

## **Literacy Advisory Panel's Community Consultation**

Attention: Literacy Advisory Panel  
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Dear members of the Literacy Advisory Panel,

We would like to draw your attention to some important Tasmanian research in the nutrition sphere that shows clear links to literacy outcomes in Tasmanian school children, which, to date, has not been considered as part of the consultation process for developing a community-wide framework to improve literacy in Tasmania.

The research, which we briefly outline below, has the potential to positively impact and improve literacy outcomes moving forward in Tasmania, via the provision of adequate iodine nutrition to Tasmanian women of child-bearing age.

### **Background information**

Iodine is an essential micronutrient required during foetal and early childhood for production of thyroid hormones required for a range of motor, cognitive, and auditory developmental processes. Mothers and children with inadequate iodine nutrition are at risk of a range of deleterious outcomes, known as Iodine Deficiency Disorders (IDD). In utero, at its most severe, sub-optimal maternal iodine can lead to spontaneous abortion, stillbirth, congenital abnormalities, mental deficiency (including mutism, spastic diplegia, and squint). But IDD occur along a continuum and even mild iodine deficiency in utero and childhood can lead to impaired cognitive function.

Tasmania has a long history of iodine deficiency, with numerous public health interventions implemented to improve iodine nutrition, including the 2001 introduction of a voluntary program of bread fortification in Tasmania, following the re-emergence of mild iodine deficiency in the 1990s. This program became mandatory across Australia and New Zealand in 2009, and we are pleased to report that regular population monitoring indicates that the “general population” in Tasmania is currently receiving adequate iodine intake.

Unfortunately, research indicates that Tasmanian women of child-bearing age, particularly those who are pregnant or breast-feeding remain at risk of inadequate iodine intake. At

these times, women require additional iodine to meet not only their needs, but the needs of their unborn child and breastfed infant. Despite a 2010 National Health and Medical Research Council (NHMRC) recommendation that all women in Australia take a daily iodine supplement when planning pregnancy (pre-conception) and throughout pregnancy and breastfeeding, Tasmanian data (from research conducted at the Royal Hobart Hospital and two Child and Family Learning Centres) indicates that most women are unaware of this advice and many are not receiving adequate iodine intake and are therefore unknowingly putting their offspring at risk of IDD.

### **Relevance to literacy**

In 2013, analysis of National Assessment Program – Literacy and Numeracy (NAPLAN) and Tasmania State Government Student Assessment and Reporting Information System (SARIS) data, revealed an association between mild iodine deficiency during pregnancy with literacy outcomes in the offspring. Children born to mothers with inadequate iodine intake during pregnancy had reductions of 10% in NAPLAN spelling, 7.6% in NAPLAN grammar and 5.7% in SARIS English-literacy, compared to their peers whose mothers had adequate iodine during pregnancy. The associations remained after adjustment for biological and socioeconomic factors that may impact literary outcomes.

The children in this cohort were followed through their school and the differences between the inadequate and adequate maternal iodine groups, although reduced over time, remained significantly different for NAPLAN spelling at Year 5 (6.6%), Year 7 (6.1%) and Year 9 (5.6%). Testing in Year 10 suggested that mild iodine deficiency during gestation had impacted parts of the brain involved in working memory and auditory processing speed.

### **Improving literacy**

Our current program of work is investigating ways of ensuring women of child-bearing age are aware of the current NHMRC guidelines with respect to iodine supplementation pre-conception and during pregnancy and breast-feeding. We are interested in educating caregivers of women during their reproductive years, as evidence shows that midwives, GPs, obstetricians, pharmacists, and other providers of maternal services are not aware of the NHMRC recommendations. A report including enablers and barriers to iodine supplementation, identified by women attending Child and Family Learning Centres (CFLCs), will be available soon; as will the findings of a study investigating the level of knowledge of iodine nutrition amongst Tasmanian pharmacists and pharmacy staff. This work fits within the 1000 days framework, which has been identified as an important part of antenatal care.

We would welcome the opportunity to provide detailed contribution into the community-wide framework. Our findings relate particularly to the first 1000 days, and even before this given the importance of adequate maternal iodine nutrition pre-conception period. Ensuring that all Tasmanian women of child-bearing age have access to iodine supplements will help improve iodine nutrition and reduce the risks of long-term, irreversible impacts on brain

development that manifest as persistent deficits in literacy in the offspring. Action is required to eliminate this preventable outcome and ensure that no more Tasmanian children are prevented from reaching their full cognitive potential.

Please see below citations for relevant research papers regarding this subject:

- Hynes KL, Otahal P, Hay I, Burgess JR, 'Mild Iodine Deficiency During Pregnancy Is Associated With Reduced Educational Outcomes in the Offspring: 9-Year Follow-up of the Gestational Iodine Cohort', *Journal of Clinical Endocrinology and Metabolism*, 98, (5) pp. 1954-1962. ISSN 0021-972X (2013), DOI: [10.1210/jc.2012-4249](https://doi.org/10.1210/jc.2012-4249)
- Hynes KL, Otahal P, Burgess JR, Oddy WH, Hay I, 'Reduced educational outcomes persist into adolescence following mild iodine deficiency in utero, despite adequacy in childhood: 15-year follow-up of the gestational iodine cohort investigating auditory processing speed and working memory', *Nutrients*, 9, (12) Article 1354. ISSN 2072-6643 (2017), DOI: [10.3390/nu9121354](https://doi.org/10.3390/nu9121354) (Note; this link <https://www.mdpi.com/2072-6643/11/6/1272> , contains a correction to the original paper).
- Hynes KL, Seal JA, Otahal P, Oddy WH, Burgess JR, 'Women remain at risk of iodine deficiency during pregnancy: the importance of iodine supplementation before conception and throughout gestation', *Nutrients*, 11, (1) Article 172. ISSN 2072-6643 (2019), DOI: [10.3390/nu11010172](https://doi.org/10.3390/nu11010172)
- Hay I, Hynes KL, Burgess J, 'Mild-to-moderate gestational iodine deficiency processing disorder', *Nutrients*, 11, (9) Article 1974. ISSN 2072-6643 (2019), DOI: [10.3390/nu11091974](https://doi.org/10.3390/nu11091974)
- Hynes K, 'Still at risk! An urgent plea for action to eliminate persistent iodine deficiency in Tasmanian women of reproductive age', *Iodophor, tamed iodine: The status of iodine in Tasmania*, Gatekeeper Press, PAC Richards et al (ed), Australia, pp. 195-230. ISBN 9780648976202 (2020) [Research Book Chapter]

Yours sincerely,

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