High-level beta-hexachlorocyclohexane contamination in dairy farms – Sacco River Valley, Latium, Italy, 2005

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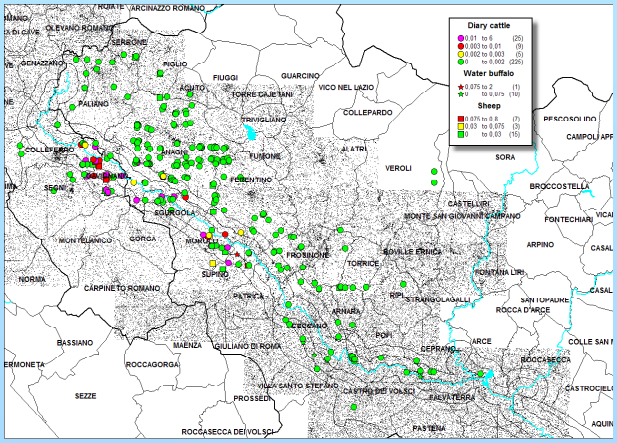
Background

In March 2005, the Italian National Monitoring System on Chemical Residuals in Food of Animal Origin detected levels of the pesticide beta-hexachlorocyclohexane (ß-HCH) in bulk-milk from a dairy farm in the Sacco River valley that were 30 times higher than the legal limit of 3ppm. B-HCH, a lindane isomer and possible human carcinogen, was subsequently found in milk from several neighbouring farms. A study was therefore undertaken to evaluate the extent and risk factors for contamination, and bulk-milk, fodder and environmental samples obtained.

Figure 1: Spatial distribution of diary farms in the Sacco River Valley and levels of ß-HCH in bulk-milk, 05/ 2005.



Methods

All dairy cattle farms in the valley were enrolled in a retrospective cohort study and their bulk milk analyzed for ß-HCH. A questionnaire was administered to farmers to evaluate possible exposure factors. Low-level contamination was defined as ß-HCH levels in bulk-milk between 0-1.9ppb and high-level as ≥2ppb.

Figure 2: Industrial area of Colleferro (Rome). Air picture and cartography

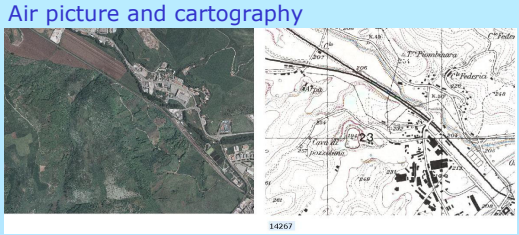


Table 1: Contingency table; diary farms exposed and not exposed to risk factors, 05/2005

	Level of contamination		
	High	Low/not detectable	Total
Exposed	33	23	56
Not Exposed	1	187	188
Total	34	210	244

RR=110.8; Chi-squared (Yates), P<0,00000001

Results

Of 244 farms tested, 34 (13,9%) had high-level contamination. Feeding animals on fodder cultivated in soils watered with and/or flooded by river water was observed in 33/34 (97.0%) of high-level farms and in 23/210 (10.9%) of those with low contamination (relative risk =110.8; 95% confidence interval 15.5-792); the risk remained essentially unaltered after controlling for several potentially confounding variables.

The source of contamination was an abandoned industrial site near the riverbank that had produced lindane for decades.

High ß-HCH levels were demonstrated in water sediments, soil, and fodder from the area

Conclusions: Cattle fodder cultivated near a contaminated river was the main risk factor for ß-HCH-contaminated milk. On the basis of the epidemiologic evidence and laboratory testing, watering local fields with river water and production of fodder in farms with contaminated soil was banned, and all animals from positive farms were culled.

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