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Cohort study of the population exposed to dioxin after the Seveso, Italy accident: Mortality results, 1976-2013

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Abstract

Introduction. On July 10, 1976 a runaway reaction in a plant for the production of 2,4,5-trichlorophenol near Seveso, Italy caused the contamination with 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD) of the surrounding area, then divided into three zones named A (very high pollution, N=700 residents at the time of the accident), B (high, N=4,800), and R (low, N=31,600). The population in that area and in a surrounding non-polluted zone (non-ABR, N=181,500) is under surveillance for mortality and cancer incidence. We present preliminary results of the extended (2002-2013) mortality follow-up.

Methods. Vital status and cause of death ascertainment were performed with record linkage and individual follow-up. Using non-ABR zone as reference, we calculate age-adjusted rate ratios (RR) and 95% confidence intervals (CI) using Poisson models.

Results. Follow-up was 95% complete. We recorded 68,000 deaths (4,000 causes still under search). Women in most polluted zones had elevated mortality from lymphatic-hematopoietic cancers (zone A: RR=1.8; CI=0.7-4.9; N=4 deaths; zone B: RR=1.5; CI=1.0-2.4, N=20), diabetes (zone A: RR=2.1; CI=0.9-5.1; N=5; zone B: RR=1.7; CI=1.1-2.5; N=24), COPD (zone B: RR=1.8; CI=1.1-3.0; N=17), and hypertension (zone A: RR=3.2; CI=1.7-6.2; N=9). Mortality was elevated 30+ years after the accident for stomach cancer (zone A: RR=6.7; CI=2.1-21.2, N=3); skin melanoma (zone B: RR=5.3; CI=1.6-17.8; N=3), and hypertension (zone A: RR=5.4; CI=2.0-14.4; N=4). Men in zone A showed increased mortality from chronic ischemic heart diseases (RR=1.9; CI=1.0-3.7; N=9) and other heart diseases (RR=2.0; CI=1.0-3.8, N=9). In zone B, all cancer mortality was elevated in males 20-29 years after the accident (RR=1.7; CI=1.1-2.6; N=21).

Conclusions. We confirmed most of the elevated mortality excesses found in previous follow-up periods. Interpretation is complicated by limited numbers in highly polluted zones and the different mortality patterns observed in males and females.

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