Assessing a Potential Risk Factor for Enamel Fluorosis: A Preliminary Evaluation of Fluoride Content in Infant Formulas

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Background. The authors conducted a study to determine concentrations of fluoride in infant formulas, and to estimate fluoride intake in infants consuming predominantly formula. The authors compared estimated fluoride ingestion with the tolerable upper limit and adequate intake level for fluoride recommended by the Institute of Medicine (IOM).

Methods. The authors analyzed fluoride concentrations of powdered and liquid formula concentrates and ready-to-feed formulas. They estimated the total fluoride ingested by infants by considering the fluoride content measured in both the infant formula and various concentrations of fluoridated water. They based consumption volumes on published recommendations. The authors compared estimates for fluoride ingestion with the upper tolerable limit and adequate intake level, which they calculated by using published infant growth charts.

Results. Fluoride concentrations of the different formulas were low and, if reconstituted with low-fluoride water, would not result in ingestion of fluoride at levels exceeding the IOM’s upper tolerable limit. Some infants aged between birth and 6 months who consume powdered and liquid concentrate formulas reconstituted with water containing 1.0 part per million fluoride likely will exceed the upper tolerable limit of fluoride.

Conclusions. When powdered or liquid concentrate infant formulas are the primary source of nutrition, some infants are likely to exceed the recommended fluoride upper limit if the formula is reconstituted with water containing 1.0 ppm fluoride. On the other hand, when the fluoride concentration in water used to reconstitute infant formulas is below 0.4 ppm, it is likely that infants between 6 and 12 months of age will be exposed to fluoride at levels below IOM’s recommended adequate intake level.

Key Words: Dental caries; dental fluorosis; water consumption; fluoridation; fluoride; infant care; bottle feeding

Abbreviations: ADA: American Dental Association • CDC: Centers for Disease Control and Prevention • IOM: Institute of Medicine • LOAEL: Lowest-observed-adverse-effect level