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Impact of downward adjustment of water fluoride concentration on caries

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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 and severity of caries in primary teeth of 8-year-olds.

Methods: Ethical approval was obtained. A random sample of 8-year-olds in Cork/Kerry and Dublin were clinically examined for dentinal caries in primary teeth in 2016-17. Parents/caregivers completed a demographics/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 and severity of caries ($d_{3vc}mft\ cde$) in 2016-17 (9 years post-adjustment) were compared with data for 1244 8-year-olds (Full-F: Dublin n=679, Cork/Kerry n=332, Non-F: Cork/Kerry n=233) in the same regions in 2002 (5 years pre-adjustment). The effect of examination year on prevalence and severity of caries was assessed using multivariate regression analyses (Hurdle model) controlling for age, socio-economic status, age at first dental visit, toothbrushing and dietary behaviours. Significance level was $p < 0.05$.

Results: Of 2308 8-years-olds examined for caries in 2016-17, 1849 were categorised Full-F (Dublin: 704, Cork/Kerry: 375) or Non-F (Cork/Kerry:770). In 2016/17 [vs 2002], prevalence of caries ($d_{3vc}mft\ cde > 0$) was 55% [54%] in Dublin Full-F, 56% [55%] in Cork/Kerry Full-F, and 65% [73%] in Cork/Kerry Non-F. In 2016-17 [vs 2002], mean (standard deviation) $d_{3vc}mft\ cde$ in Dublin Full-F was 1.9 (2.4) [1.8 (2.2)], in Cork/Kerry Full-F 2.1 (2.6) [1.9 (2.4)] and in Cork/Kerry Non-F 2.7 (2.8) [3.5 (3.1)]. There was no statistically significant difference in prevalence or severity of caries in 2016-17 compared to 2002 in Dublin Full-F, Cork/Kerry Full-F or in prevalence of caries in Cork/Kerry Non-F (all $p > 0.05$). In Cork-Kerry Non-F, children examined in 2016-17 had less severe caries than in 2002 ($p = 0.03$).

Conclusions: Prevalence and severity of caries in primary teeth in Cork/Kerry and Dublin Full-F are no different following adjustment of water fluoride concentration. Severity of caries in Cork/Kerry Non-F is less in 2016-17 than in 2002, while caries prevalence is no different.