

Conclusions The recalculation resulted in a substantial reduction in the number of measurements below the LOD. The degree of censoring after recalculation is well within the operating range of the statistical methods used in the GuLF STUDY to estimate exposure levels.

0300

THE NIEHS GULF STUDY: A COMPARISON OF THE β -SUBSTITUTION METHOD AND A BAYESIAN APPROACH FOR HANDLING HIGHLY CENSORED MEASUREMENT DATA

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Objectives Over 150 000 measurements taken on workers responding to the 2010 Deepwater Horizon oil spill are being used to develop exposure estimates for the participants in the GuLF STUDY. A large portion of the measurements, however, has values below the limit of detection (left-censored). The β -substitution method has been shown to provide accurate estimates for handling censored data, but a comparison to a Bayesian method, which permits the estimation of uncertainty and accounts for prior information, is currently lacking. The goal of this research was to compare the two methods.

Method Each method was challenged with computer-generated datasets drawn from lognormal distributions with the geometric mean (GM) = 1, sample sizes = 5–100, geometric standard deviation (GSD) = 2–5, and percent censoring = 10–90%. Percent bias and coverage (the percentage of 95% uncertainty intervals containing the truth) were used as evaluation metrics.

Results For most of our simulation scenarios, estimates of bias from the β -substitution and Bayesian methods were generally comparable for the AM and GM. The β -substitution was generally less biased in estimating the GSD and the 95th percentile than the Bayesian method. The Bayesian method provided consistently better coverage for the AM than β -substitution. It also provided uncertainty estimates the GM, GSD, and the 95th percentile while β -substitution does not.

Conclusions The β -substitution method generally was observed to have little bias but it only allows the calculation of uncertainty estimates around the AM. The Bayesian approach provided reasonably accurate point and interval estimates (i.e., coverage), but this comes with the cost of additional computation.

0301

USE OF ACETOCHLOR AND CANCER INCIDENCE IN THE AGRICULTURAL HEALTH STUDY COHORT

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Objectives Since its registration in 1994, acetochlor, an herbicide licensed for use on corn, has been one of the most commonly used pesticides in the US. We evaluated use of acetochlor and cancer incidence in the Agricultural Health Study, a prospective cohort of licensed pesticide applicators.

Method During a telephone interview administered from 1999–2005, participants provided information on acetochlor use and other factors. Total lifetime days of acetochlor use were calculated and an intensity-weighting algorithm was applied that accounted for factors that modify exposure. We used Poisson regression to estimate relative risks (RR) and 95% confidence intervals (CI) for cancers that occurred from the time of interview through 2011 in Iowa and 2010 in North Carolina. We examined all cancer sites together, and individual sites with >10 exposed cases.

Results Among 33 484 men, 3234 incident cancers and 304 acetochlor-exposed cases occurred. An increased risk of lung cancer was observed among ever users of acetochlor (n = 23) (RR=1.57; CI=0.95–2.59) compared to never users, but there was no evidence of an exposure response trend (p-trend=0.30). Also, there was increased risk of colorectal cancer (n = 25) with high acetochlor use (RR=1.60; CI=0.97–2.65, p-trend=0.14).

Conclusions The associations between acetochlor use and colorectal and lung cancer are novel. However, due to lack of exposure-response trend, small number of exposed cases, and relatively short time between acetochlor use and cancer development, these findings warrant caution in interpretation and further investigation.

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INCIDENCE OF SICKNESS ABSENCE AMONG BRAZILIAN PUBLIC WORKERS

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Objectives Investigate the incidence and risk factors of sickness absence (SA) among Brazilian public workers.

Method It is a dynamic cohort composed by all public workers of the Goiania municipality hired from January, 2005 to December, 2011 where certified SA data were analysed. Incidence density (ID) was calculated per 1.000 person-years in each ICD-10 category. We used multiple logistic regression analysis to estimate the association between SA and socioeconomic and occupational characteristics.

Results 18.450 workers contributed to 49.410 06 person-years and 7.044 (38.2%) employees had at least one certified episode of SA. The ID of sickness absence was 142.5 per 1.000 person-years. This rate was significantly higher among women (155.5). Diagnostic groups with the highest sick leave ID were for injury (32.3) and musculoskeletal diseases (15.3). The logistic analysis showed association between SA and the female gender (OR 1.46 CI95% 1.35–1.58), low education (OR 1.34 CI95% 1.18–1.52), low salary (OR 1.82 CI95% 1.61–2.05), multiple work contracts (OR 1.56 CI95% 1.46–1.66) and was greater among professionals in the health field (OR 1.73 CI95% 1.55–1.92).

Conclusions On average, 14% of workers received a SA certificate each year, and the socioeconomic and occupational characteristics were associated with higher rate of certification. This study suggests an increased risk according to the professional category, the field of education was more associated with mental