



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

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Project Title Incidence of Mercury Exposure in Childhood Vaccination Schedules Exceeding Federal Safety Guidelines	
Abstract Objectives/Goals Mercury and other heavy metals can adversely affect the nervous, immune, gastrointestinal, and endocrine systems. Thimerosal is a neurotoxic, organic mercury compound which has been used as a vaccine preservative to prevent bacterial and fungal contamination. Today, children have more total vaccinations and have them closer together in life than ever before in history. In this study, doses of mercury from thimerosal-containing childhood immunizations were calculated for test subjects, and compared to U.S. Federal Safety Guidelines for the oral ingestion of methylmercury. Methods/Materials Vaccination records of 56 subjects born after 1981 were collected in conjunction with the weight at the time of immunization. Mercury content was determined from manufacturer product inserts and the Physician Desk Reference. Subject mercury dose was computed for birth, 2 months, 4 months, 6 months, 15 months, and 60 months. Results were compared to the Environmental Protection Agency maximum permissible limit of 0.4 microgram per kilogram weight per day. Results At birth, 55% of the subjects received mercury levels above the EPA limit (range 2.7-12.8 mcg Hg/kg). At 2 months, 95% received levels above the EPA limit (4.5-17.9 mcg Hg/kg). At 4 months, 96% received levels above the EPA limit (3.2-10.6 mcg Hg/kg). At 6 months, 93% received levels above the EPA limit (1.3-9.2 mcg Hg/kg). At 15 months, 89% received levels above the EPA limit (1.8-5.4 mcg Hg/kg). At 60 months, 50% received levels above the EPA limit (1.0-1.9 mcg Hg/kg). 98% of the subjects received three or greater bolus mercury doses above the EPA limit before 24 months of age. Conclusions/Discussion In 1991, Hepatitis B vaccine was added to the schedule. As a result, the number of thimerosal containing vaccines in the first 18 months of life increased to 11, and the amount of mercury exposure grew to 237.5 micrograms. The infant mercury exposure from a single doctor visit are 5-20 times the minimum safe level as determined by the EPA and FDA. The hypothesis that mercury exposure exceeding safety guidelines has increased over the past 20 years was supported in the population sampled. For further analysis, mercury levels in a larger population should be studied in relationship to the incidence of neurodevelopmental disorders as 6 of the subjects in the study are diagnosed with medical problems that possibly are related to unsafe mercury exposure.	
Summary Statement The recommended routine childhood immunization schedule exposes infants to cumulative doses of ethyl-mercury that exceeds some federal safety guidelines established for oral ingestion of methyl-mercury.	
Help Received Thomas Blake instructed me on the use of the graphing program to create the 3-D graphs.	