

Correction to Normalized Diurnal and Between-Day Trends in Illicit and Legal Drug Loads that Account for Changes in Population

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Environ. Sci. Technol. **2012**, *46* (15) 8305–8314; DOI:10.1021/es202447r

We thank Phong Thai and Jochen Mueller for pointing out an error in our calculations that combined measured creatinine loads (kg) associated with a municipality's wastewater together with a reported range in human urine output ($L_{\text{urine}}/\text{d}$) to estimate the municipality's population. The resulting estimated population was then compared to the census-based population. In addition, the original article erroneously reported a value $1.7 L_{\text{urine}}/\text{person} \cdot \text{day}$ instead of 1.6 in Table S8 as the upper value in the range of human urine output ($1.1 \pm 0.5 L/\text{person} \cdot \text{day}$) reported by Murakami et al.³ Corrected calculations indicate that the upper range of population estimated from creatinine measurements in wastewater is greater than originally reported. For example, on Wednesday the estimated population compared to the census-based population is 27–73% (Table S8) compared to 26–49% in the original report.

Despite this incrementally improved agreement with the census-based population, we wish to reiterate the point that creatinine biodegradation during transit in sewers may result in lower apparent creatinine loads. However, as originally stated, the rates of biodegradation and, thus its impact on absolute creatinine loads, may be effectively constant for a municipality and its fixed infrastructure. Thus, for a given municipality, creatinine mass loads may still be proportional to its actual population. What was not stated in the original article is that differences in infrastructure and wastewater residence times may limit the utility of creatinine for quantifying absolute differences in population between municipalities. Additional studies are warranted to further explore the limitations and advantages of using creatinine to discern changes in population in single and between multiple municipalities.

Specifically, the revised text on p. 8309 should read "The population of the municipality was then further estimated from Equation S3 by incorporating the reported average \pm one standard deviation of the volumes of urine produced per person per day ($1.1 \pm 0.5 L/\text{day}$) as reported by Murakami et al. for $n = 654$ subjects.⁵⁰ The estimated population ranged from

17 000 to 46 000 on Wednesday, which is 27–72% of the total maximum population (weekday with residents + commuters) down to a low of 9100 to 24 000 on Saturday, which is 17–44% of the resident-only (weekend) population (Table S8). As indicated earlier, the accuracy of the back-calculated population estimate is unknown and was not within the scope of the current study."

In addition, Equation S3 is now written

$$\text{population} = X \text{kg}_{\text{creat}} \times \frac{10^6 \text{mg}_{\text{creat}}}{\text{kg}_{\text{creat}}} \times \frac{L_{\text{urine}}}{1300 \text{mg}_{\text{creat}}} \times \frac{\text{person}}{Y L_{\text{urine}}}$$

where

$X \text{ kg}_{\text{creat}}$ = measured total mass (kg) of creatinine for the municipality on a given day

$Y L_{\text{urine}}/\text{person}$ = human urine output in L per day⁵⁰

Table S8 in the Supporting Information now reads as follows:

Table S8. Estimated Population Computed from Equation S3 Using Total Measured Creatinine Mass for the Four Days and Urine Volumes \pm One Standard Deviation (L/d) as Reported by Murakami et al.³

	total measured creatinine mass (kg) ^a	0.60 $L_{\text{urine}}/\text{person} \cdot \text{d}$	estimated population ^b	1.1 $L_{\text{urine}}/\text{person} \cdot \text{d}$	1.6 $L_{\text{urine}}/\text{person} \cdot \text{d}$	% of Population ^c
Wednesday	36	46 000	25 000		17 000	27–72%
Thursday	27	35 000	19 000		13 000	20–55%
Friday	22	28 000	15 000		11 000	17–44%
Saturday	19	24 000	13 000		9100	17–44%

^aTotal measured mass of creatinine taken from Table 1. ^bEstimated population computed from Equation S3 using average urine volumes \pm one standard deviation ($L/\text{person} \cdot \text{d}$) for $n = 654$ individuals as reported by Murakami et al.³ ^cPopulation Base Estimate: Wednesday–Friday = 2010 census-based population (54 462) + commuters (9000) = 63 462 and for Saturday = 2010 census-based population (54 462).

Published: October 3, 2013