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Impact of downward adjustment of water fluoride concentration on fluorosis

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Objective: To determine the impact of downward adjustment of water fluoride concentration (2007) from 0.8-1.0ppm to 0.6-0.8ppm on prevalence of fluorosis in 8-year-olds.

Methods: Ethical approval was obtained. A random sample of 8-year-olds in Cork/Kerry and Dublin were clinically examined for fluorosis in 2016-17. Parents/caregivers completed a demographics and oral health behaviours questionnaire. Based on complete residential history, children were categorised as having lifetime/no exposure to community water fluoridation (Full-F/Non-F). Prevalence of fluorosis (Dean's Index scores very mild/mild/moderate) in 2016-17 (9 years post-adjustment) was compared with prevalence of fluorosis in 1224 8-year-olds (Full-F: Dublin n=671, Cork/Kerry n=325 Non-F: Cork/Kerry n=228) in the same regions in 2002 (5 years pre-adjustment). Effect of examination year on prevalence of fluorosis was assessed using multivariate logistic regression analyses controlling for socio-demographic variables and tooth-brushing behaviours. Significance level was $p < 0.05$.

Results: Of 2304 8-year-olds examined for fluorosis in 2016-17, 1846 were categorised Full-F (Dublin: n=703, Cork/Kerry: n=371) or Non-F (Cork/Kerry: n=772). In 2016-17 [vs 2002], prevalence of fluorosis was 18.1% [15.5%] in Dublin Full-F, 11.6% [12.9%] in Cork/Kerry Full-F, and 5.2% [2.6%] in Cork/Kerry Non-F. In 2016-17 [vs 2002] prevalence of very mild fluorosis was 14.1% [11.2%] in Dublin Full-F, 9.2% [7.7%] in Cork/Kerry Full-F and 4.9% [2.6%] in Cork/Kerry Non-F. In 2016-17 [vs 2002] prevalence of mild fluorosis was 3.7% [3.6%] in Dublin Full-F, 2.2% [5.2%] in Cork/Kerry Full-F and 0.3% [0.0%] in Cork/Kerry Non-F. At both time points, prevalence of moderate fluorosis was $\leq 1\%$ in Dublin and Cork/Kerry Full-F, and zero in Cork/Kerry Non-F. In multivariate analyses, there was no statistically significant difference in prevalence of fluorosis in 2016-17 compared to 2002 in Dublin ($p=0.27$), Cork/Kerry Full-F ($p=0.91$) or Cork/Kerry Non-F ($p=0.18$) holding all other variables constant.

Conclusions: There is no difference in the prevalence of fluorosis in 2016-17 following downward adjustment of water fluoride concentration.