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ORGANIZASION OF ASSISTANCE IN OCCUPATIONAL MEDICINE, IN HEALTH REFORM IN ROMANIA BY APPLYING GEOGRAPHIC INFORMATION SYSTEMS

RESUME

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1. INTRODUCTION

Keeping state of health and fighting against diseases fall among the oldest human concerns and therefore from ancient times till few a decades ago, almost all the medical scientific achievements have been used exclusive for healling the pacient, the term consacrated for defining this medicine's character being "curative medicine"

Present work addresses several theoretical and practical aspects of the development of methods and algorithms for automatic and semi-automatic data collection. To solve this problem, my research was focused in the following areas:

- "developing methods and algorithms for automatic vectorization";
- "developing methods for tasting the accuracy of geographical databases"

In addition the paper work brings studies regarding the field occupational health, being applied through geographic information system.

2. PRESENTATION OF OCCUPATIONAL MEDICINE FIELD, NOMINATED FOR IMPLEMENTATION OF DIGITAL GEOGRAPHICAL MAP (SIG PROJECT)

History of occupational medicine falls on the long road from the caveman to the space propelled "as a noble and thrilling adventure in the history of human civilization and culture". Prehistoric man used flint as a tool, so it can be assumed that he suffered from silicoses. The research on two prehistoric bodies suggested the possibility of pneumoconiosis.

Occupational health activity, actually, promoting human state of health in the labor process aims in the most general acceptation knowledge and overcome all this negative phenomenons which disrupts the ability of work extended reproduction, reducing the overall volume available and hance its results .

3. DEFINING SIG AND CHARACTERIZATION OF SPATIAL DATA

"Geograhic Information Systems, short SIG, are seen as a special case of general information systems. The information derives from the interpretation of data which are the symbolic representations of characteristics.

"A geographic information system its the ensemble of subsystems, designed for the collection, processing, integration, retrieval, presentation and provision of data and grographic information".

Geographic Information System (SIG) is the only integrating system for collecting, storing and processing the information about natural geographic objects in interaction with other base informational data system consisting in geographical information systems and state

reginal and teritorial departaments, integrated under a single system of identification and registration of coding objects in Romania.

Creating SIG with data and occupational medicine indicators in Arad County is the main objective.

The paper work identified the aspects from informational county system that can be included in SI.

- *Stabile population at July, 1st, 2012;*
- *Surface;*
- *Population density (2011);*
- *The situation of economical units(after statistical yearbook);*
- *Data regarding new cases of professional diseases (2001 till 2011);*
- *New cases of chronic diseases, possible related to profession (2001 till 2011), overall incidence;*
- *Family doctors;*
- *Occupational medicine doctors;*
- *Distribution of risk factors and occupational diseases on localities (2001 till 2011);*
- *Areas of activities on localities: economy, agricultures, commerce, mining industry.*

4. GEOGRAPHIC INFORMATION SYSTEM WORLD WIDE, EUROPEAN AND NATIONAL

National Geographic Information System is deisgned to reflect the information in the form of spatial model of the region, with the possibility of remodeling the situation and spatial analysis to obtain an primary objective information about the objects with natural resources potential of the country, to improve the quality and efficiency of administrative decisions for the society developing.

Geographic instruments can offer answers at the public health issues regarding prevention and control of diseases, transmissible and non-transmissible, for prevention and control of occupational and work-related diseases.

The application of SIG in public health data and occupational medicine share a friendly way of working and viewing the results of activities in an understandable format for the general public .

5. SPECIFIC ASPECTS OF OCCUPATIONAL DISEASES IN ROMANIA

"Occupational diseases are conditions that occur as a result of the exercise of a occupation and profession caused by harmful physical, biological psychosicial specific to the work place, as well as the excessive application of various devices and different systems of the body in the work process, regardless the type of employment contract between the employer and employee".

Study of professional morbidity in Romania highlights a number of overall aspects and specific requirements, namely:
- Proper recognition of occupation risks and oversight of the work is the main field of the work of occupational medicine doctors, imposing access to occupational health services for all workers in Romania, regardless workplace, for real coverage of this issues.

- Occupational medicine doctor is the employer specialist in problems of health risk management, member of health and work safety committe, having the duty to notify and communicate the professional risks, for being taken technical-organizational and medical prophylaxis measures by those responsible.

6. WORK HYPOTHESIS, STUDY MATERIAL, WORK METHODOLOGY

It started from the premise that specific SIG operations over the spatial data are doing from these systems both effective tools for visualization of multiple data as maps and tools for analysis of information on land surface.

The study material encompasses aspects whitin the informational system of Arad County, that can be incorporated into geographic information system, such as:
  I.   Demographic data
 II.   Economic data
III.   Morbidity data
 IV.   Medical cabinets specialty

7. USING GEOGRAPHIC INFORMATION SYSTEM SIGEPI FOR MONITORING PROFESSIONAL DISEASES AND WORK-RELATED FORM ARAD COUNTY

Arad county comprises a number of 75 localities, with a population over 300 and under 150000 inhabitants, the most populated localities being the ones with red clor, from west of the country, having over 5000 inhabitants.

The areas occupied by these communities are over 2000 and under 26000ha, totaling 775409ha, the largest cities hovering mostly in South-Central, West part, having over 10000 ha.

The population density is higher in the west side of the county, the mst popular cities being: Arad, Vladimirescu, Livada, Şofronea, Curtici, Macea, Sântana, Fântânele, Lipova, Pâncota, Chişineu-Criş, Ineu, Sebiş.

45 % of the towns form the county have just only family doctor, 25 % have 2 family doctors, the largest number of family doctors being found in locality Arad, in number of 110.

Doctors from occupational work, from existing record of Department of Public Health Arad, can be found in Arad (35 doctors of occupational medicine).

8. IMPLEMENTATION RESULTS SIG IN OCCUPATIONAL WORK
REPARTION OF RISK FACTORS CAUSING PROFESSIONAL DISEASES, DECLARED PROFESSIONAL DISEASES (2001 till 2011), OTHER EFFECTS ON HEALTH

The results obtained are in the form of maps whose future utility is to analysis and prioritize issues concerning occuaptional medicine, establishing actions strategies.

In Arad there were declared professional diseases and work-related diseases in preponderantly based industrial units, (over 50%), trade and agriculture units. Most of the units from Arad, where are registered professional diseases, are the industrial units, located in : Arad, Vladimirescu, Fântânele, Curtici, Chişineu-Criş, Ineu, Lipova.Trade units are in: Arad, Vladimirescu, Lipova şi Curtici and agriculture units in: Arad, Şagu, Lipova, Şiria, Curtici.

Risk factor "noise" caused the occurence of 14 professional diseases cases, as: deafness, occupational hypoacusis, in 2001, 2002, 2004, 2009, most of the cases being found in Arad (11) and just a few cases in other localitites: Lipova, Târnova, Vârfurile.

Risk Factor "Powder with SiO_2" occurence in units from Arad and surroundings, but also in units from North-East of the county: Chişineu Criş, Şepreuş, Cermei, Sebiş, Moneasa, Gurahonţ, Vârfurile, Hălmagiu and centre: Şiria, Târnova, Tauţ, being recorded cases of occupational diseases caused by the risk factor "Powder with SiO_2" (silicosis, silicosideroza), between 2001 and 2011, a number of 138 cases.

Risk factors "mineral oil, other chemicals" occures in units from localitites: Arad, Şagu, Zimandu-Nou, Sântana, Curtici, Şimand, Chişineu-Criş, being recorded a number of 27 cases of professional diseases, as dermatoses, most of the cases found in Arad (21) and 1 in other 6 localities between 2003 and2004, 2007 and 2011.

Risk factor "gas welding, iron oxides" occures in units from from Central-West pat of the county, 85 cases presented professional diseases, 71 from these were in Arad and surroundings, between 2004 and 2009, 2011.

The mos common risk factor is "Powder with SiO_2", the most common in localities located in Central and East side of the county, about 30% and the highest value of frequency index of 11.67, followed by the risk factor "gas welding, iron ixides" about 16%.

In the county of Arad, there were a total of 34 cases of chronic bronchitis, 2 cases of *rihinitis*, 1 cases of *upper airway iritation*, 3 cases of *pneumoconiosis*, 5 of *pulmonary fibrosis*, 1 cases of *pulmonary tuberculosis* and 13 cases of *BPOC*.

Also there were declared 8 cases of *osteomusculoarticulare conditions* (spondilartoză, gonartroză bilaterală, discopatie lombară), of which 6 cases in Arad locality and 2 cases in Chişineu-Criş, the overall incidence rate being higher in Chişineu-Criş (0.26 towards 0.04 in Arad).

In localities from Arad there weren't identified cases of diseases related to profession (82%), number of inhabitans is 326 and 9539 with am average of M=2888(SD=1938), and density of population between 0.03 and 1.41 with an average of M=0.34 (SD=0.27).

The most frequent work-related disease is asthma, in 10% having the higher overall of incidence index of 0.44, followed by chronic bronchitis appearing in 7%, with the highest overall of incidence index with 0.48. Osteomusculoarticulare conditions have the highest overall of incidence index with 0.26; BPOC have the overall of incidence index with 0.19, and in the last position are pulmonary tuberculosis (0.09), pulmonary fibrosis (0.03), pneumoconiosis (0.02), rhinitis (0.01), upper airway irritation(0.007).

9. PROPOSALS TO DE UTILIZ THE SYSTEM SIG IN OCCUPATIONAL MEDICINE

Organizasion of medical assitance for active population is performed by the occupational medicine doctors who are only in the city of Arad, and in the county by the doctors wwho are certified in occupational medicine, family doctors and general medicine doctors.

Safety and health in work can be represented in SIG. Legislation in the field does not prohibited, currently, using Geographic Information Systems.

Directiva Cadru 89/391/EEC, regarding safety and health in work, states that " the employesr have the obligation to ensure the safety and health in work for all employees".

In the maps produced by the SIG system could be configuredbasic elements, including the determinants state of health factors.

For effective implementation of Geographic Information System in the field of occupational medicine in Romania it is necessary to have legislation requiring occupational medicine authorities at national, regional county to use this application which in the first fase will be free.

It also requires an Order of the Ministery of Health for implementation of Geographic Information Systems in occupational medicine.

The central institution responsible for implementation of SIG is the National Centre of Organisation and Assurance of Information System in Health Bucharest . Regionaly, SIG will be implemented by the Public Health Institute and Centers for subordinated counties. At county level SIG will be managed by Department of Public Health.

Data resulting from Gepgraphic Information System will be used in activities regarding public information by the mentioned institutions, respecting personal privacy data and the law regarding public information .

BIBLIOGRAPHY:

1. Marcu A. And colaborators, Public Health and Sanitary Management, All Publishing, București, 2002;
2. Oțelea M., Effective communication in health promotion in the work place , Romanian Magasine of Occupational Medicine, Vol. 63, nr.1-2, 2012;
3. Agency for Military Equipment andTehnologies Research, research studies for the development of automatic and semi-automatic collection algorithms to geographic data and determining the accuracy of database results 2008;
4. Bardac D.I, Berca C., Aspects of Occupational Medicine reflected in the pages of Holly Bible, essays, "Lucian Blaga" University Sibiu, Sfinții Împărați Sopot Curch Slatina, AMT, vol. II, nr. 4, 2011;

5. Bardac D.I., Mihaela Stoia, Elements of Occupational Medicine, ULB Publishing Sibiu, 2007;

6. Bardac D.I., Life and creation of Bernardino Ramazzini, the father of occupational medicine. Abstract book. National conference of occupational medicine with international participation, Galaţi, 18-21 septembrie, 2013;

7. Cocârlă A., Tefas L., Petran M. – Occupational Medicine, Publishing Universitară I. Haţieganu, Cluj, 2000;

8. Enăchescu D., Public Health and Sanitary Management, Publishing All, 1998;

9. Popescu O., De la Hipocrate-ncoace, Caleidoscop medical, Fiat Lux Publishing, Bucureşti, 2001;

10. Ţârt D.P., Aplication of Geographic Information System in Public Health, Publishing of Oradea University, 2009;

11. Ion Toma, Occupational Medicine, Sitech Publishing, Craiova,2006;

12. Niculescu Toma „Professional Diseases" Publishing Medmun, Bucureşti Vol I, 2008;

13. General rules of labor protection, Ministery of Labor and Social Solidarity, Ministeru of Health, 2002;

14. HG nr. 355/2007 regarding workers's health surveillance, as amended and supplemented;

15. Todea Adriana, Rusea Daniela „Knowledge of occupational hazards, means to protect worker's health" Publishing Fundaţiei "Romania tomorrw", 2008;

16. Todea Adriana „Ghid of occupational medicine doctor regarding establishing working skills" Ed. Fundaţiei "Romania tomorrow", 2007;

17. Niţu C., Niţu C., D., Tudose C.E., Vişan M.C., Geographic Information System and Computerised mapping, University of Bucharest Publishing, 2002;

18. Geographic Information Systems (SIG/GIS), 2010, www.scritube.com/stiinta/informatica/SISTEME IFORMATIONALE-GEOGRAFICE;

19. Mihăescu L."Informational Systems and Informatics Application in Business Administration, University Publishing "Lucian Blaga",Sibiu, 2009;

20. Botezatu C., Algoritmi şi structuri de date, University Publishing, Bucharest, 2004;

21. Bălteanu D., Geographic Informational Systems (GIS) for the study of natural disaster, Romanian Academy, 2010;

22. Dimitru Mihai George, Geographic Information Systems GIS, Blue Publishing, Cluj Napoca, 2001;

23. Imbroane M.A., Moore D., Initiation in GIS and Remote Sensing, Cluj Universitary Press, 1999;

24. Herbei O., Herbei M.V.,Geographic Information Systems, Theoretical Fundamentals and Applications, Universitas Publishing, Petroşani,2010;