

2011 Review of Kidney Health Australia Fluoride Position Statement

Background

In Australia, the first inclusion of fluoride into community drinking water occurred in Tasmania in 1953. Since that time, all Australian capital cities and the majority of regional areas have implemented water fluoridation. Current optimal fluoride levels vary according to climate and local water needs but range from 0.6 mg/L to 1.0 mg/L¹, with a recommended maximum of 1.5 mg/L².

The aim of water fluoridation is to adjust the natural fluoride concentration in water to that recommended for optimal dental health. This requires a balance between reducing dental decay and limiting the prevalence of dental fluorosis and accumulation of fluoride in the body. Healthy kidneys are responsible for removing approximately half of all fluoride that is consumed. If the kidneys are not functioning properly, then less fluoride is eliminated from the body.

In 2007 Kidney Health Australia (KHA) published a Position Statement '*The Risks of Consumption of Fluoridated Water for People with Chronic Kidney Disease (CKD)*'³. On the basis of available evidence (up to 1 June 2006) KHA developed the following position regarding consumption of optimally fluoridated drinking water:

- There is no evidence that consumption of optimally fluoridated drinking water increases the risk of developing CKD, although only limited studies addressing this issue are available
- There is consistent evidence that impairment of kidney function results in changes to the way in which fluoride is metabolised and eliminated from the body resulting in an increased burden of fluoride
- There is no evidence that consumption of optimally fluoridated drinking water poses any health risks for people with CKD, although only limited studies addressing this issue are available
- There is limited evidence that people with stage 4 or 5 CKD who ingest substances with a high concentration of fluoride (which exceeds the optimal dose) may be at risk of fluorosis
- Monitoring of fluoride intake and avoidance of fluoride-rich substances would be prudent for people with stage 4 or 5 CKD, in addition to regular investigations for possible signs of fluorosis
- Fluoride concentrations in the final feed water to the dialysis machine must comply with established water quality guidelines

The publication of the evidence base for this Position Statement⁴ led to correspondence which counter-argued that fluoride can be consumed from multiple dietary sources, that measurement of fluoride levels are not routine for people with stage 4 or 5 CKD, and that detection of side-effects of excessive fluoride intake such as skeletal fluorosis can be problematical⁵.

Domestic and International Developments

In the four years since the development of this Position Statement, fluoridation of community water supplies has continued to expand in previously un-fluoridated regional areas of Queensland and Victoria. In 2007, the National Health and Medical Research Council (NHMRC) published an update of their 1999 *Review of Water Fluoridation and Fluoride Intake from Discretionary Fluoride Supplements*⁶. While the latest NHMRC report presents analyses of the scientific literature pertaining to the health effects of fluoride and fluoridation from 1996 to 2006, the potential interaction of reduced kidney function and fluoride toxicity is not discussed.

In 2008 the United States (US) National Kidney Foundation (NKF) updated their 1981 position paper on *Fluoride Intake in Chronic Kidney Disease*. The NKF report reiterated the previous position that there is insufficient evidence at this time to recommend the use of fluoride-free drinking water for all patients with renal disease, and concluded that the NKF has “no position on the optimal fluoridation of water”⁷.

In January 2011 the US Department of Health and Human Services proposed to revise the optimal level of fluoride used in water programs in the US from a range of 0.7 – 1.2 mg/L to a single level of 0.7 mg/L. Australian dental experts⁸ and government health departments⁹ highlighted several differences between the US and Australian experience, including the unavailability of low-fluoride children’s toothpastes in the US and high natural levels of fluoride in many US water supplies. As such, they have agreed that the current water fluoridation policy continues to be appropriate for Australia.

Literature Review

In light of these recent developments, we repeated our previous literature review to determine if any new studies had been published with regards to the following research questions:

- (1) Does consumption of fluoridated drinking water increase the risk of developing CKD?
- (2) Are there negative health effects for people with kidney disease who consume fluoridated drinking water?

(3) Are there particular risks for people using fluoridated water for dialysis?

The original literature review search was repeated (see previous literature review⁴ for the detailed search strategy), with databases searched from 1 July to 1 May 2011. The searches resulted in the identification of 1 new eligible study.

Itai and colleagues¹⁰ investigated fasting serum fluoride concentrations in a cohort of healthy subjects aged 40 to 69 years. Using estimated glomerular filtration rate (eGFR) they confirmed that serum fluoride concentrations in healthy adults increase with an age-related decline in kidney function. However, the clinical significance of this finding is unclear, as both the mean serum fluoride concentrations and eGFR values were within the normal ranges.

This new study reiterates one of the conclusions of the 2007 Position Statement that “there is consistent evidence that impairment of kidney function results in changes to the way in which fluoride is metabolised and eliminated from the body resulting in an increased burden of fluoride”. No additional new evidence regarding the three research questions was identified.

Conclusion

There has been no new published evidence to contradict the 2007 KHA Position Statement.

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References

- (1) National Health and Medical Research Council (NHMRC). A systematic review of the efficacy and safety of water fluoridation. Australian Government, Canberra; 2007.
- (2) NHMRC, NRMCC. Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council, National Resource Management Ministerial Council, Commonwealth of Australia, Canberra; 2011.
- (3) Kidney Health Australia. The Risks of Consumption of Fluoridated Water for People with Chronic Kidney Disease: A Position Statement. 2007.
- (4) Ludlow M, Luxton G, Mathew T. Effects of fluoridation of community water supplies for people with chronic kidney disease. *Nephrol Dial Transplant* 2007;22(10):2763-7.
- (5) Schiff H, Schiff. Fluoridation of drinking water and chronic kidney disease: absence of evidence is not evidence of absence. *Nephrol Dial Transplant* 2007;23(1):411.
- (6) National Health and Medical Research Council (NHMRC). Review of Water Fluoridation and Fluoride Intake from Discretionary Fluoride Supplements. NHMRC, Melbourne; 1999.
- (7) United States National Kidney Foundation. Fluoride Intake in Chronic Kidney Disease. 2008.
- (8) Spencer J, Do L. Comments on the proposed US HHS recommendation on fluoride concentration in drinking water. ARCPOH, The University of Adelaide, Australia; 2011.
- (9) Department of Health V. Fluoride concentration in Australia's drinking water. 2011.
- (10) Itai K, Onoda T, Nohara M et al. Serum ionic fluoride concentrations are related to renal function and menopause status but not to age in a Japanese general population. *Clinica Chimica Acta* 2010 February;411(3-4):263-6.