

Dental Caries Events by Exposure to Fluoridated Water – A Survival Analysis

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Background

- Water fluoridation is an important public health measure
- Water fluoridation prevents dental caries*
- Epidemiological investigations of dental caries are commonly based on cross-sectional designs
- ARCPOH's Child Fluoride Study Mark I (CFS - I) data provide an opportunity to carry out a longitudinal study**

*www.adelaide.edu.au/oral-health-promotion/

**www.arcpoh.adelaide.edu.au

Objective

- To examine the association of lifetime exposure to fluoridated water with dental caries events on the occlusal surface of first permanent molar teeth.

Data

- Clinical data were obtained from a cohort 9,485 SA children and 10,109 Qld children recruited through the school dental services in 1991/1992 and followed until the end of 1997
- A baseline questionnaire to parents provided information on residential and fluoride history and other confounders

Methods (I)

For each individual child's life span



- The percentage of lifetime exposure to fluoridated water (FW) was estimated between DOB and Baseline
- Eruption time E of first permanent molar teeth was estimated
- Time of a caries event (D) on the occlusal surfaces of 1st permanent molars was estimated
- Duration (months) to each caries event or duration of exposure to a risk of caries



Methods (II)

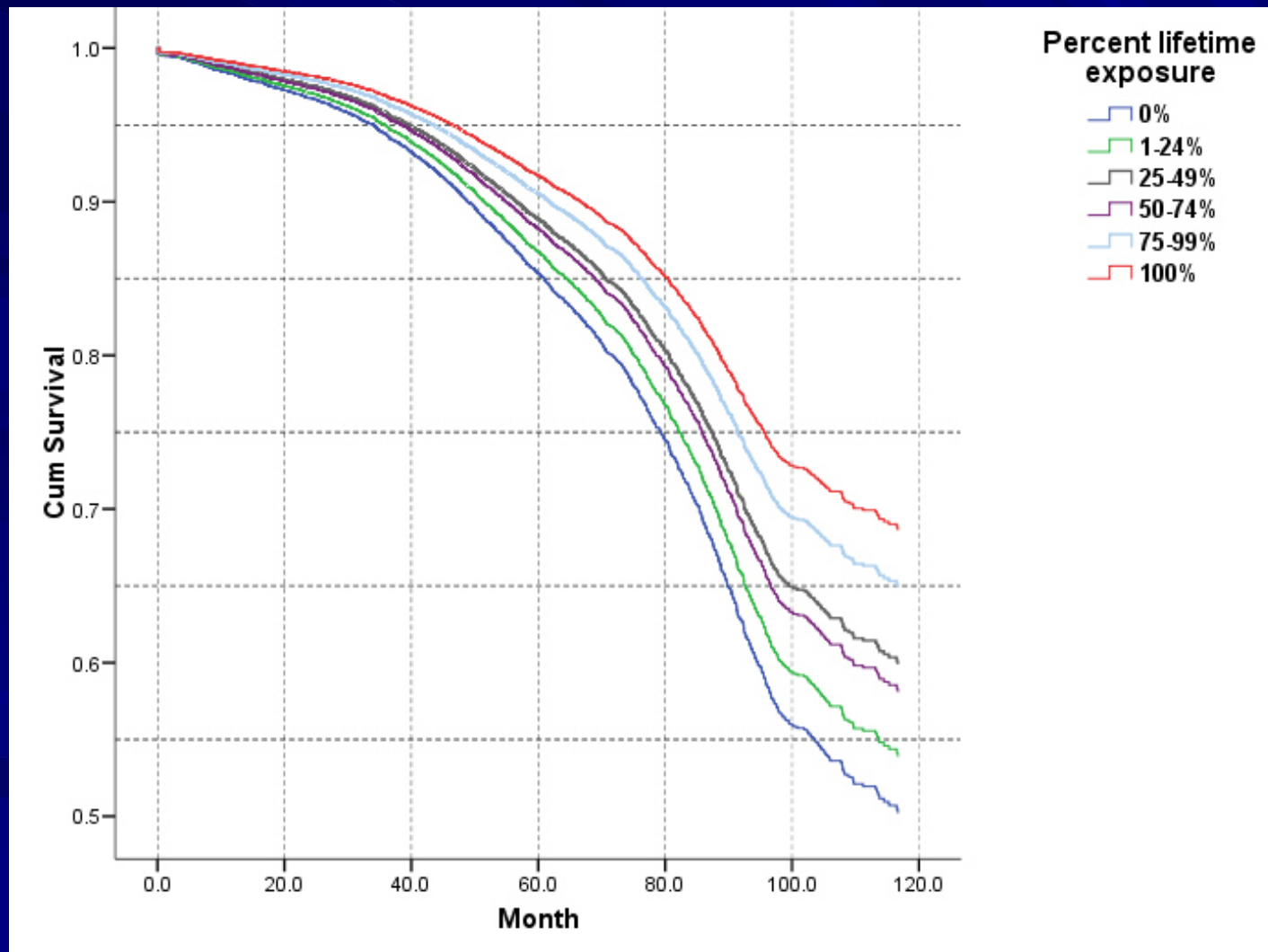
Survival analysis techniques using a Cox regression model were used to estimate the probability of dental caries events, the risk ratio and their association with explanatory variables.

Cox regression model showing the effect of percent lifetime exposure to FW

Lifetime exposure to FW	Unadjusted		Adjusted [¶]	
	Risk Ratio	95% CI	Risk Ratio	95% CI
0%	2.38	(2.03, 2.79)	1.83	(1.54, 2.18)
1-24%	1.89	(1.50, 2.37)	1.64	(1.29, 2.09)
25-49%	1.30	(1.07, 1.59)	1.36	(1.10, 1.69)
50-74%	1.27	(1.05, 1.53)	1.44	(1.18, 1.76)
75-99%	1.10	(0.89, 1.35)	1.15	(0.92, 1.44)
100%	1.00		1.00	

[¶] Adjusted by state, brushing frequency and household income

Survival function for percent lifetime exposure to FW*



* Adjusted by State, brushing frequency and household income

Results

- The hazard of a dental caries event among children with zero exposure was 2.4 times that of children with 100% lifetime exposure to fluoridated water ($p < 0.001$).
- With control of covariates (State, brushing frequency, income), the hazard of a dental caries event on the occlusal surface of first permanent molars for zero exposure was still 1.8 times that of 100% exposure to fluoridated water ($p < 0.001$).



Conclusion

Exposure to fluoridated water has a strong protective effect on the risk of developing caries on the occlusal surface of 1st permanent molars of children