



## Cancer incidence near oilfields in the Amazon basin of Ecuador revisited

Alejandro Arana and Felix Arellano

*Occup. Environ. Med.* 2007;64:490-

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## LETTERS

### Cancer incidence near oilfields in the Amazon basin of Ecuador revisited

San Sebastian *et al*<sup>1</sup> reported an overall excess for all cancers in San Carlos, Ecuador (standardised incidence ratio (SIR) 2.26; 95% CI 0.97 to 4.46 for males), and an increased mortality due to cancers in males (standardised mortality ratio (SMR) 3.6; 95% CI 1.31 to 7.81). The authors concluded that there was an excess of cancer cases among the villagers linked to environmental pollutants stemming from oil production activities.

Since clusters present many epidemiological biases, the Centers for Disease Control issued a set of guidelines<sup>2</sup> in 1990 to investigate clusters. Under those guidelines, we reviewed the cluster of cancer cases reported in San Carlos.

Cancer cases from 1989 to 1998 were obtained from the original article. Data on cancer occurrence and mortality in the region were obtained from the National Cancer Registry of Ecuador, Quito (1993-7),<sup>3</sup> using GLOBOCAN. GLOBOCAN<sup>4</sup> is a database built by the descriptive epidemiology group of the International Agency for Research on Cancer. The International Agency for Research on Cancer calculates cancer mortality from national mortality data (1998-2000) corrected for estimated completeness (72% for males, 68% for females from Ecuador) to avoid the effect of deaths not notified to health authorities. We obtained data on population for the village of San Carlos, Ecuador, from the 2001 Ecuador census, the first to include data on the population of San Carlos.

San Sebastian *et al*<sup>1</sup> underestimated the population of San Carlos by almost 50%. In the absence of census data, they estimated the population to be "approximately 1000" and assumed the population to be constant during the period 1989-98, which was not the case as shown in the 2001 census where population growth in the province of Orellana was 84% during the period 1990-2001 (from 46 781 to 86 493 people). Census data showed the average population was 1471 and that it grew by 84% in 11 years.<sup>5</sup> In males there were 8 cases of cancer observed and, according to the 2001 census, 8.8 were expected (SIR 0.91; 95% CI 0.42 to 1.72). In females, there were 2 cases observed and 8.9 expected (SIR 0.22; 95% CI 0.04 to 0.42). In males, there were 6 deaths observed and 6.1 expected (SMR 0.98; 95% CI 0.40 to 2.03). No cancer deaths were reported in females.

Using data from the 2001 census and applying the Centers for Disease Control cluster guidelines yielded no excess of cancer or cancer mortality in the village of San Carlos. Full details of the methodology used for the calculation can be obtained from the authors at <http://www.riskmr.com>.

**Alejandro Arana**

Risk Management Resources España, Zaragoza, Spain

**Felix Arellano**

St Vincent's Clinical School, Faculty of Medicine, University of New South Wales, Sydney, New South Wales, Australia

Correspondence to: F M Arellano, Risk Management Resources España, SL Zurita 14, 50001 Zaragoza, Spain; [arellano@riskmr.com](mailto:arellano@riskmr.com)

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Competing interests: AA and FA are partners of Risk Management Resources that provides consultancy to Chevron, an oil Production Company with business in Ecuador in the past.

### References

- 1 San Sebastian M, Armstrong B, Cordoba JA, *et al*. Exposures and cancer incidence near oil fields in the Amazon basin of Ecuador. *Occup Environ Med* 2001;158:517-22.
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### Sickness absence of multivaccinated employees at Porton Down: a retrospective cohort study

Concerns have been raised about the effects of multiple vaccinations on long-term health, particularly in military personnel, but are unproven.<sup>1</sup> Animal models have shown no significant relations between multiple vaccination and reported ill health in service personnel.<sup>2-4</sup>

The Defence Science and Technology Laboratory (Dstl) conducts scientific research for the UK Ministry of Defence; staff working

with pathogens or serving abroad are offered appropriate vaccinations. We investigated whether increased sickness absence, as a measure of morbidity, was associated with multiple vaccinations in Dstl staff working at Porton Down.

A retrospective cohort study was undertaken following ethical approval. Group 1 comprised multivaccinated staff employed for 2-38 years who had, in adult life, received four or more different vaccines (including for anthrax, plague, botulism, tularemia and smallpox). Controls (Group 2), who had received three or fewer vaccines (but not anthrax, plague or botulism) as adults, were matched for gender, age, grade and service length. Both groups had received standard childhood immunisations. Total sick leave over the employment period was obtained from personnel records. Absences considered unrelated to vaccination (for example, surgery) were excluded ("filtered" leave).

Group 1 received a mean of 5.6 different vaccines (median 5, range 4-11); 35 individuals had received five different vaccines, seven had received 10 or more. Total injections ranged from 6-100. There was no difference between the two groups for average annual total sick leave but filtered sick leave was significantly less in Group 1 (table 1). Sick leave in both groups decreased in a similar fashion with individual length of employment, despite the fact that average annual sickness rates for all staff increased over the period studied (data not shown).

In conclusion, there was no excess sickness absence among staff receiving multiple vaccinations (including repeated doses of potential biological warfare agent vaccines) compared to matched controls. Sickness rates did not increase with the number of different vaccines received or total number of injections. These data are consistent with experience in the US<sup>5</sup> and provide additional evidence against multiple vaccinations contributing to long-term ill health.

**E Hugh Dyson, Andrew J H Simpson, Robert J Gwyther, Paul Rice**

Biomedical Sciences Department, Dstl, Porton Down, Salisbury, Wiltshire, UK

Correspondence to: Dr P Rice, Biomedical Sciences Department, Dstl, Salisbury, Wiltshire SP4 0JQ, UK; [price1@dstl.gov.uk](mailto:price1@dstl.gov.uk)

**Table 1** Sick leave in Group 1 versus Group 2

	Group 1	Group 2	P Value*
Number of subjects	118	212	
Male (%)	82 (69.5)	147 (69.3)	
Mean age (years)	39.6	38.7	
Mean duration of employment (years)	13.4	12.3	
Average total sick leave (days per year)			
Mean (SD)	3.36 (5.45)	4.26 (7.32)	
Median (range)	1.42 (<1-35.1)	2.12 (<1-74.1)	0.11
Average filtered sick leave (days per year)			
Mean (SD)	1.90 (2.56)	3.02 (4.05)	
Median (range)	0.81 (<1-12.7)	1.63 (<1-26.2)	0.012

\*Mann-Whitney U test.