British Journal of Nutrition (2016), **116**, 377–379
doi:10.1017/S0007114516002014

British Journal of Nutrition

Corrigendum

Does prenatal exposure to vitamin D-fortified margarine and milk alter birth weight? A societal experiment – CORRIGENDUM

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(First published online 19 May 2016)

DOI:10.1017/S0007114514001330

In our recent paper '*Does prenatal exposure to vitamin D-fortified margarine and milk alter birth weight? A societal experiment*' published in *British Journal of Nutrition* we explored the association between a national vitamin D fortification programmes of margarine and milk and birth weight[1]. Based on available official documents from the Nordic Council of Ministers the initiation of vitamin D fortification of margarine was introduced in 1961[2]. However, we have recently uncovered evidence from old law texts that questions this onset date. This information source suggests that mandatory fortification apparently started even before World War II for vitamin D and for vitamin A[3]. While this new evidence makes the onset date of the vitamin D fortification of margarine uncertain all sources of information that we have come across confirms that the date of termination of the fortification programme was indeed in 1985[4].

For the voluntary vitamin D fortification of milk insecurity has arisen about the termination date in 1976. A similar Ministerial order that cancelled the permission to fortify milk in 1976[5] appears to have been issued in 1974 as well[6]. Which of the two Ministerial orders that in reality cancelled the milk fortification is unclear. The voluntary vitamin D fortification of milk was, however, confirmed to commence in 1972 by all law texts[7].

During the study period margarine was also fortified with vitamin A, and the new evidence reveals that the vitamin A dose was increased by 25 % (from 20 to 25 IU/g) in 1962[3]. There were also minor increases in 1971 from 25 to 26 IU/g[8] and in 1985 from 26 to 28 IU/g[4].

Therefore, we request the editor and readers to disregard the estimates based on analyses in 1961 and 1976, and to keep in mind that changes in vitamin A fortification also took place (Fig. 1).

In the original paper we investigated potential effects of prenatal exposure to vitamin D fortification on mean birth weight and risk of low and high birth weight. We found no difference in risk of low and high birth weight between exposed and non-exposed children. Contrary to our expectations, we found inconsistent effects of the vitamin D fortification on mean birth weight; the mean birth weight was lower among exposed than non-exposed in all analyses except in the analyses based on margarine fortification in 1961 (Fig. 2). However, the mean difference in birth weight did not exceed 60 grams, and we questioned the clinical relevance.

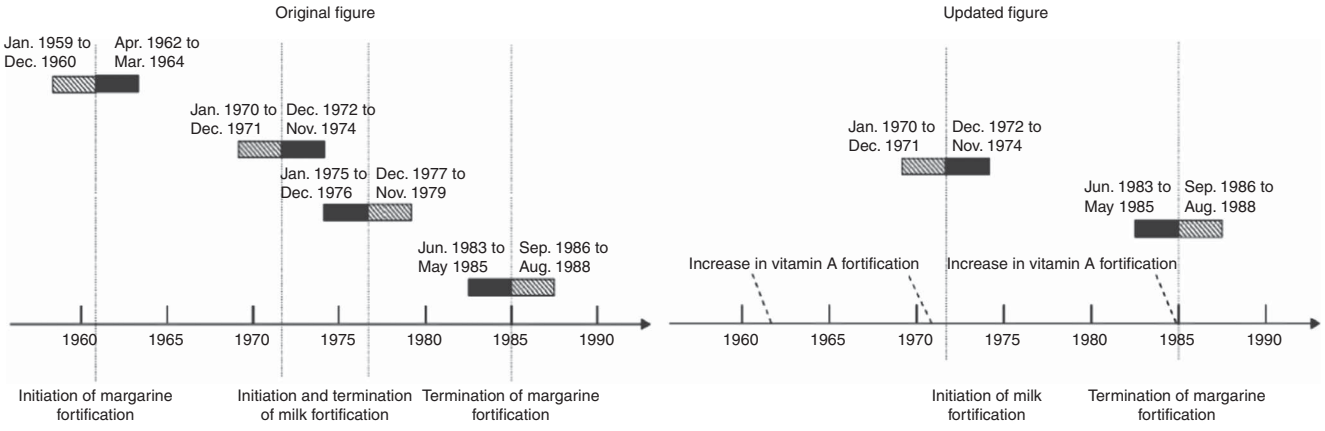

Fig. 1. Original and updated figures illustrating the timeline of the study. In the original figure the four vitamin D fortification events (initiation and termination of margarine and milk fortification) are indicated. The updated figure includes the initiation of milk fortification, the termination of margarine fortification, and the three time points for increase in vitamin A fortification dose. Figure modified from Jensen *et al.*[1]. ▧, Non-exposed; ■, Exposed.

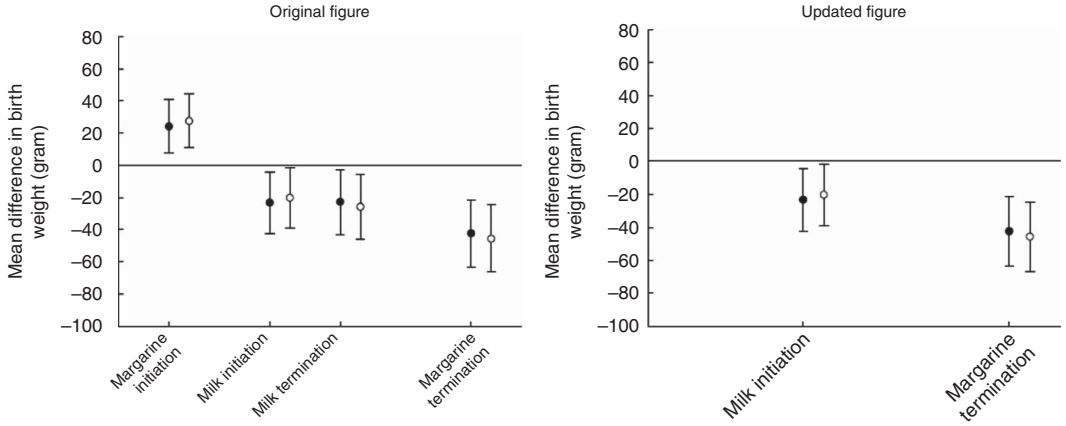

Fig. 2. Mean difference in birth weight (gram) between children exposed to vitamin D fortification prenatally and non-exposed children (exposed − non-exposed) who were born during the years around the initiation and termination of margarine and milk fortification. Crude differences (●) and differences adjusted for the secular trend in birth weight (○). The updated figure includes results based on the initiation of milk fortification and the termination of margarine fortification. Figure modified from Jensen *et al.*[1].

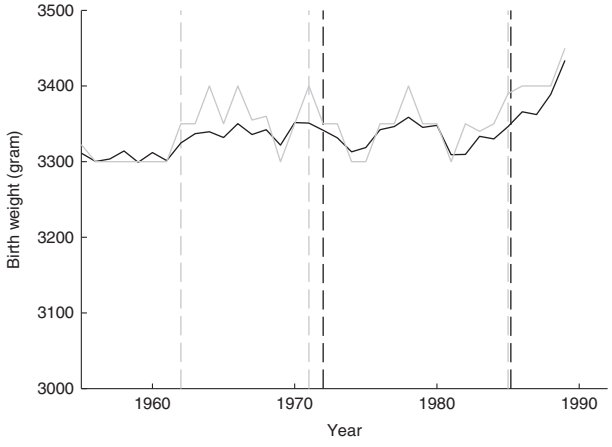

Fig. 3. Annual mean and median birth weight (gram) across the study period. Vertical lines indicate timing of the increases in vitamin A dose and initiation of vitamin D milk fortification and termination of vitamin D margarine fortification. ——, Mean; ——, median; — —, vitamin A event; — —, vitamin D event.

Excluding the analyses based on margarine fortification in 1961 and milk fortification in 1976 removes the inconsistency in the mean birth weight results and leaves the impression that prenatal exposure to vitamin D fortified foods is associated with lower mean birth weight (Fig. 2). The timing of both of these remaining analyses coincides with small increases in dose of vitamin A fortification, and we cannot exclude that this could have influenced the results. However, the increases in vitamin A dose in 1971 and 1985 were very small (1-2 IU/g), and we have found no evidence to support an association between prenatal vitamin A and birth weight in an affluent population like the Danish.

Overall, when examining trend in birth weight across the study period we found no suggestions of societal influences on birth weight from neither the changes in vitamin D fortification policies nor the changes in vitamin A fortification dose (Fig. 3).

The effect of prenatal exposure to vitamin D-fortified foods on birth weight has yet to be investigated by others. Our results may be compared to results from trials of vitamin D supplementation in pregnancy. However, doses of supplemented vitamin D are often 100-fold or more higher than doses supplied by fortification, hampering comparison of results. The results from the previous trials of vitamin D supplementation have shown either no effect or a direct effect of vitamin D on birth weight[9]. Cautious interpretation of our inverse association between vitamin D fortification and mean birth weight is warranted.

In our original paper, we speculated that the inconsistency in effect of vitamin D could be a result of pre-conceptional programming, and we proposed maternal vitamin D status or obesity before conception as potential explanations. Even though the results that inspired us no longer can be interpreted that way, we still suggest that it is worthwhile to consider that exposures before conception might influence fetal programming.

In light of the existing literature and the insecurities of our study design, we suggest that the results of our study should not be interpreted as evidence of an association between prenatal exposure to vitamin D fortification and birth weight. We conclude that the Danish national vitamin D fortification programmes did not seem to have an impact on birth weight.

Sincerely yours,

Jensen CB, Stougård M, Sørensen TIA and Heitmann BL.

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