

BACKGROUND

Dietary carotenoid intake is associated with health benefits in adults and children, including improved visual and cognitive function. Studies have suggested infant carotenoid status differs by primary nutrition source and feeding stage. However, infant blood carotenoid concentration patterns by diet and feeding stage have not been examined on a worldwide basis.

PURPOSE

We aim to define a range of usual carotenoid exposures in infant blood across a range of different nutritional sources and feeding stages in order to better understand the role of dietary carotenoids in infant health.

METHODS

- Searches for concentrations of major dietary carotenoids (beta-carotene, lutein, lycopene, beta-cryptoxanthin, alpha-carotene, zeaxanthin, and alpha-cryptoxanthin) in infant blood were performed with PubMed, EMBASE, and Web of Science.
- Full-text articles in English were screened for duplicates and relevance.
- Carotenoid concentrations in blood of healthy infants ≤ 1 y.o., along with nutritional source and feeding stage were extracted and analyzed.

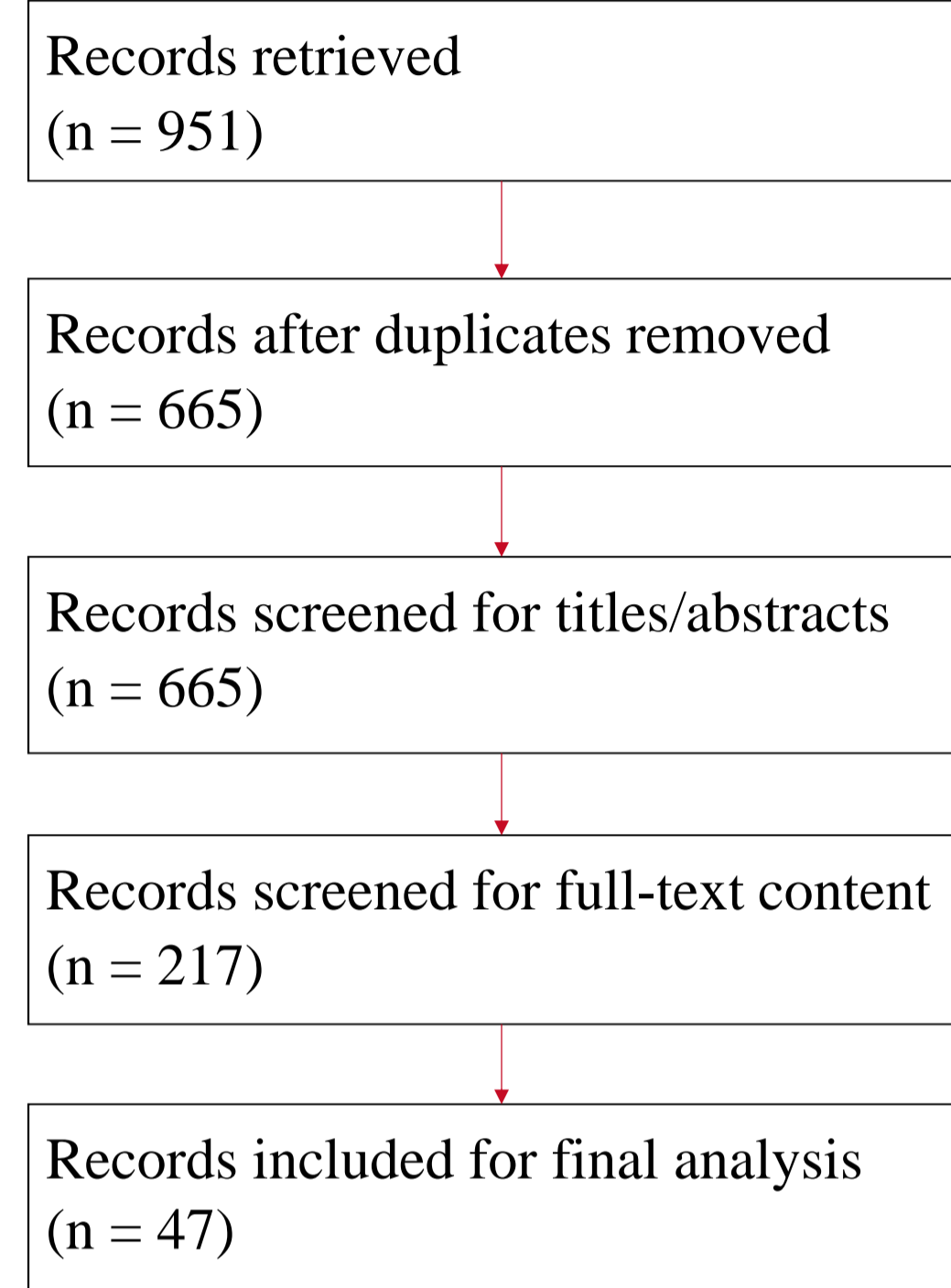


Fig 1. Flowchart of Articles Retrieved

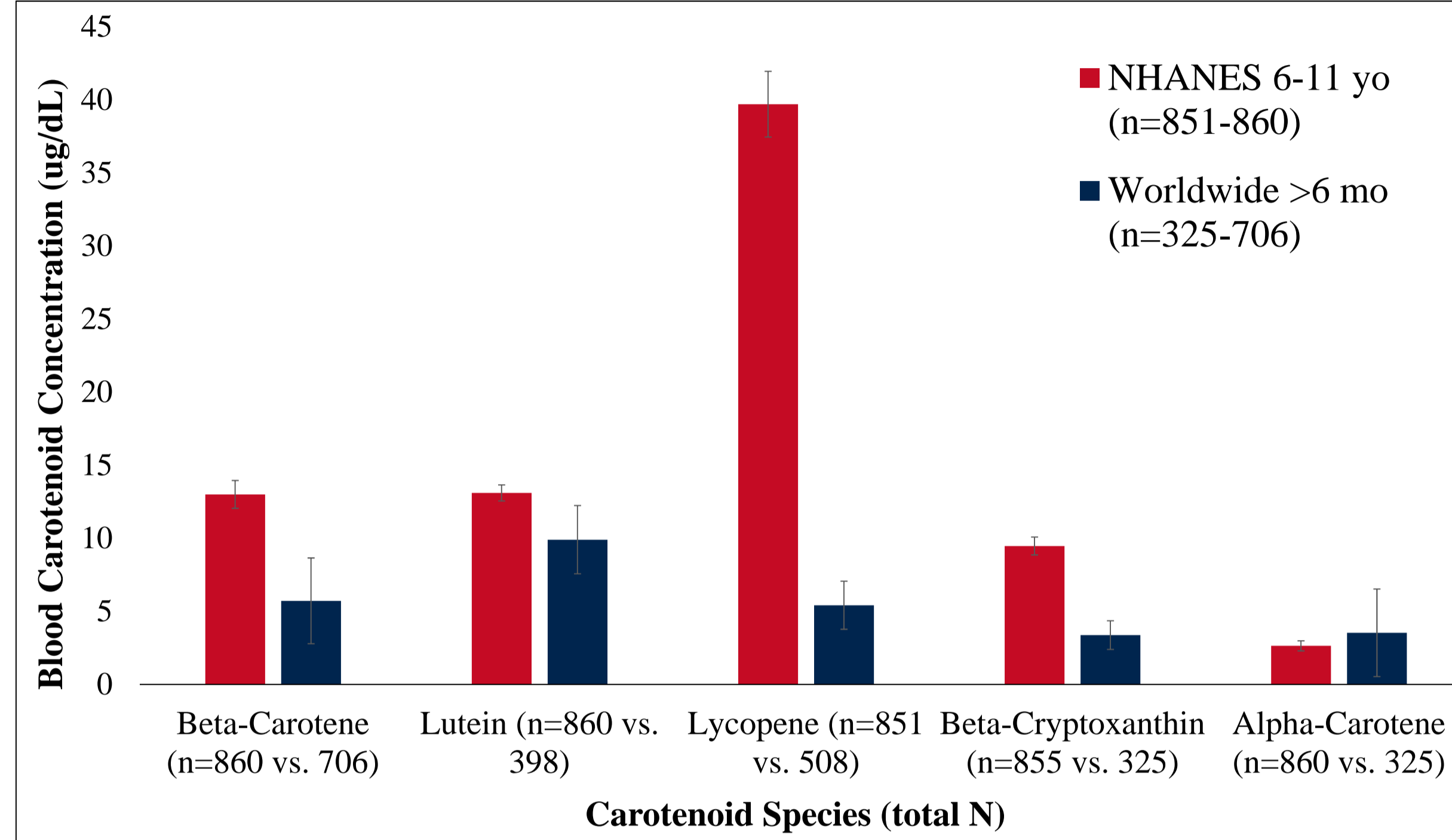


Fig 2. Comparison of 2012 NHANES data for 6-11 yo and worldwide >6 mo infant blood carotenoid concentrations (ug/dL). Bars represent weighted means and error bars represent 95% confidence intervals. NHANES reports a combined lutein+zeaxanthin value.

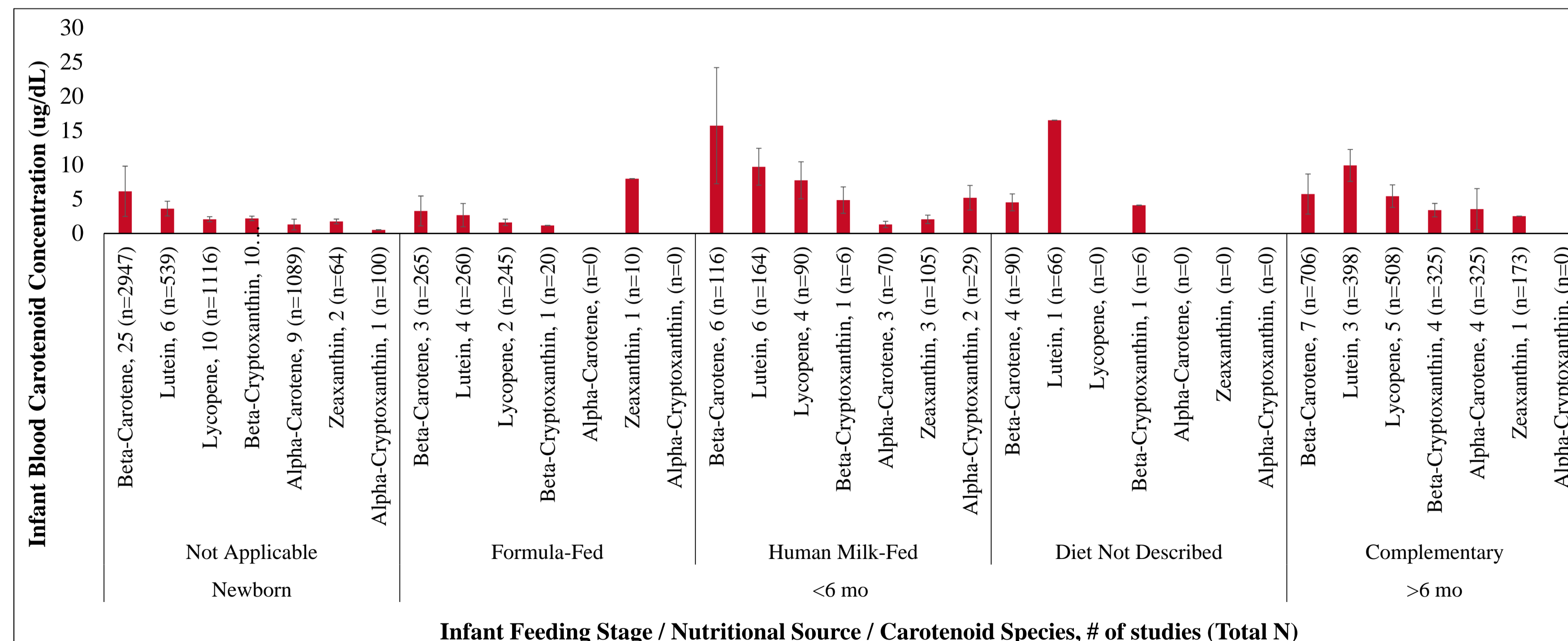


Fig 3. Mean major carotenoid concentrations in worldwide infant blood (ug/dL). Bars represent weighted means and error bars represent 95% confidence intervals.

RESULTS

- 47 of 665 unique publications reviewed met inclusion criteria.
- Beta-carotene was the most abundant carotenoid in newborns' cord blood (6.1 ± 3.7 ug/dL) and in <6 mo human milk-fed infants (15.7 ± 8.5 ug/dL), while zeaxanthin was the most abundant carotenoid in <6 mo formula-fed infants (8.0 ug/dL).
- Lutein was the most abundant carotenoid in >6 mo complementary fed-infants blood (9.9 ± 2.3 ug/dL).
- Blood carotenoid concentrations tended to be greater across all analytes in infants fed human milk, compared to formula (analytes were 2.7 to 3.9 times greater).
- Mean blood carotenoid concentrations in >6 mo complementary fed-infants were generally lower than the lower 95% C.I. limits reported by NHANES for 6-11 year olds (e.g. beta-carotene 95% C.I.s of 2.8-8.6 vs. 12.1-14.0 ug/dL).

CONCLUSION

Infants experience marked dietary carotenoid exposures, though lower than those reported in older children, which may differ across infant feeding stages and dietary sources.

SUPPORT

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