Correction

Heavy metal ions in wines: meta-analysis of target hazard quotients reveal health risks
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Abstract

Correction to Naughton DP, Petroczi A: Heavy metal ions in wines: meta-analysis of target hazard quotients reveals health risks. Chem Central J 2008, 2:22.
Correction

During preparation of a subsequent paper, we observed a computational error in the Target Hazard Quotients (THQ) listed in this work which have been inadvertently overestimated [1]. The overall results and conclusion of our paper with the corrected figures have remained valid. Corrections for Figures Four, Five and Six are given below in tabular form. The correct values with EFr = 365 days, ED_{tot-male} = 63.9 years and ED_{tot-female} = 66.7 years; BW_{male} = 83.11 kg, BW_{female} = 69.81 kg, AT = 6 years and 30 years (non-carcinogenic) are shown in Tables 1 and 2 (for Fig Four); and Tables 3 and 4 (for Figs Five and Six). Although in keeping with the literature, THQ values were calculated for AT = 30 years, given the effect metals are assumed to have on health and delayed onset, AT is likely to be below 30 years. As noted in the paper, the THQ values calculated are concerning in that they are mainly above the safe level of THQ ≤ 1, which premise holds for many cases with the adjusted THQ values. It must be emphasized that the THQ value is to be judged as either below or above 1, where any value above 1 is a cause for health concern. It is notable that i) choices in value input into averaging time (AT), ii) uncertainty factor regarding the oral reference dose (RfD) and iii) bioavailability can have significant effect on the THQ value. The THQ is designed to be a conservative estimate. However, further research is required in order to provide guidance on appropriate value choices.

Competing interests

The authors declare that they have no competing interests.

References

1. Naughton DP, Petroczi A: Heavy metal ions in wines: meta-analysis of target hazard quotients reveals health risks. Chem Central J 2008, 2:22.

Table 1: corrected combined THQ values for countries (AT = 6 years)

| Country       | SUM Male min | SUM Male max | SUM Female min | SUM Female max |
|---------------|--------------|--------------|----------------|----------------|
| Argentinean   | 0.021624     | 0.038379     | 0.026872       | 0.047693       |
| Australian    | 0.080282     | 0.359869     | 0.099765       | 0.447204       |
| Austrian      | 2.243322     | 5.447014     | 2.787739       | 6.768916       |
| Brazilian     | 0.000192     | 0.001068     | 0.000239       | 0.001327       |
| Czech         | 0.705472     | 2.476704     | 0.876679       | 3.07760        |
| French        | 2.114068     | 8.136375     | 2.627117       | 10.11094       |
| German        | 0.483296     | 5.512977     | 0.600584       | 6.850887       |
| Greek         | 0.192215     | 3.015917     | 0.238863       | 3.747830       |
| Hungarian     | 0.535830     | 14.63428     | 0.647560       | 17.45348       |
| Italian       | 0.000491     | 0.000726     | 0.000610       | 0.000902       |
| Jordanian     | 0.040045     | 2.405039     | 0.049763       | 2.988702       |
| Macedonian    | 0            | 1.441614     | 0              | 1.791470       |
| Portuguese    | 3.524521     | 5.126613     | 4.379865       | 6.370758       |
| Serbian       | 0.221963     | 1.438181     | 0.275829       | 1.787204       |
| Slovakian     | 0.000128     | 12.81552     | 0.000159       | 15.92563       |
| Spanish       | 0.864379     | 5.742503     | 1.074150       | 7.136116       |
Table 2: corrected combined THQ values for countries (AT = 30 years)

| Country     | SUM Male min | SUM Male max | SUM Female min | SUM Female max |
|-------------|--------------|--------------|----------------|----------------|
| Argentinean | 0.004325     | 0.007676     | 0.005374       | 0.009539       |
| Australian  | 0.016056     | 0.071974     | 0.019953       | 0.089441       |
| Austrian    | 0.448664     | 1.089403     | 0.557548       | 1.353783       |
| Brazilian   | 0.000038     | 0.000214     | 0.000048       | 0.000265       |
| Czech       | 0.141094     | 0.495341     | 0.175336       | 0.615552       |
| French      | 0.422814     | 1.627275     | 0.525423       | 2.022188       |
| German      | 0.096659     | 1.102595     | 0.120117       | 1.370177       |
| Greek       | 0.038443     | 0.603183     | 0.047773       | 0.749566       |
| Hungarian   | 0.107166     | 2.926856     | 0.129512       | 3.490697       |
| Italian     | 0.000098     | 0.000145     | 0.000122       | 0.000180       |
| Jordanian   | 0.008009     | 0.481008     | 0.009953       | 0.597740       |
| Macedonian  | 0.000000     | 0.288323     | 0.000000       | 0.358294       |
| Portuguese  | 0.704904     | 1.025323     | 0.875973       | 1.274152       |
| Serbian     | 0.044393     | 0.287636     | 0.055166       | 0.357441       |
| Slovakian   | 0.000026     | 2.563103     | 0.000032       | 3.185127       |
| Spanish     | 0.172876     | 1.148501     | 0.214830       | 1.427223       |
Table 3: Corrected mean THQ values for individual metals comparing red and white wines (AT = 6 years)

|                | Portuguese Red | Portuguese White | Czech Red | Czech White |
|----------------|----------------|------------------|-----------|------------|
| V (male)       | 0.775268       | 1.890116         | 2.082331  | 2.386671   |
| V (female)     | 0.963413       | 2.348816         | 2.587678  | 2.965878   |
| Mn (male)      | 0.201139       | 0.237065         | 0.230353  | 0.179058   |
| Mn (female)    | 0.249953       | 0.294597         | 0.286256  | 0.222512   |
| Ni (male)      | 0.029153       | 0.039244         | 0.061402  | 0.043649   |
| Ni (female)    | 0.036227       | 0.048768         | 0.076303  | 0.054242   |
| Zn (male)      | 0.068557       | 0.070586         | 0.078310  | 0.046986   |
| Zn (female)    | 0.085194       | 0.087716         | 0.097314  | 0.058389   |
| Cu (male)      | 0.189812       | 0.039244         | 0.140157  | 0.122137   |
| Cu (female)    | 0.235877       | 0.048768         | 0.174171  | 0.151777   |
| Cr (male)      | 0.000562       | 0.000699         |           |            |
| Cr (female)    | 0.000518       | 0.000644         |           |            |
| Pb (male)      | 0.000410       | 0.000308         | 0.000342  | 0.000667   |
| Pb (female)    | 0.000510       | 0.000383         | 0.000425  | 0.000829   |
### Table 4: Corrected mean THQ values for individual metals comparing red and white wines (AT = 30 years)

|                   | Portuguese Red | Portuguese White | Czech Red | Czech White |
|-------------------|----------------|------------------|-----------|-------------|
| V (male)          | 0.155054       | 0.378023         | 0.416466  | 0.477334    |
| V (female)        | 0.192683       | 0.469763         | 0.517536  | 0.593176    |
| Mn (male)         | 0.040228       | 0.047413         | 0.046071  | 0.035812    |
| Mn (female)       | 0.049991       | 0.058919         | 0.057251  | 0.044502    |
| Ni (male)         | 0.005831       | 0.007849         | 0.012280  | 0.008730    |
| Ni (female)       | 0.007245       | 0.009754         | 0.015261  | 0.010848    |
| Zn (male)         | 0.013711       | 0.014117         | 0.015662  | 0.009397    |
| Zn (female)       | 0.017039       | 0.017543         | 0.019463  | 0.011678    |
| Cu (male)         | 0.037962       | 0.007849         | 0.028031  | 0.024427    |
| Cu (female)       | 0.047175       | 0.009754         | 0.034834  | 0.030355    |
| Cr (male)         | 0.000112       | 0.000104         |           |             |
| Cr (female)       | 0.000140       | 0.000129         |           |             |
| Pb (male)         | 0.000082       | 0.000062         | 0.000068  | 0.000133    |
| Pb (female)       | 0.000102       | 0.000077         | 0.000085  | 0.000166    |