

## Pollution Impact of Oil, Gas and petrochemical Industries on Cancer Diseases

| System | Diseases/risk factor   | Methods  | Results   | References |
|--------|--|--|---|------------|
| cancer | <ul style="list-style-type: none"> <li>• Acute lymphocytic leukemia</li> <li>• Acute myeloid leukemia</li> <li>• Chronic myeloid leukemia</li> </ul>                         | <p>case-control study</p> <p>Questionnaire</p> <p>Between November 1997 and June 2003, 171 cases and 410 controls</p>  | <p>Different conditional logistic regression models were fitted for subjects aged 0–19 and 20–29 years to evaluate separately childhood versus adulthood leukemia. No overall association was observed for the younger age group. However, residential petrochemical exposure was a significant risk factor for leukemia for the older age group.</p>                                       | (1)        |
| cancer | <ul style="list-style-type: none"> <li>• Stomach</li> <li>• Liver</li> <li>• Larynx</li> <li>• Melanoma</li> <li>• Leukemia</li> <li>• Lymphoma</li> <li>• Cervix</li> </ul> | <p>To confirm the diagnosis, data from the hospitals where people had been treated were solicited</p> <p>Cases were included only when pathological evidence was present</p> <p>The water was analysed for total petroleum hydrocarbons (TPHs)</p> | <p>An overall excess for all types of cancer was found in the male population (8 observed v 3.5 expected) with a risk 2.26 times higher than expected (95% confidence interval (95% CI) 0.97 to 4.46). There was an overall excess of deaths for all types of cancer (6 v 1.6 expected) among the male population 3.6 times higher than the reference population (95% CI 1.31 to 7.81).</p> | (2)        |
| cancer | <ul style="list-style-type: none"> <li>• lung cancer</li> </ul>  | <p>case-control study</p> <p>standardized questionnaire to identify potential risk factors.</p>  | <p>small or no association with lung cancer (odds ratio for residence within a half-mile of a site= 1.10, 95% confidence interval 0.58–2.08). While associations were strongest for exposures exceeding 15 years</p>  | (3)        |
| cancer | <ul style="list-style-type: none"> <li>• Lung cancer</li> </ul>  | <p>Data on cancer incidence rates for the present study were</p>   | <p>From all the patients diagnosed with cancer during the period of</p>   | (4)        |

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|               | <ul style="list-style-type: none"> <li>• Non-Hodgkin lymphoma</li> </ul>  | obtained from the Israel National Cancer Registry established in 1960   | 2000–2006 and living within the distance of up to 2 km from the KH industrial zone, 98 primary lung cancer cases and 53 cases of non-Hodgkin lymphoma (NHL) cancer were identified in the database and used in the analysis. these types of cancer may potentially be related to exposure to petroleum emissions.  |     |
| <b>cancer</b> | <ul style="list-style-type: none"> <li>• leukemia</li> </ul>  | This descriptive cross-sectional study was conducted in three stages. First stage consisted of identifying hazardous chemicals and determination of chemicals risk ratio, the second stage includes evaluation of workers exposure to hazardous chemicals, and the third stage was estimating the relative risk of blood cancer caused by exposure to benzene through epidemiological studies | The results of estimated leukemia relative risk stage in benzene exposure, the highest relative risk in workers related to site man workers in aromatic units with cumulative exposure benzene to 4.149 ppm. Years obtained relative risk of 2.3. The test results showed that relationship between worker's exposure to benzene and their job was significant ( $p < 0/001$ ) | (5) |
| <b>cancer</b> | <ul style="list-style-type: none"> <li>• lung cancer,</li> <li>• pleural neoplasm,</li> <li>• bladder cancer</li> <li>• lymphohematopoietic malignancies</li> </ul> | interviewer collected information Cases were all subjects resident in Brindisi and in three neighbouring municipalities who died in the study area in 1996–1997 from lung cancer, pleural neoplasm, bladder cancer and lymphohematopoietic malignancies.  | Residence within 2 km from the centre of the petrochemical plant was associated with a 3 fold increase of the OR   | (6) |
| <b>cancer</b> | <ul style="list-style-type: none"> <li>• Leukaem</li> <li>• cancer of the larynx</li> </ul>   | This is a small area study of cancer incidence, 1974-84 and of mortality, 1981-91 based on the national postcoded data held by the Small Area Health Statistics Unit and with population and  | There was an 8% excess incidence of all cancers within 7.5 km, and a 24% excess of cancer of the larynx  | (7) |

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|  |  | socioeconomic data from<br>the 1981 census.<br>general population<br>sample of 115,721 people<br>(1981 census) living within<br>7.5 km of the plant |  |  |
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## References:

1. Yu C-L, Wang S-F, Pan P-C, Wu M-T, Ho C-K, Smith TJ, et al. Residential exposure to petrochemicals and the risk of leukemia: using geographic information system tools to estimate individual-level residential exposure. *American journal of epidemiology*. 2006;164(3):200-7.
2. San Sebastián M, Armstrong B, Cordoba J, Stephens C. Exposures and cancer incidence near oil fields in the Amazon basin of Ecuador. *Occupational and environmental medicine*. 2001;58(8):517-22.
3. Simonsen N, Scribner R, Su LJ, Williams D, Lockett B, Yang T, et al. Environmental exposure to emissions from petrochemical sites and lung cancer: the lower Mississippi interagency cancer study. *Journal of environmental and public health*. 2010;2010.
4. Zusman M, Dubnov J, Barchana M, Portnov BA. Residential proximity to petroleum storage tanks and associated cancer risks: Double Kernel Density approach vs. zonal estimates. *Science of the Total environment*. 2012;441:265-76.
5. Golbabaie F, Eskandari D, Azari M, Jahangiri M, Rahimi A, Shahtaheri J. Health risk assessment of chemical pollutants in a petrochemical complex. *Iran Occupational Health*. 2012;9(3).
6. Belli S, Benedetti M, Comba P, Lagravinese D, Martucci V, Martuzzi M, et al. Case–control study on cancer risk associated to residence in the neighbourhood of a petrochemical plant. *European Journal of Epidemiology*. 2004;19(1):49-54.
7. Sans S, Elliott P, Kleinschmidt I, Shaddick G, Pattenden S, Walls P, et al. Cancer incidence and mortality near the Baglan Bay petrochemical works, South Wales. *Occupational and Environmental Medicine*. 1995;52(4):217-24.