic

Černivci: Main Statistic Department in Chernivtsi region (socio-demographic data and mortality data), statistical offices of hospitals of Chernivtsi (hospital admissions)

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For further information on the project's objectives, please refer to our previous newsletters or visit the project website [www.ufireg-central.eu](http://www.ufireg-central.eu).

Dodatne informacije o vsebini projekta so vam na voljo v naših prejšnjih glasilih in na spletni strani projekta [www.ufireg-central.eu](http://www.ufireg-central.eu).

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