Increased iodine deficiency in Victoria, Australia: analysis of neonatal thyroid-stimulating hormone data, 2001 to 2006

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To the Editor: Rahman and colleagues suggest that iodine deficiency in Victoria increased between 2001 and 2006, based on the findings of thyroid-stimulating hormone (TSH) levels in neonates at routine newborn screening.[1] Indeed, their data as presented suggest a doubling of the percentage of mothers with iodine deficiency to over 9% during that period. This could be correct. Certainly, as they state, there is much evidence to suggest that there is mild iodine deficiency in Australia. However, there are caveats about the data they report which are not mentioned.

Data from New South Wales do not show this trend. While they do suggest a degree of mild iodine deficiency, there was no increase in the percentage of neonates with TSH levels >5 mIU/L of whole blood from 2002 to 2009 (Box), although the average age at sampling falls slightly (from 2.96 to 2.32 days) over this period.

The World Health Organization has defined iodine sufficiency as being indicated, inter alia, when more than 3% of newborns aged 3–4 days have a TSH level >5 mIU/L of whole blood.[2] Factors that affect the TSH level in a newborn screening program include the precise age at sampling, and any changes to the method of TSH analysis used. In a Swiss study assessing the efficacy of iodine supplementation, there was a small but significant decrease in the TSH level from Day 3 to Day 4 of age.[3] This is unsurprising: following the TSH surge in the first hours after birth, TSH levels decline gradually to a steady level at about Day 7.[4]

There could well have been a trend to earlier sampling in Victoria, within the bounds of the 2–4 days of age assay that Rahman and colleagues mention, over the period studied, but these crucial data are not given. The dried blood spot TSH assay method is not described either. A change in any aspect of the methodology; for example, if the manufacturer modified the antibody used, may produce a small, clinically insignificant but numerically significant, change in results.

If the data presented by Rahman and colleagues for Victoria do not have these biases, then the situation warrants further investigation, but whatever is happening in Victoria seems not to be replicated over the border.

Percentage of newborns with thyroid-stimulating hormone (TSH) level >5 mIU/L of whole blood, detected by routine newborn screening in New South Wales, by year

Year	Newborns with TSH level >5 mIU/L
2002	3.80%
2003	3.68%
2004	3.87%
2005	5.02%
2006	4.48%
2007	3.56%
2008	3.92%
2009	4.00%

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1 Rahman A, Savige GS, Deacon NJ, et al. Increased iodine deficiency in Victoria, Australia: analysis of neonatal thyroid-stimulating hormone data, 2001 to 2006. *Med J Aust* 2010; 193: 503-505.
2 World Health Organization, United Nations Children's Fund, and International Council for the Control of Iodine Deficiency Disorders. Assessment of iodine deficiency disorders and monitoring their elimination. A guide for programme managers. 3rd ed. Geneva: WHO, 2007.
3 Zimmermann MB, Aeberli I, Torresani T, Bürgi H. Increasing the iodine concentration in the Swiss iodized salt program markedly improved iodine status in pregnant women and children: a 5-y prospective national study. *Am J Clin Nutr* 2005; 82: 388-392.
4 Lafranchi SH. Newborn screening strategies for congenital hypothyroidism: an update. *J Inherit Metab Dis* 2010; 33 Suppl 2: S225-S233. ❑

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In reply: The methods used for blood sample collection and analysis remained unchanged during our data collection period. One source of thyroid-stimulating hormone (TSH) calibrators and reagents was used over the study period by a single laboratory covering all of Victoria. Material from the United States Centers for

Percentage of newborns with thyroid-stimulating hormone (TSH) level >5 mIU/L for blood samples collected at 48, 72 and 96 hours after birth, Victoria, 2001–2006

Sample collection time (h)	Percentage of neonates with TSH >5 mIU/L according to birth year					
	2001	2002	2003	2004	2005	2006
48	5.73%	6.83%	8.47%	10.58%	11.86%	13.53%
72	4.20%	5.15%	6.87%	7.01%	9.13%	9.38%
96	2.49%	3.21%	4.37%	3.78%	5.98%	5.34%

Disease Control and Prevention was used for external quality assurance, ensuring that the results were in agreement with those of other laboratories. The per cent coefficient of variation over the period ranged from 10% to 20%.

The table of neonatal TSH values for New South Wales provided by Wilcken and Wiley further demonstrates the value of using TSH levels as a screening tool for population iodine status, even with a decreasing mean age of sample collection. While we dealt with the effect of sample collection time in our published article,[1] here we present a table illustrating analysis of the Victorian neonatal TSH values for samples collected at 48, 72 and 96 hours after birth (Box). The percentage of elevated TSH values increased from 2001 to 2006 at each collection time and, although the percentage of elevated TSH values decreased with increasing age, these values were still indicative of iodine deficiency.

Iodine status varies between regions. The National Iodine Nutrition Study (NINS) found both South Australia and Queensland iodine sufficient, while the neighbouring states of NSW and Victoria were iodine deficient.[2] The results also indicated that iodine status was worse in Victoria than in NSW; therefore, we might expect similar differences in TSH values. We are now in the process of analysing Victorian TSH values for 2007 to 2010.

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1 Rahman A, Savige GS, Deacon NJ, et al. Increased iodine deficiency in Victoria, Australia: analysis of neonatal thyroid-stimulating hormone data, 2001 to 2006. *Med J Aust* 2010; 193: 503-505.
2 Li M, Eastman CJ, Waite KV, et al. Are Australian children iodine deficient? Results of the Australian National Iodine Nutrition Study. *Med J Aust* 2006; 184: 165-169. ❑