Correspondence

be avoided if our aim is to create a good work environment. The exact meaning of words such as "adverse", "toxic", "disease", or "illness" is important but the process of defining them must not obstruct the improvement of the work environment.


These studies use often spot urine Hg concentrations readily available from routine biological monitoring strategies in the chloralkali and other Hg utilizing industries. Diurnal variation in the metal's excretion has been noted, but the higher concentrations found in morning samples compared with afternoon and evening samples have been suggested as being of no practical relevance in biological monitoring scheme.

Urinary Hg concentrations are said to reflect integrated exposure over the preceding weeks or months in workers with long term exposure. There has been debate about whether correction forms of correction for urinary concentration are better in reducing intra individual variation of urinary Hg and thus making a single spot measurement more closely reflect true Hg exposure.

Within day variation was studied in 17 workers with long term exposure to Hg vapour at a single factory. All spot urine samples were taken during a single day at the approximate times of of worknormal work pattern (1000, 1300, 1600, 1900, and 2200 hours). Mercury was measured by an automated method; creatinine, specific gravity (SG), and osmolality were also measured. The total analytical imprecision (CVT) for urinary Hg corrected for either creatinine, SG or osmolality was between 5% and 6%. All Hg measurements were either uncorrected (nmol/l) or per mg creatinine, to SG 1016, and to 500 mosmol. The between day variation was studied in 10 workers with relatively constant, long term exposure to Hg vapour at a single factory. Spot urine samples were taken from each worker on each day of the working week (five days). The samples from this study were uncorrected or corrected for creatinine concentration or for an SG of 1-016.

The mean (SD) of uncorrected Hg concentrations in the workers from the within day and between day studies were 58 (4-268) and 32 (6-50) nmol/mmol creatinine respectively. The table shows the calculated mean (SD) and quantities (CVT) for the intradiurnal coefficients of variation (CV) for urinary Hg results in the two studies and, the calculation of the mean CVs of corrected urinary Hg results with uncertainties. The data from the within day study confirmed the previously reported diurnal variation.

A low mean and SD of intradiurnal CVs derived from multiple spot urine Hg values would imply that a single urine sample closely reflects the true Hg excretion in that individual subject. Creatinine correction of Hg concentration significantly reduced mean intradiurnal variation, both between and within day, to about 50% of the variation in uncorrected urine values.


Comparison of mean CVs of corrected urinary Hg results with uncorrected results

<table>
<thead>
<tr>
<th>CV (%)</th>
<th>Hg concentration</th>
<th>mean (SD)</th>
<th>CV (%)</th>
<th>Hg concentration</th>
<th>mean (SD)</th>
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<td>SVM (1-016)</td>
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<td>SVM (1-016)</td>
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<td>Osmolality (SD)</td>
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<td>With</td>
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<td>Uncorrected (SD)</td>
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<td>day (100 subjects)</td>
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<td>day (10 subjects)</td>
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<tr>
<td></td>
<td>p &lt; 0-01</td>
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<td></td>
<td></td>
<td>p &lt; 0-05</td>
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<td></td>
<td>47-3 (22-2)%</td>
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<td></td>
<td></td>
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<td>p &lt; 0-01</td>
<td></td>
<td></td>
<td>37-3 (23-6)%</td>
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</tr>
</tbody>
</table>

|        |        |        |        |        |        |        |        |    36-5 (15-1)%   |
|        |        |        |        |        |        |        |        | 47-3 (22-2)%     |

The correction of urinary mercury concentrations in untimed, random urine samples.

Editor,—We note with interest the continuing number of reports defining dose-effect relations for occupational exposure to mercury (Hg) that have used urinary Hg concentrations in "untimed, random samples (spot urines) either as a cumulative exposure dose" or a simple dose index. The uncertainty of the above calculation has been confirmed in a recent study of Hg workers (1).

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Coal mining, emphysema, and compensation revisited

NJ Wikeley

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