SHORT COMMUNICATION

RE-EXAMINATION OF CADMIUM IN URINE DATA REPORTED IN 1979 RELATING TO SOME MEN IN 1968 AND AFTER

P. Dewell
17 Brotherton Avenue, Redditch, Worcestershire B97 5SA, U.K.

(Received 31 July 1995)

THE ORIGINAL DATA

Adams (1979) showed individual cadmium in urine concentrations (CdU) for men before their withdrawal from exposure to cadmium in an alkaline battery works and after re-employment elsewhere within the company. The figure (Adams, 1979, Fig. 11) has been redrawn and is shown below as Fig. 1(A), while Fig. 1(B) shows the data using a logarithmic scale.

The policy of removing men with elevated proteinuria from exposure to cadmium began in 1968, although the exact dates are not known for the removal of individuals shown in Fig. 1. It is known, however, that all the withdrawals were within the period of 1 year.

In 1979 Adams observed that wide variations in an individual's cadmium exposure and absorption might be found and consequently CdU is an unreliable index of individual cadmium uptake, although it can be used as an indicator of group trends. The plot [Fig. 1(A)] of the cadmium in urine concentrations for men removed from cadmium exposure in 1968 was interpreted as showing a definite reduction in the first 3 years, with excretion levelling off at 20–25 μg l.−1.

RE-EXAMINATION OF THE DATA

A reworking of these results indicates that most of the annual CdU data from Adams were log-normally distributed. This, together with the indication of an exponential decay, suggested the use of a logarithmic scale for CdU [Fig. 1(B)]. From this it can be seen that the rapid decrease in CdU in the first 2 or 3 years is still present, but thereafter the CdU concentrations are not asymptotic. Instead they apparently settle down to a steady rate of decrease after year 2 or year 3 of about 10% per year. This is not as apparent in the arithmetic scale of Fig. 1(A).

This rate of decrease is, in fact, similar to that reported elsewhere for men still exposed to cadmium in the period 1970–1990 (Dewell, 1994,a,b). For the period 1965–1986 the cadmium in air (CdA) concentrations were decreasing at about 15% per year.

The arithmetic means for CdU for the exposed workforce, as shown in Fig. 6.2 in Dewell (1994a,b), from 1970 to 1991 are shown in Fig. 2. This time the arithmetic means for CdU from the workers removed from cadmium exposure are plotted.
Fig. 1 Cadmium in urine in men with proteinuria following re-employment in non-exposed jobs (A) Arithmetic scale after Adams (1979) (B) Logarithmic scale.
There may be some residual doubt (but no more than 1 year either way) about the exact lateral location of the data in Fig. 2 for the men removed from cadmium exposure, but the conclusion remains the same. After an initial rapid decrease in CdU the annual rate of decrease for removed workers is soon the same as for workers still exposed. After 2 or 3 years their mean CdU levels appear to be no more than about 50% above those for men who continue to be exposed to cadmium.

Since the annual rate of decrease of CdU for the withdrawn men is the same as for those men still exposed to CdA, and their mean CdU levels are not much greater than for their exposed colleagues, two thoughts arise, with the benefit of hindsight.

1. It seems probable that, had the men not been removed from cadmium exposure, the rate at which their CdU would have decreased would have been the same as for their still-exposed colleagues, and would have, in time, fallen to very similar levels.

2. Was the removal of the men from exposure clinically necessary when the CdA exposure was falling faster than the CdU?

Such knowledge and hindsight was obviously not available to Adams in 1968. The decision to remove the men from exposure at the time was, of course, the only one to take in the circumstances. The same decision would certainly have been taken even with the knowledge of the rates of decrease in CdU for men removed from, and still exposed to, cadmium exposure.

REFERENCES
