

Reviewer's report

Title: Mortality among US employees of a large computer manufacturing company -- 1969-2001

Version: 1 **Date:** 16 August 2006

Reviewer: Robert M Park

Reviewer's report:

General

This analysis presents preliminary findings from an important body of mortality experience at a large modern high-technology manufacturer (IBM). Constraints relating to data access, documentation and records completeness have limited the investigation and the resulting public health inferences that can be drawn. Nonetheless, the results clearly indicate that a number of causes of death are elevated and plausibly related to workplace exposures known to have existed in electromechanical and electronics manufacturing over the past 50 years. The current work is an important first step in characterizing the hazards of this industry and demonstrates the utility of this approach in the face of restricted access to data.

General Comments

1. PMR and PCMR Analyses. While elegant in their simplicity, and even superior to some other methods (e.g., standardized mortality ratio, SMR) in handling certain forms of bias (noncomparability of study and reference populations □ the healthy worker effect), the proportional methods have the serious shortcoming that the presence of multiple work-related cause of death excesses will result in the systematic underestimation of all of those excesses. Given the limitations of the current dataset and the likely presence of a very large healthy worker effect, the proportional methods used here may well be the optimum approach. A strong healthy worker effect is apparent, as the authors point out, in the PMR observed for respiratory diseases.

2. Exposure history plausibly related to mortality. In this study population there is potential for excess mortality related to a diversity of manufacturing exposures. For the more traditional manufacturing processes, there is considerable evidence in the scientific literature for increased risks of cancer and noncancer disease, particularly concerning metalworking, die-casting, plastics fabrication and microelectronics. Microelectronics has been less well studied. Precision production of electromechanical devices, which has always been a core activity of this employer, could have entailed wide use of solvents, metalworking fluids, specialty lubricants, adhesives, and polymer resin systems in addition to the specific exposures encompassed by microelectronics, all with potential health effects risks. Varying over time, isolated excesses in selected employee groups would contribute to a broad overlay of excess mortality which would not be analytically discernable without detailed, complete work histories and corresponding

Conclusions

This study finds plausible evidence of several work-related cancer excesses in computer and related manufacturing, excesses that should be elucidated in further investigation.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

-none-

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

1. Last paragraph before METHODS: The paper should disclose that the population studied overlaps with that of Beall et al. 2005 and should describe the approximate extent of that overlap (looks like 31,900 deaths here vs 6,500 deaths in Beall et al.). What other plants are included in this study that were not in Beall et al.? Why not disclose that this is IBM □ Beall et al. does.

2. In paragraph Comparison Population (p.8) ref 10 appears to actually be ref 11.
3. In second Analysis paragraph (p.9) how were confidence intervals calculated: chi sq or Poisson?
4. The last paragraph of the DISCUSSION attributes to the PMR method lack of information on confounders, prior exposures etc. (□PMR analyses are always limited by the availability of..□). This has nothing to do with the method; rather, the method is often chosen for use in those situations but not always.
5. There is considerable congruence between the findings here and those of the Beall study, which should be pointed out. The Beall study was able to perform internal comparisons on duration in process areas, controlling for SES (pdn vs mgt employees?). The fact that the current study was able to detect increases using far less detailed information is noteworthy.

Discretionary Revisions (which the author can choose to ignore)

1. The expected PMR for all-cancer in typical industrial populations without exposures and due to the differential impact of HWE is about 1.06, close to that observed here for men (see Park et al., A Comparison of PMRs and SMRs as estimators of occupational mortality. Epidemiology 1991; 2:49-59).
2. The rather dramatic reduction in the population analyzed due to missing/inconsistent data is somewhat worrisome; could not some of the problem data be estimated (e.g., dates of birth, hire and termination are not wholly independent; if someone had a date of hire=1955 and date of termination=1990 their DOB is very likely 1925 □ 1935; est=1930).
3. RESULTS: Table 3 is not very informative, reflecting the unknown age structure of the population at risk. I would delete Table 3 and reduce the corresponding paragraph.
4. Given that the PCMR may be more biased than the PMR due to multiple excess sites of cancer, I would include in the PMR tables, the important cancer results: e.g., brain, kidney, pancreas, ovarian (□other female genital□).
5. I don□t see the value in separate analyses for men and women, esp Table 4-7. These could be reduced to two tables, if reduction is needed.

What next?: Accept after minor essential revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.