Preventing Dental Caries: Community Water Fluoridation

Summary Evidence Tables for Updated Search Period (1999-2012)

Evidence on Fluorosis

Study details	Characteristics	Participants	Interventions	Outcomes
Author (Year): Acharya (2005) **Least:** Cross sectional **Country of study:** India **Geographic location:** Davangere, Southern India	**Urban/rural:** Rural **Unit of allocation:** Cluster **Year conducted:** Not reported **Fluoridation type:** Natural **Social class:** Reported to be broadly similar across groups but no supporting data provided **Other sources of fluoride:** Not reported **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Not reported	**Inclusion criteria:** Lifetime residency **Exclusion criteria:** Children who were not present at school on the day of examination were excluded from the study **Age:** 12-15 years **Gender:** 44.6% female; 55.3% male **Number of participants recruited:** 544	**Change in status:** No change, naturally occurring fluoride **5 sites:** **Comparison group 1:** 0.43ppm; n=163 **Comparison group 2:** 0.72ppm n=49 **Comparison group 3:** 1.1ppm n=96 **Comparison group 4:** 1.22ppm n=81 **Comparison group 5:** 3.41ppm n=155	**Outcome measure:** Fluorosis, Dean's Index, prevalence **Tooth type**: Permanent **Data:** **Group 1:** 16% **Group 2:** 51% **Group 3:** 56.2% **Group 4:** 54.3% **Group 5:** 100%
Author (Year): Alarcon-Herrera et al. (2001) **Least:** Cross sectional **Country of study:** Mexico **Geographic location:** Guadiana Valley including Durano City	**Urban/rural:** Mixed **Unit of allocation:** Cluster **Year conducted:** 1990 **Fluoridation type:** Natural **Social class:** Not reported **Other sources of fluoride:** Not reported **Residential history:** Lifetime residents **Ethnicity:** Not reported	**Inclusion criteria:** Lifetime residency **Exclusion criteria:** None reported **Age:** 6-12 years **Gender:** Not reported **Number of participants recruited:** 333	**Change in status:** No change, naturally occurring fluoride **5 sites:** **Comparison group 1:** 0.75ppm; n=97 **Comparison group 2:** 3.25ppm; n=112 **Comparison group 3:** 6.74ppm; n=38 **Comparison group 4:** 10.24ppm; n=27	**Outcome measure:** Fluorosis, Dean's Index, prevalence **Tooth type**: Permanent **Data:** **Group 1:** 76% **Group 2:** 86%

Study details	Characteristics	Participants	Interventions	Outcomes
	Other confounding: Bottled water consumption was thought to be higher in one of the high fluoride areas (>5ppm), presumably due to awareness of potential dangers **Funded by:** A project grant from the Mexican National Council of Science and Technology Conacyt – Sivilla, Project 9502160		**Comparison group 5:** 14ppm; n=59	**N.B.** Data for groups of <5ppm only used, as per inclusion criteria
Author (Year): AlDosari et al. (2010) **Least:** Cross sectional **Country of study:** Saudi Arabia **Geographic location:** National (with the exception of Central Province)	**Urban/rural:** Mixed **Unit of allocation:** Cluster **Year conducted:** Not reported **Fluoridation type:** Natural **Social class:** Not reported **Other sources of fluoride:** Considered as a limitation by authors but no data reported **Residential history:** Lifetime residents **Ethnicity:** All participants were Saudi Nationals **Funded by:** Grant from King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia, Project No. AT-20-47	**Inclusion criteria:** Saudi national children present in school on the day of examination. Lifetime residency. Children were to be aged 6-7 years; 12-13 years or 15-18years **Exclusion criteria:** Not reported **Age:** 6 – 18 years **Gender:** Reported to be approximately equal **Number of participants recruited:** 12,200	**Change in status:** No change, naturally occurring fluoride **7 sites:** **Comparison group 1:** 0-0.3ppm; n=4,675 **Comparison group 2:** 0.31-0.6ppm; n=3,738 **Comparison group 3:** 0.61-1ppm; n=1880 **Comparison group 4:** 1.01-1.5ppm; n=947 **Comparison group 5:** 1.51-2ppm; n=342 **Comparison group 6:** 2.01-2.5ppm; n=201 **Comparison group 7:** >2.5ppm; n=381	**Outcome measure:** Fluorosis, TF Index, prevalence **Tooth type:** Both permanent and deciduous **Data:** <u>6-7 yr olds:</u> **Group 1:** 14% **Group 2:** 14.4% **Group 3:** 19.4% **Group 4:** 32.6% **Group 5:** 28.7% **Group 6:** 34% **Group 7:** 34.2% <u>12-13 yr olds:</u> **Group 1:** 19.7% **Group 2:** 21.1% **Group 3:** 29.3% **Group 4:** 57.6% **Group 5:** 42.3%

Study details	Characteristics	Participants	Interventions	Outcomes
				Group 6: 72.8% **Group 7:** 57.7% **N.B.** Data for 15 – 18 year olds was not reported in published work
Author (Year): Awadia et al. (2000) **Least:** Cross sectional **Country of study:** Tanzania **Geographic location:** Kilimanjaro, Arusha	**Urban/rural:** Mixed **Unit of allocation:** Cluster **Year conducted:** 1996 **Fluoridation type:** Natural **Social class:** Data on mother's occupation was collected, although broadly similar across clusters, one had a substantially lower proportion of 'peasants' than other **Other sources of fluoride:** Use of fluoride containing food additives and toothpaste differed between groups **Residential history:** Lifetime residents **Ethnicity:** All participants were African **Funded by:** Norwegian State Educational Loan fund, NUFU project 61-96 and the committee for research and postgraduate training	**Inclusion criteria:** Lifetime residency **Exclusion criteria:** Not reported **Age:** 9-14 years **Gender:** Not reported **Number of participants recruited:** 176	**Change in status:** No change, naturally occurring fluoride **2 sites:** **Comparison group 1:** <0.4ppm; n=96 **Comparison group 2:** 3.6ppm; n=80	**Outcome measure:** Fluorosis; TF Index, median score (range not reported) **Tooth type:** Permanent **Data:** **Group 1:** 4 **Group 2:** 4
Author (Year): Beltran-Aguiler et al. (2002) **Least:** Cross sectional	**Urban/rural:** Not reported **Unit of allocation:** Cluster **Year conducted:** 1986 **Fluoridation type:** Natural and	**Inclusion criteria:** Children served by a single public water supply. Continuous residents with available exposure data and fewer than 5 residencies.	**Change in status:** Various points since 1945 into public water supplies; some areas naturally fluoridated **3 site types:**	**Outcome measure:** Fluorosis, Dean's Index, prevalence **Tooth type:** Both permanent and deciduous

Study details	Characteristics	Participants	Interventions	Outcomes
Country of study: USA **Geographic location:** National	artificial **Social class:** Not reported **Other sources of fluoride:** Higher use of fluoride drops and tablets in sub-optimal fluoride areas **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Not reported	**Exclusion criteria:** Not reported **Age:** 5-17 years **Gender:** Not reported **Number of participants recruited:** 3736	**Comparison group 1:** Suboptimal **-** <0.7ppm; n=2081 **Comparison group 2:** Natural – 0.7-4ppm; n=237 **Comparison group 3:** Optimal - >-1.2ppm	**Data:** **Group 1:** 43.9% **Group 2:** 61.8% **Group 3:** 74.5%
Author (Year): Chandrashekar et al. (2004) **Least:** Cross sectional **Country of study:** India **Geographic location:** Davangere District	**Urban/rural:** Rural **Unit of allocation:** Cluster **Year conducted:** 2002 **Fluoridation type:** Natural **Social class:** Reported to be similar across clusters but not supporting data provided **Other sources of fluoride:** Reported to be broadly similar across groups, no supporting data provided **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Not reported	**Inclusion criteria:** Villages had to contain at least 1 high school and a common bore-hole water supply. Villages were selected only if they were broadly similar in terms of altitude, SES and dietary conditions. Individuals were required to be lifetime residents. **Exclusion criteria:** Not reported **Age:** 12-15 years **Gender:** 44% female; 56% male **Number of participants recruited:** 1131	**Change in status:** No change, naturally occurring fluoride **12 sites (individual numbers not reported):** **Comparison group 1:** 0.22ppm **Comparison group 2:** 0.43ppm **Comparison group 3:** 0.74ppm **Comparison group 4:** 0.93ppm **Comparison group 5:** 1.1ppm **Comparison group 6:** 1.22ppm **Comparison group 7:** 1.63ppm **Comparison group 8:** 2.08ppm **Comparison group 9:** 2.33ppm **Comparison group 10:** 2.64ppm **Comparison group 11:** 2.91ppm **Comparison group 12:** 3.41ppm	**Outcome measure:** Fluorosis, Dean's Index – not consistently reported. Community Fluorosis Index (CFI) provided **Tooth type:** Permanent **Data :** CFI reported: **Group 1:** 0.10 **Group 2:** 0.11 **Group 3:** 0.57 **Group 4:** 0.66 **Group 5:** 0.73 **Group 6:** 0.83 **Group 7:** 1.36 **Group 8:** 1.68 **Group 9:** 1.90 **Group 10:** 2.10 **Group 11:** 2.28 **Group 12:** 2.47

Study details	Characteristics	Participants	Interventions	Outcomes
Author (Year): Ekanayake et al. (2002) **Least:** Cross sectional **Country of study:** Sri Lanka **Geographic location:** Uda Walawe	**Urban/rural:** Rural **Unit of allocation:** Cluster **Year conducted:** 2001 **Fluoridation type:** Natural **Social class:** Reported that the majority of participants were low SES but no supporting data provided **Other sources of fluoride:** It is noted that 75% of participants used fluoride toothpaste from age 9-12 months, this is reported for entire study population only **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Not reported	**Inclusion criteria:** Lifetime residency **Exclusion criteria:** Absent from school on day of exam **Age:** 14 years **Gender:** 51% female; 49% male **Number of participants recruited:** 486	**Change in status:** No change, naturally occurring fluoride **4 sites:** **Comparison group 1:** ≤0.3; n=119 **Comparison group 2:** 0.31-0.49ppm; n=126 **Comparison group 3:** 0.5-0.7ppm; n=88 **Comparison group 4:** >0.7ppm; n=153	**Outcome measure:** Fluorosis, DDE prevalence **Tooth type:** Permanent **Data:** **Group 1:** 29% **Group 2:** 35% **Group 3:** 43% **Group 4:** 57%
Author (Year): Ermis et al. (2003) **Least:** Cross sectional **Country of study:** Turkey **Geographic location:** The cities of Izmir and Ispata	**Urban/rural:** Urban **Unit of allocation:** Cluster **Year conducted:** 1999 **Fluoridation type:** Natural **Social class:** Not reported **Other sources of fluoride:** Not reported **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Not reported	**Inclusion criteria:** Lifetime residents **Exclusion criteria:** Nutritionally deficient **Age:** 12-14 years **Gender:** 41% female; 59% male **Number of participants recruited:** 278	**Change in status:** No change, naturally occurring fluoride **3 sites:** **Comparison group 1**: 0.3-0.4ppm; n=149 **Comparison group 2:** 1.42- 1.54ppm; n=63 **Comparison group 3:** 1.55-1.66ppm; n=66	**Outcome measure:** Fluorosis, TSIF, prevalence **Tooth type:** Permanent **Data:** **Group 1:** 0% **Group 2:** 29% **Group 3:** 77%
Author (Year): Franzolin et al. (2010)	**Urban/rural:** Not reported **Unit of allocation:** Cluster	**Inclusion criteria:** Lifetime residency **Exclusion criteria:** None	**Change in status:** 1975 **3 sites:**	**Outcome measure:** Fluorosis, TF Index,

Study details	Characteristics	Participants	Interventions	Outcomes
Least: Cross sectional **Country of study:** Brazil **Geographic location:** Bauru	**Year conducted:** Not reported **Fluoridation type:** Artificial **Social class:** Not reported **Other sources of fluoride:** Not reported **Residential history:** Lifetime residents **Ethnicity:** 68% White; 21% Mixed; 11% Black; **Funded by:** Not reported	reported **Age:** 12 years **Gender:** 49% female; 51% male **Number of participants recruited:** 360	**Comparison group 1:** Non-fluoridated; ppm not reported; n=118 **Comparison group 2:** Artificially fluoridated; ppm not reported; n=118 **Comparison group 3:** Naturally fluoridated; ppm not reported; n=118	prevalence, partial reporting **Tooth type**: Permanent **Data:** **Group 1:** 45.8% **Group 2:** 32.5% **Group 3:** 40%
Author (Year): Grobleri et al. (2001) **Least:** Cross sectional **Country of study:** South Africa **Geographic location:** Lee Gamka, Kuboes and Sanddrif	**Urban/rural:** Rural **Unit of allocation:** Cluster **Year conducted:** Not reported **Fluoridation type:** Natural **Social class:** Reported as broadly similar across groups, no supporting data provided **Other sources of fluoride:** Not reported **Residential history:** Lifetime residents **Ethnicity:** Reported as broadly similar across groups, no supporting data provided **Funded by:** Not reported	**Inclusion criteria:** Lifetime residency **Exclusion criteria:** Having had any previous fluoride treatment **Age:** 10- 15 years **Gender:** 49% female; 51% male **Number of participants recruited:** 282	**Change in status:** No change, naturally occurring fluoride **3 sites:** **Comparison group 1:** 0.19ppm; n=47 **Comparison group 2:** 0.48ppm; n=115 **Comparison group 3:** 3ppm not reported; n=120	**Outcome measure:** Fluorosis, Dean's Index, mean scores **Tooth type**: Permanent **Data:** **Group 1:** mean 1.3 sd.0.2 **Group 2:** mean 1.3 sd.0.1 **Group 3:** mean 3.6 sd.0.1
Author (Year): Harding et al. (2005) **Least:** Cross sectional **Country of study:** Ireland	**Urban/rural:** Mixed **Unit of allocation:** Cluster **Year conducted:** Not reported **Fluoridation type:** Artificial **Social class:** Data collected but	**Inclusion criteria:** None reported **Exclusion criteria:** Partial fluoride history (i.e. not lifetime residents of either fluoridated or non-fluoridated areas); absent on	**Change in status:** 1960 **2 sites:** **Comparison group 1:** Non-fluoridated, ppm not reported; n=86	**Outcome measure:** Fluorosis, modified TSIF, prevalence **Tooth type:** Deciduous

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Geographic location: Cork City and County	not reported, a range of schools were sampled to 'provide a socio-economic spread', no supporting data is provided **Other sources of fluoride:** Significant difference found between groups, unaccounted for in analysis **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Not reported, though assistance of the Department of Health and Children is acknowledged	day of examination; apprehensive about examination; not 5 years old; incomplete consent documentation or medical histories **Age:** 5 years **Gender:** 51% female; 49% male **Number of participants recruited:** 294	**Comparison group 2:** 0.8-1ppm; n=208	**Data:** **Group 1:** 1.2% **Group 2:** 66%
Author (Year): Indermitte et al. (2007) **Least:** Cross sectional **Country of study:** Estonia **Geographic location:** Tartu	**Urban/rural:** Urban **Unit of allocation:** Cluster **Year conducted:** 1999 **Fluoridation type:** Natural **Social class:** Reported to be broadly similar across groups, no supporting data provided **Other sources of fluoride:** Authors assumed that exposure to all other sources of fluoride was similar across groups, no supporting data provided **Residential history:** Lifetime residents **Ethnicity:** Reported to be broadly similar across groups, no supporting data provided **Funded by:** Target Funding	**Inclusion criteria:** Only areas with a known fluoride concentration in their water supply selected for study, children were required to be lifetime residents **Exclusion criteria:** None reported **Age:** 12 years **Gender:** Female 53%; Male 47% **Number of participants recruited:** 368	**Change in status:** No change, naturally occurring fluoride **6 sites:** **Comparison group 1**: 0.18ppm; n=34 **Comparison group 2:** 0.29ppm; n=38 **Comparison group 3:** 1.19ppm; n=100 **Comparison group 4:** 1.59ppm; n=149 **Comparison group 5:** 1.85ppm; n=17 **Comparison group 6:** 3.89ppm; n=30	**Outcome measure:** Fluorosis, no valid index used, classified as no fluorosis/ mild fluorosis / severe fluorosis, prevalence **Tooth type:** Permanent **Data:** **Group 1:** 8.8% **Group 2:** 15.8% **Group 3:** 21% **Group 4:** 38.3% **Group 5:** 47.1% **Group 6:** 53.3%

Study details	Characteristics	Participants	Interventions	Outcomes
	Projects No 0180052s07 and No. 0182648s04 of the Ministry if Education and Science of Estonia and by Estonian Society of Stomatology			
Author (Year): Kanagaratnam et al. (2009) **Least:** Cross sectional **Country of study:** New Zealand **Geographic location:** Auckland	**Urban/rural:** Not reported **Unit of allocation:** Cluster **Year conducted:** Not reported **Fluoridation type:** Not reported **Social class:** Higher proportion of high SES in fluoridated group; higher number of low SES in non-fluoridated group **Other sources of fluoride:** Unclear, data collected but analysis is incomplete – only reported for diffuse opacities **Residential history:** Continuous/intermittent (analyzed separately) **Ethnicity:** Higher proportion of people of European origin in non-fluoridated area **Funded by:** AUT University, Counties Manukau District Health Board and New Zealand Dental Research Foundation	**Inclusion criteria:** 9 year old children enrolled with the Auckland regional School Dental Service and attending school in Auckland **Exclusion criteria:** Schools with less than 5 9yr old children were excluded at the sampling stage due to limited resources. Children were excluded from examination if their parent did not complete both the consent form and questionnaire. **Age:** 9 years **Gender:** 48% female; 52% male **Number of participants recruited:** 612	**Change in status:** Not reported **2 sites, 4 categorizations:** **Comparison group 1:** Non-fluoridated continuously: <0.3ppm; n=149 **Comparison group 2:** Non-fluoridated intermittently <0.3ppm; n=153 **Comparison group 3:** Fluoridated continuously ppm not reported; n=175 **Comparison group 4:** Fluoridated intermittently, ppm not reported; n=135	**Outcome measure:** Fluorosis, DDE, prevalence **Tooth type:** Both permanent and deciduous **Data:** **Group 1:** 28% **Group 2:** 39% **Group 3:** 38% **Group 4:** 35%
Author (Year): Machiulskiene et al. (2009) **Least:** Cross sectional **Country of study:** Lithuania **Geographic location:**	**Urban/rural:** Not reported **Unit of allocation:** Cluster **Year conducted:** 2004 **Fluoridation type:** Not reported **Social class:** Higher proportion of	**Inclusion criteria:** Never having taken part in a caries preventive program. Lifetime residency. **Exclusion criteria:** Attending a school with fluoride/ sealant program in place	**Change in status:** Not reported **Comparison group 1:** 0.3ppm; n=150 **Comparison group 2:** 1.1ppm; n=150	**Outcome measure:** Fluorosis, TF Index, prevalence **Tooth type:** Permanent **Data:**

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Vilkaviskis; Jonuciai	children in the fluoridated area were affected by parental unemployment **Other sources of fluoride:** Not reported **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Colgate Palmolive, unrestricted research grant	**Age:** 12-13 years **Gender:** 47% female; 53% male **Number of participants recruited:** 300		**Group 1:** 21% **Group 2:** 45%
Author (Year): Macpherson et al. (2007) **Least:** Cross sectional **Country of study:** Sweden **Geographic location:** Halmstad and Kungsbacka	**Urban/rural:** Urban **Unit of allocation:** Cluster **Year conducted:** 2002 **Fluoridation type:** Natural **Social class:** Parental education levels across groups were comparable **Other sources of fluoride:** Higher use of fluoride supplements in non fluoridated area **Residential history:** Lifetime residents (analyzed by lifetime residency) **Ethnicity:** Not reported **Funded by:** Not reported	**Inclusion criteria:** Children from the same birth cohort **Exclusion criteria:** None reported **Age:** 7-10 years **Gender:** 47% female; 53% male **Number of participants recruited:** 250	**Change in status:** No change, naturally occurring fluoride **2 sites:** **Comparison group 1:** 0.1ppm; n=125 **Comparison group 2:** 1.3ppm; n-125	**Outcome measure:** Fluorosis, Modified TF Index, prevalence **Tooth type:** Permanent **Data:** **Group 1:** 58% **Group 2:** 85%
Author (Year): McGrady et al. (2012) **Least:** Cross sectional **Country of study:** Thailand	**Urban/rural:** Urban **Unit of allocation:** Cluster **Year conducted:** 2007 **Fluoridation type:** Natural **Social class:** Not reported	**Inclusion criteria:** Lifetime residency, in good general health with both maxillary incisors erupted and free from orthodontic apparatus **Exclusion criteria:** Unsuitable	**Change in status:** No change, naturally occurring fluoride **4 sites:** **Comparison group 1:** <0.2ppm; n=210 **Comparison group 2:**	**Outcome measure:** Fluorosis, TF Index; prevalence **Tooth type:** Permanent

Study details	Characteristics	Participants	Interventions	Outcomes
Geographic location: Chiang Mai	**Other sources of fluoride:** Reported but not statistically analyzed. **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** NIHR / Colgate Palmolive	dentition, not within the specified age boundaries **Age:** 8-13 years **Gender:** 47% female; 53% male **Number of participants recruited:** 560	0.2-0.59ppm; n=218 **Comparison group 3:** 0.6-0.89ppm; n=63 **Comparison group 4:** =>0.9ppm; n=69	**Data:** Prevalence with fluorosis: **Group 1:** 62.4% **Group 2:** 74.8% **Group 3:** 71.4% **Group 4:** 84.1% **N.B. Associated paper-** McGrady et al 2012b 'Dental fluorosis in populations from Chiang Mai, Thailand with difficult fluoride exposures – Paper 1: ass' BMC Oral Health 12;16 pp1-12
Author (Year): Narbuitaite et al. (2007) **Least:** Cross sectional **Country of study:** Lithuania **Geographic location:** National	**Country of study:** Lithuania **Geographic location:** National **Urban/rural:** Urban **Unit of allocation:** Cluster **Year conducted:** 1997 **Fluoridation type:** Natural **Social class:** Reported as broadly similar across groups, no supporting data **Other sources of fluoride:** Not reported **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Not reported	**Inclusion criteria:** Lifetime residency **Exclusion criteria:** None reported **Age:** 12 years **Gender:** 53% female; 47% male **Number of participants recruited:** 600	**Change in status:** No change, naturally occurring fluoride **Comparison group 1:** 0.2ppm; n=299 **Comparison group 2:** 1.7-2.2ppm; n=301	**Outcome measure:** Fluorosis, TF Index, prevalence and mean number of fluorosed teeth **Tooth type:** Permanent **Data:** **Group 1:** 4% mean 0.2 (95% CI 0.1-0.2) **Group 2:** 66% mean 4.5 (95% CI 4-5)
Author (Year): Pontigo-Loyola et al. (2008)	**Urban/rural:** Mixed **Unit of allocation:** Cluster	**Inclusion criteria:** None reported **Exclusion criteria:** Having	**Change in status:** No change, naturally occurring fluoride	**Outcome measure:** Fluorosis, modified Dean's

Study details	Characteristics	Participants	Interventions	Outcomes
Least: Cross sectional **Country of study:** Mexico **Geographic location:** Tula Centro and El Llano in Tula de Allende, in the state of Hidalgo	**Year conducted:** 1999 **Fluoridation type:** Natural **Social class:** Reported as broadly similar across groups, no supporting data provided **Other sources of fluoride:** Not reported **Residential history:** birth-6 years residency; no longer than 1 year living outside of area **Ethnicity:** Not reported **Funded by:** Data collection funded by Universidad Autónoma del Estado de Hidalgo, Data analysis was partially supported by a grant (to C. E. M. S.) from the National Council of Science and Technology (CONACyT 166266) of Mexico. This report is part of the research outfit Bi-National/Cross-Cultural Health Enhancement Center	orthodontic apparatus or metal crowns **Age:** 12-15 years **Gender:** 50% female; 50% male **Number of participants recruited:** 1024	**3 sites:** **Comparison group 1:** 1.38ppm; n=128 **Comparison group 2:** 1.42ppm; n=821 **Comparison group 3:** 3.07ppm; n=75	Index, prevalence **Tooth type:** Permanent **Data:** **Group 1:** 89.8% **Group 2:** 81.9% **Group 3:** 94.7%
Author (Year): Riordan (2002) **Least:** Cross sectional **Country of study:** Australia **Geographic location:** Western Australia, Perth (metropolitan area) and Bunbury (towns)	**Urban/rural:** Urban **Unit of allocation:** Cluster **Year conducted:** 2000 **Fluoridation type:** Artificial **Social class:** Not reported **Other sources of fluoride:** Reported and accounted for **Residential history:** Not lifetime, accounted for in analysis **Ethnicity:** Not reported	**Inclusion criteria:** Children born around 1990 (10yrs old) who had lived in Australia/ New Zealand for most of their lives (so as to determine life time exposure to fluoride through water and other means). **Exclusion criteria:** Migrants from outside Australia; refusal to consent; not present at school when exams were conducted **Age:** 12 – 13 years	**Change in status:** **2 sites:** **Comparison group 1:** 0.25ppm; n=207 **Comparison group 2:** 0.8ppm; n=375	**Outcome measure:** Fluorosis, TF Index, prevalence **Tooth type:** Permanent **Data:** **Group 1:** 11.6% **Group 2:** 21.9%

Study details	Characteristics	Participants	Interventions	Outcomes
	Funded by: Not reported	**Gender:** 51% female; 49% male **Number of participants recruited:** 582		
Author (Year): Ruan et al. (2005) **Least:** Cross sectional **Country of study:** China **Geographic location:** Shaanxi Province – Bao Ji and Jing Bian	**Urban/rural:** Rural **Unit of allocation:** Cluster **Year conducted:** 2000 **Fluoridation type:** Natural **Social class:** Reported to be similar across groups, no supporting data provided **Other sources of fluoride:** Report on lack of supplement program/fluoride supply by dental service but no other data **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Norwegian State Educational Loan Fund	**Inclusion criteria:** None reported **Exclusion criteria:** Not lifetime residents; absent from school on the day of exam **Age:** 12-13 years **Gender:** 50% female; 50% male **Number of participants recruited:** 477	**Change in status:** No change, naturally occurring fluoride **5 sites:** **Comparison group 1:** 0.4ppm; n=95 **Comparison group 2:** 1ppm; n=116 **Comparison group 3:** 1.8ppm; n=115 **Comparison group 4:** 3.5ppm; n=112 **Comparison group 5:** 5.6ppm; n=39	**Outcome measure:** Fluorosis, TF Index, prevalence , mean scores **Tooth type:** Permanent **Data** **Group 1:** 0.3; 95%CI 0.02 – 0.57 **Group 2:** 1.4 95%CI 1.15 – 1.65 **Group 3:** 3.16 95% CI 2.91 – 3.40 **Group 4:** 3.62 95% CI 3.32 – 3.92
Author (Year): Stephen et al. (2002) **Least:** Cross sectional **Country of study:** Scotland **Geographic location:** Rural Moroyshire	**Urban/rural:** Rural **Unit of allocation:** Cluster **Year Conducted:** Not reported **Fluoridation type:** Natural **Social class:** Classified using parental occupation data, slightly more inequality was observed in the non-fluoridated area **Other sources of fluoride:** Slight imbalance in fluoride drop use, analysis showed this did not significantly affect results	**Inclusion criteria:** Children had to be either lifetime or school life-time residents of the areas chosen for study **Exclusion criteria:** None reported **Age:** 5-12 years **Gender:** Not reported **Number of participants recruited:** 227	**Change in status:** No change, naturally occurring fluoride **Comparison group 1:** 0.3ppm; n=126 **Comparison group 2:** 1-2.4ppm; n=101	**Outcome measure:** Fluorosis, TF Index prevalence s for individual **Tooth type:** Both permanent and deciduous **Data:** **Group 1:** 18% **Group 2:** 33%

Study details	Characteristics	Participants	Interventions	Outcomes
	Residential history: Lifetime residents **Ethnicity:** Not reported **Funded by:** Scottish Office Department of Health Grant			
Author (Year): Sudhir et al. (2009) **Least:** Cross sectional **Country of study:** India **Geographic location:** Nalgonda district, Andhra Pradesh	**Urban/rural:** Not reported **Unit of allocation:** Cluster **Year conducted:** 2006 **Fluoridation type:** Natural **Social class:** Not reported **Other sources of fluoride:** The authors report that oral hygiene habits and use of fluoride products did not affect prevalence and severity of fluorosis, no supporting data or analysis provided **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Not reported	**Inclusion criteria:** Lifetime residency, children using the same source of water from birth to 10 years. Children with permanent teeth with at least >50% of the crown erupted. No fillings on the facial surface **Exclusion criteria:** Children who used more than 1 drinking water supply. Children with orthodontic apparatus and children with severe extrinsic stains on their teeth **Age:** 13-15 years **Gender:** 41% female; 59% male **Number of participants recruited:** 749	**Change in status:** No change, naturally occurring fluoride **3 sites:** **Comparison group 1:** <0.7ppm; n=250 **Comparison group 2:** 0.7-1.2ppm; n=251 **Comparison group 3:** 1.3-4ppm; n=242 **Comparison group 4:** >4ppm; n=257	**Outcome measure:** Fluorosis, TF Index, mean and median scores **Tooth type:** Permanent **Data** **Group 1:** mean 1.3 sd. 0.9, median 1 range 0 - 4 **Group 2:** mean 2 sd. 1.2, median 2 range 0 – 8 **Group 3:** mean 3.4, sd. 1.5, median 4 range 1- 7 **Group 4:** mean 4.8 sd. 1.4, median 5 range 1 - 9
Author (Year): Tabari et al. (2000) **Least:** Cross sectional **Country of study:** UK **Geographic location:** Northumberland and Newcastle	**Urban/rural:** Not reported **Unit of allocation:** Cluster **Year conducted:** 1998 **Fluoridation type:** Artificial **Social class:** Children in the fluoridated area were found to be of lower SES, analysis showed this did not affect the results **Other sources of fluoride:** No significant difference between	**Inclusion criteria:** Not reported **Exclusion criteria:** It is not clear but children missing central incisors may have been excluded **Age:** 8-9 years **Gender:** 53% female; 47% male **Number of participants recruited:** 1034	**Change in status:** 1968/70 **2 sites:** **Comparison group 1:** 0.1ppm; n=524 **Comparison group 2:** 1ppm; n=524	**Outcome measure:** Fluorosis, TF Index, prevalence **Tooth type:** Permanent **Data:** **Group 1:** 22.9% **Group 2:** 54%

Study details	Characteristics	Participants	Interventions	Outcomes
	groups **Residential history:** Lifetime residents **Ethnicity:** Not reported **Funded by:** Not reported			
Author (Year): Warren et al. (2001) **Least:** Cross sectional **Country of study:** USA **Geographic location:** Iowa	**Urban/rural:** Not reported **Unit of allocation:** Cluster **Year conducted:** 1997 **Fluoridation type:** Artificial **Social class:** Reported to be higher than the general population but broadly similar across groups. No supporting data provided **Other sources of fluoride:** Unclear **Residential history:** Not reported **Ethnicity:** 98% white	**Inclusion criteria:** Not reported **Exclusion criteria:** Not reported **Age:** 4.5-5 years **Gender:** 50% female; 50% male **Number of participants recruited:** 386	**Change in status:** Not reported **3 sites:** **Comparison group 1:** <0.7ppm; n=173 **Comparison group 2:** 0.7-1.2ppm; n=305 **Comparison group 3:** >1.2ppm; n=81	**Outcome measure:** Fluorosis, TSIF, prevalence **Tooth type:** Deciduous **Data:** **Group 1:** 5.8% **Group 2:** 12.5% **Group 3:** 21% **N.B.** Participants in this study were sampled from an ongoing cohort study

Evidence on Disparities and Fluorosis

Study details	Characteristics	Participants	Interventions	Outcomes
Author (Year): Whelton et al. (2004) **Least:** Cross sectional **Country of study:**	**Urban/rural:** Not reported **Unit of allocation:** Cluster **Year conducted:** 2002 **Fluoridation type:** Artificial **Other sources of fluoride:**	**Inclusion criteria:** Age, gender and fluoridation status of school location **Exclusion criteria:** Not reported	**Change in status:** 1960 **Comparison group 1:** Not fluoridated; n=4353 **Comparison group 2:** 0.8-1ppm; n= 9976	**Outcome measure:** Caries, DMFT /dmft **SES measure:** Possession of a medical card (lower SES) or not

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Ireland **Geographic location:** National	Commented on potential imbalance but no data reported **Diet:** Not reported **Residential history:** Lifetime **Ethnicity:** Not reported **Funded by:** Not explicitly stated however, the projected is noted to be a joint one with the Department of Health and Children and 10 Health Boards in Ireland	**Age:** 5 – 15 years **Gender:** It was reported that an equal balance was achieved **Number of participants recruited:** 14,329		(higher SES) (means tested benefit) **Fluorosis:** Dean's Index prevalence **Tooth type:** Both permanent and deciduous **Data:** **Caries:** **Group 1:** <u>5 years</u> Lower SES - mean 2.1 sd.3 Higher SES - mean 1.6 sd.2.1 <u>8 years</u> Lower SES - mean 0.5 sd. 1 Higher SES - mean 0.3 sd. 0.8 <u>12 years</u> Lower SES - mean 1.5 sd. 2 Higher SES - mean 1.2 sd.1.6 <u>15 years</u> Lower SES - mean 3.2 sd.3.3 Higher SES - mean 3.3 sd.3.2 **Group2:** <u>5 years</u> Lower SES - mean 0.9

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				sd.1.9 Higher SES - mean 1 sd.2.1 8 years Lower SES - mean 0.4 sd. 0.9 Higher SES - mean 0.3 sd.07 12 years Lower SES - 1.2 sd. 1.6 Higher SES - 1 sd.1.4 15 years Lower SES - 2.3 sd. 2.6 Higher SES - 2.1 sd. 2.3 **Fluorosis:** **Group 1:** 8 years 9% 12 years 16% 15 years 17% **Group 2:** 8 years 23% 12 years 30% 15 years 36%
Author (Year): Whelton et al. (2006) **Least:** Cross sectional **Country of study:** Ireland (including Northern Ireland) **Geographic location:** The Republic of Ireland	**Urban/rural:** Not reported **Unit of allocation:** Cluster **Year conducted:** 2001/2 **Fluoridation type:** Artificial **Other sources of fluoride:** Commented on, potential imbalance but no data	**Inclusion criteria:** Children aged 5, 8, 12 or 15yrs and resident in ROI (fluoridated water supply) or NI. Children living in ROI had to have lived with fluoridated water for their whole lives. Children living in NI had to have never lived in fluoridated areas or	**Change in status:** 1960 **Comparison group 1:** Not fluoridated; n=2112 **Comparison group 2:** 0.8-1ppm; n= 17,838	**Outcome measure:** Caries, DMFT/ dmft **SES measure:** Possession of a medical card (RoI)/income support (NI) (lower SES) or not (higher SES) (means tested

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and the North (UK)	reported **Diet:** Not reported **Residential history:** Lifetime **Ethnicity:** Not reported **Funded by:** Not reported	attend a school with a fluoridated water supply; they must never have used fluoride mouth rinses or supplements. **Exclusion criteria:** None reported **Age:** 5 – 15 years **Gender:** 50% female; 50% male **Number of participants recruited:** 19,950		benefit) **Fluorosis measure:** Dean's Index prevalence **Tooth type:** Both permanent and deciduous **Data:** **Caries:** **Group 1:** <u>5 years</u> Lower SES - mean 2.7 sd.3.5 Higher SES - mean 1.3 sd.2.2 <u>8yrs</u> Lower SES - mean 0.4 sd. 0.7 Higher SES - mean 0.2 sd. 0.6 <u>12yrs</u> Lower SES - mean 1.5 sd. 1.6 Higher SES - mean 1.6 sd.1.9 <u>15yrs</u> Lower SES - mean 4.6 sd.4.1 Higher SES - mean 3.2 sd.3.2 **Group 2:** <u>5 years</u> Lower SES - mean 1.5 sd. 2.6

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				Higher SES 0.9 sd. 1.9 8 years Lower SES - mean 0.4 sd. 0.9 Higher SES - mean 0.3 sd. 0.7 12 years Lower SES - mean 1.2 sd. 1.6 Higher SES - mean 1 sd.1.4 15 years Lower SES - mean 2.3 sd. 2.6 Higher SES - mean 2.1 sd. 2.3 **Fluorosis:** **Group 1:** 8 years: 9% 12 years: 21% 15 years: 13% **Group 2:** 8 years: 23% 12 years: 30% 15 years: 36%

Evidence on Disparities

Study details	Characteristics	Participants	Interventions	Outcomes
Author (Year): Peres et al. (2006) **Least:** Cross sectional **Country of study:** Brazil **Geographic location:** National	**Urban/rural:** Mixed **Unit of allocation:** Cluster **Year conducted:** 2002 **Fluoridation type:** Artificial **Other sources of fluoride:** Not stated **Diet:** Not reported **Residential history:** Not stated **Ethnicity:** Not reported **Funded by:** Partially funded by National Council Grant	**Inclusion criteria:** Not reported **Exclusion criteria:** Not reported **Age:** 12 years **Gender:** Not reported **Number of participants recruited:** 249 towns (34550 children)	**Change in status:** Not reported **Comparison group 1:** Fluoridated, ppm not reported n=100 towns **Comparison group 2:** Not fluoridated, ppm not reported n=149 towns	**Outcome measure:** Caries, DMFT, percent caries free **SES measure:** Proxy of public (lower SES) vs private school **Tooth type:** Permanent (higher SES) was used **Data** **Group 1:** DMFT Lower SES : 2.19 Higher SES: 1.53 % caries free: Lower SES: 38.3% Higher SES: 50.9% % high caries Lower SES: 26.7% Higher SES: 17.5% **Group 2:** DMFT Lower SES: 3.37 Higher SES: 3.31 % caries free Lower SES: 23.4% Higher SES: 30.8% % high caries Lower SES: 40.1% Higher SES: 40.1%

Evidence on Caries

Study details	Characteristics	Participants	Interventions	Outcomes
Author (Year): Gray et al. (2001) **Greatest:** Prospective cohort study – Fluoride initiation study **Country of study:** UK **Geographic location:** West Midlands	**Urban/rural:** Urban **Unit of allocation:** Cluster **Year study started:** 1988/89 **Year study ended:** 1996/97 **Data collection time points:** 1988/89; 1992/93; 1996/97 **Fluoridation type: artificial** **Social class:** Reported as stable but no supporting data provided **Other sources of fluoride:** Not reported **Diet:** Not reported **Residential history:** Lifetime residents **Ethnicity:** Reported as stable but no supporting data provided **Funded by:** Not reported	**Inclusion criteria:** Not reported **Exclusion criteria:** Not reported **Age at baseline:** 5 years **Age at follow-up:** 5 years **Gender:** Not reported **Number of participants recruited:** 1810 **Number of participants evaluated:** 2176	**Change in status:** Fluoridation initiated in 1987 **5 sites, 2 categorizations:** **Comparison group 1:** 1ppm; n=1465 (across 4 sites) **Comparison group 2:** <0.3ppm; n=345	**Outcome measure:** Caries, dmft, percent caries free **Tooth type:** Deciduous **Data**: Range of mean difference in % caries free: 19.8% to 31.6% (median 25.1%, IQI 20.35 to 30.45%)
Author (Year): Maupome et al. (2001) **Greatest:** Prospective cohort – fluoride discontinuation study **Country of study:** Canada **Geographic location:** British Columbia	**Urban/rural:** Rural **Unit of allocation:** Cluster **Year study started:** 1993 **Year study ended:** 1997 **Fluoridation type:** Artificial 1991/93 (removed) **Social class:** Data used in regression but not reported **Other sources of fluoride:** Toothpaste, mouth rinse and supplements? Regression indicated increased sealant use	**Inclusion criteria:** Not reported **Exclusion criteria:** Not reported **Age at baseline:** 8 years **Age at follow-up:** 14 years **Gender:** Not reported **Number of participants recruited:** 2707 **Number of participants evaluated:** 3220	**Change in status:** Fluoridation discontinued 1991/93 **9 sites – 2 categorizations:** **Comparison group 1:** Fluoridation ended; n=1468 **Comparison group 2:** Never fluoridated; n= 1239	**Outcome measure:** Caries, D1D2MFS, caries prevalence and incidence **Tooth type:** Permanent **Data:** Mean age 8.3 years: change in DMFS (mean difference) =0.13 (95% CI -0.07 to 0.33)

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	through the course of the study had a significant impact on results **Diet:** Data is not reported for each group. **Residential history:** Not all subjects were lifetime residents (79.8% were) **Ethnicity:** Not reported **Funded by:** NHRDP Operating grant 6610-2225-002			Mean age 14.3 years: change in DMFS (mean difference) = 0.47(95% CI -0.05 to 0.99)