Reviewer's report

Title: Metals and trace element concentrations in breast milk of first time healthy mothers

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Reviewer: Birger Heinzow

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Very little is known about secretion of trace elements into human milk thus this is highly appreciated and fills a gap in the field, because there are no recent studies on essential and toxic elements in breast milk from European women.

The manuscript is well written and concise.

The current textbook opinion on the mineral content in human milk is taught to be fairly constant because of physiological regulation and homeostasis. There is little circadian and within-feeding variation, diet; maternal age and parity also seem to have little influence on most elements.

Minor Essential Revisions

Differences in mineral content between the two surveys are very interesting and some observations in the study deserve more discussion.

“Large interindividual and over time differences were detected for Na concentrations…”

It is quite remarkable, the difference in composition of milk and blood plasma, both have similar osmolarity but striking differences: lower sodium and higher Potassium concentrations in milk.

“Arsenic and B were positively correlated with fish consumption…”

Discussion if fish is a known source for boron, a comment on selenium, where seafood is a possible source would be welcomed.

Zinc is actively transported, and essential for growth, a reduced growth rate might be related to depletion and low zinc levels in milk, maternal supplements will then be required.

Calcium and other minerals (Na, K) are comparably low in human milk compared to bovine milk, except copper which also shows great variation between mothers.

If available information on osmolarity of the samples and fat and casein content would be valuable information concerning homogeneity of the samples collected.

Page 9: are the values normal or log-normal distributed?

Page 11: “or is affected by” delete: is
Page 12: “Although, breast milk Na concentration is reported to decrease during the lactation period [10, 21], the observed difference may reflect a true increase in Na intake over time, since there has been a substantial increase in the intake of salt through food among Swedes since the 1980’s.”

This is a very interesting because unexpected observation is there information on variation of Na because of salt intake? What is known: Sodium might be elevated during weaning! and impaired lactation (inter alia: mastitis).

Page 13
The strikingly low Selenium status of Swedish women should be discussed by means of recent information on serum Se in Sweden rather than a 20 year old view, was selenium related to fish and correlated with arsenic? If not, this might be worth mentioning. Selenium in human milk declines during the course of breastfeeding, depleting the mother within a couple of months:

Thus a low start at 10 µg might have some health implication on selenium-status of mother and child and this information should be pointed out and might even require supplementation. Discussion of these aspects is essential.

Page 15 “Based on the fact that breast milk B concentrations were 60-100% of plasma B concentrations...“

Referring further to this interesting aspect here: It would be very valuable to enrich table 2 with recent plasma concentration data from Sweden.

Page 16:
“Also, little is known about Ag and U concentrations in breast milk, which varied largely in our samples, indicating some influence of maternal exposure to these elements.”

Uranium is very important and shows high CV, drinking water might be a source, if the water supply comes from different wells.

For some elements the correlations are mentioned in the text I encourage the authors to include a correlation table of all elements, this will be useful for studies in the future and in other countries.

Finally a toxicological assessment of the values of the toxic elements, i.e. lead, uranium et al with a comment that the concentration of these elements is low compared to drinking water and that they pose no risk would be appropriate.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

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

Declaration of competing interests:

No conflicting interest, me no have