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Data Article

Infodemiological data concerning silicosis in the USA in the period 2004–2010 correlating with real-world statistical data

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ABSTRACT

This article reports data concerning silicosis-related web-activities using Google Trends (GT) capturing the Internet behavior in the USA for the period 2004–2010. GT-generated data were then compared with the most recent available epidemiological data of silicosis mortality obtained from the Centers for Disease Control and Prevention for the same study period. Statistically significant correlations with epidemiological data of silicosis ($r=0.805$, p -value <0.05) and other related web searches were found. The temporal trend well correlated with the epidemiological data, as well as the geospatial distribution of the web-activities with the geographic epidemiology of silicosis.

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Specifications Table

Subject area	Medicine
More specific sub- ject area	Occupational medicine
Type of data	Figure, tables
How data was acquired	Outsourcing of Google Trends site and the Centers for Disease Control and Prevention (CDC) site
Data format	Raw, analyzed
Experimental factors	Google Trends search volumes were obtained through graphs and heat-maps
Experimental features	Validation of Google Trends-based data with “real-world” data taken from the CDC site was performed by means of correlational analysis
Data source location	USA
Data accessibility	Data are within this article

Value of the data

- Google Trends (GT)-based data (*infodemiological* data) could be useful for scientific community, researchers and occupational physicians in that they show good correlation with “real world” data obtained from the Centers for Disease Control and Prevention site, thus proving to be reliable.
- These data could be further statistically processed, analyzed, refined and validated in such a way to complement traditional surveillance of silicosis, providing data quicker and in real time.
- These data could be used to understand occupational diseases-related web activities.
- To our knowledge, this is the first analysis of web search behavior related to an occupational disease, namely silicosis, carried out both in quantitative and qualitative terms.

1. Data

This article contains infodemiological data on silicosis searched in the USA in the study period 2004–2010, obtained from Google Trends (GT) (Fig. 1). These data well correlated with “real-world” data obtained from the Centers for Disease Control and Prevention (CDC) site for the same study period (Tables 1–3).

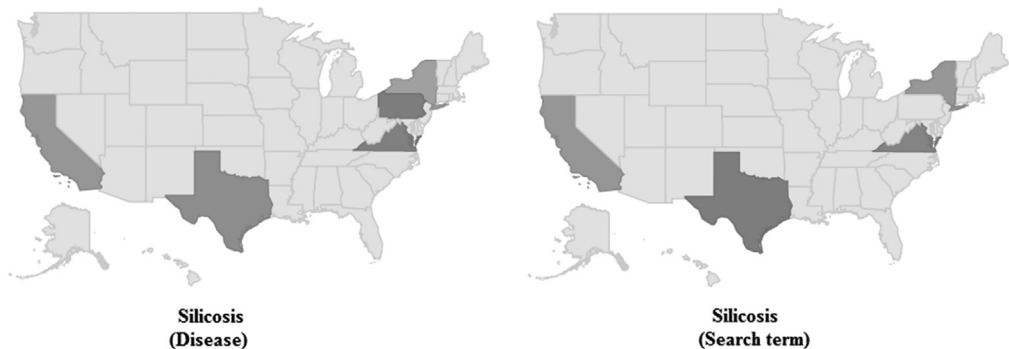


Fig. 1. Google Trends-generated heat-map showing the regional interest for silicosis in the USA. In particular, it can be noticed that silicosis-related web searches are concentrated in some counties (namely, California, Texas, New York, Pennsylvania, and Virginia).

Table 1
Pearson's correlation between Google Trends-based data and epidemiological data in the study period 2004–2010.

Variable		GT-based sili- cosis (Disease)	GT-based silicosis (search term)
Gender			
Female	Correlation coefficient	–0.145	–0.144
	Significance level <i>P</i>	0.7562	0.7588
Male	Correlation coefficient	0.778*	0.765*
	Significance level <i>P</i>	0.0394	0.0453
Ethnicities			
White			
	Correlation coefficient	0.713	0.696
	Significance level <i>P</i>	0.0720	0.0825
Female	Correlation coefficient	0.010	–0.001
	Significance level <i>P</i>	0.9832	0.9980
Male	Correlation coefficient	0.767*	0.755*
	Significance level <i>P</i>	0.0441	0.0498
Black			
	Correlation coefficient	0.841*	0.847*
	Significance level <i>P</i>	0.0177	0.0162
Female	Correlation coefficient	–0.176	–0.162
	Significance level <i>P</i>	0.7066	0.7281
Male	Correlation coefficient	0.855*	0.859*
	Significance level <i>P</i>	0.0143	0.0132
Other			
	Correlation coefficient	–0.135	–0.162
	Significance level <i>P</i>	0.7731	0.7286
Female	Correlation coefficient	–0.292	–0.254
	Significance level <i>P</i>	0.5249	0.5833
Male	Correlation coefficient	–0.019	–0.055
	Significance level <i>P</i>	0.9676	0.9074
Adjusted white			
Female	Correlation coefficient	–0.015	–0.007

Table 1 (continued)

Variable		GT-based sili- cosis (Disease)	GT-based silicosis (search term)
	Significance level <i>P</i>	0.9751	0.9876
Male	Correlation coefficient	0.787*	0.778*
	Significance level <i>P</i>	0.0357	0.0396
Adjusted black			
Female	Correlation coefficient	−0.155	−0.149
	Significance Level <i>P</i>	0.7396	0.7507
Male	Correlation coefficient	0.864*	0.867*
	Significance level <i>P</i>	0.0122	0.0116
Adjusted other			
Female	Correlation coefficient	−0.292	−0.254
	Significance level <i>P</i>	0.5249	0.5833
Male	Correlation coefficient	0.030	0.004
	Significance level <i>P</i>	0.9490	0.9939
Adjusted overall			
	Correlation coefficient	0.823*	0.816*
	Significance level <i>P</i>	0.0231	0.0253
Age			
age 15–24	Correlation coefficient	−0.070	−0.018
	Significance level <i>P</i>	0.8813	0.9695
age 25–34	Correlation coefficient	−0.657	−0.656
	Significance level <i>P</i>	0.1091	0.1092
age 35–44	Correlation coefficient	0.501	0.533
	Significance level <i>P</i>	0.2520	0.2179
age 45–54	Correlation coefficient	0.308	0.278
	Significance Level <i>P</i>	0.5017	0.5466
age 55–64	Correlation coefficient	0.457	0.468
	Significance level <i>P</i>	0.3031	0.2898

Table 1 (continued)

Variable		GT-based sili- cosis (Disease)	GT-based silicosis (search term)
age 65–74	Correlation coefficient	0.619	0.622
	Significance level <i>P</i>	0.1379	0.1357
age 75–84	Correlation coefficient	0.701	0.677
	Significance level <i>P</i>	0.0792	0.0949
age 85-on	Correlation coefficient	0.462	0.442
	Significance level <i>P</i>	0.2966	0.3208
No. > 45	Correlation coefficient	0.747	0.730
	Significance level <i>P</i>	0.0535	0.0623
No. 15–44	Correlation coefficient	0.291	0.334
	Significance level <i>P</i>	0.5262	0.4636
Underlying	Correlation coefficient	−0.850*	−0.832*
	Significance level <i>P</i>	0.0154	0.0203
Number of deaths	Correlation coefficient	0.759*	0.746
	Significance level <i>P</i>	0.0477	0.0542
Death rate	Correlation coefficient	0.805*	0.794*
	Significance level <i>P</i>	0.0291	0.0329

* Statistically significant, with *p*-value < 0.05.

2. Experimental design, materials and methods

GT (available at <https://www.google.com/trends>) was exploited in order to capture Internet activities and interest related to silicosis. GT was mined in the USA, looking for “silicosis” as keyword, and using both “search term” (data directly available at <https://www.google.com/trends/explore?date=2004-01-01%202010-12-31&geo=US&q=Silicosis>) and “search topic” [Disease] (data directly available at <https://www.google.com/trends/explore?date=2004-01-01%202010-12-31&geo=US&q=%2Fm%2F02yw8n>) as search strategy options, from 2004 to 2010. Data downloadable from GT are available as monthly data, in comma-separated values (CSV) format.

“Real-world” statistical data, both raw and adjusted, were collected from the CDC site for the same study period 2004–2010 [1–5].

Correlational analysis was carried out between the GT-based search volumes and the “real-world” statistical data about silicosis. A list of silicosis-related terms (clinical symptoms and other associated diseases) was further searched and their flux volumes were correlated with the silicosis hit-search data and the epidemiological data (namely, death rate and number of deaths).

Table 2

Pearson's correlation between GT-based data and clinical symptoms/diseases associated with silicosis.

Variable		GT-based silicosis (Disease)	GT-based silicosis (search term)
Associated diseases			
Lung cancer	Correlation coefficient	0.714	0.740
	Significance level <i>P</i>	0.0712	0.0574
Laryngeal cancer	Correlation coefficient	−0.749	−0.786
	Significance level <i>P</i>	0.0526	0.0360
Rheumatoid arthritis	Correlation coefficient	0.793*	0.767*
	Significance level <i>P</i>	0.0333	0.0443
Systemic Lupus Erythematosus	Correlation coefficient	0.869*	0.865*
	Significance level <i>P</i>	0.0112	0.0120
Scleroderma	Correlation coefficient	0.918*	0.934*
	Significance level <i>P</i>	0.0035	0.0021
Tuberculosis	Correlation coefficient	0.083	0.106
	Significance level <i>P</i>	0.8588	0.8217
Symptoms			
Anorexia	Correlation coefficient	0.220	0.184
	Significance level <i>P</i>	0.6348	0.6931
Cough	Correlation coefficient	−0.740	−0.770*
	Significance level <i>P</i>	0.0571	0.0429
Dyspnea	Correlation coefficient	−0.725	−0.757*
	Significance level <i>P</i>	0.0654	0.0490
Fatigue	Correlation coefficient	−0.576	−0.612
	Significance level <i>P</i>	0.1756	0.1438
Fever	Correlation coefficient	−0.848*	−0.869*
	Significance level <i>P</i>	0.0158	0.0110
Respiratory failure	Correlation coefficient	−0.939**	−0.939**
	Significance level <i>P</i>	0.0017	0.0017
Tachipnea	Correlation coefficient	−0.937**	−0.941**
	Significance level <i>P</i>	0.0018	0.0016

* Statistically significant, with *p*-value < 0.05;** Statistically significant, with *p*-value < 0.01.

All statistical analyses were carried out using the Statistical Package for Social Science version 23.0 (SPSS, IBM, IL, USA) and STATISTICA version 12 (StatSoft Inc., Tulsa, OK, USA). Figures with a *p*-value < 0.05 were considered significant.

For further details, the reader is referred to [6].

Table 3

Pearson's correlation between GT-based data concerning clinical symptoms/diseases associated with silicosis and silicosis epidemiological data (namely, death rate and number of deaths) in the study period 2004–2010.

Variable		GT-based silicosis (Disease)	GT-based silicosis (search term)
Associated diseases			
Lung cancer	Correlation coefficient	0.736	0.697
	Significance level <i>P</i>	0.0595	0.0818
Laryngeal cancer	Correlation coefficient	−0.680	−0.628
	Significance level <i>P</i>	0.0929	0.1308
Rheumatoid arthritis	Correlation coefficient	0.476	0.445
	Significance level <i>P</i>	0.2797	0.3165
Systemic Lupus Erythematosus	Correlation coefficient	0.455	0.399
	Significance level <i>P</i>	0.3051	0.3755
Scleroderma	Correlation coefficient	0.861*	0.823*
	Significance level <i>P</i>	0.0129	0.0230
Tuberculosis	Correlation coefficient	−0.007	−0.030
	Significance level <i>P</i>	0.9879	0.9484
Symptoms			
Anorexia	Correlation coefficient	−0.161	−0.175
	Significance level <i>P</i>	0.7299	0.7080
Cough	Correlation coefficient	−0.817*	−0.784*
	Significance level <i>P</i>	0.0247	0.0370
Dyspnea	Correlation coefficient	−0.790*	−0.754
	Significance level <i>P</i>	0.0347	0.0503
Fatigue	Correlation coefficient	−0.753	−0.729
	Significance level <i>P</i>	0.0505	0.0632
Fever	Correlation coefficient	−0.820*	−0.776
	Significance level <i>P</i>	0.0240	0.0401
Respiratory failure	Correlation coefficient	−0.864*	−0.825*
	Significance level <i>P</i>	0.0121	0.0225
Tachipnea	Correlation coefficient	−0.902**	−0.867*
	Significance level <i>P</i>	0.0054	0.0115

* Statistically significant, with *p*-value < 0.05;

** Statistically significant, with *p*-value < 0.01.

Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.dib.2016.11.021>.

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