

Assessment of Vitamin A (VA) Total Body Stores (TBS) Using Dried Serum Spots (DSS)

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Objectives: The retinol isotope dilution method has been successfully applied to assess the efficacy of VA interventions in low and middle-income countries. However, the current method is limited in its applicability because it relies on keeping serum samples in the cold chain. To overcome that limitation, we assessed the feasibility of using DSS for assessing TBS in Filipino children 12–18 months of age.

Methods: Serum (40 μ L) from Filipino children, who had received an oral dose of [¹³C₁₀]-retinyl acetate was spotted and dried on

Whatman 903 cards then stored at -20°C before shipment at room temperature; aliquots of liquid serum were kept frozen at -80°C until analysis. DSS and liquid serum were extracted by established methods and then analysed by LC-MS/MS to quantify the [¹³C]/[¹²C] retinol ratio and TBS.

Results: Mean \pm SD TBS of 57 Filipino infants aged 12–18 mo were 507.6 ± 185.8 μmol and 495.5 ± 170.1 μmol from either serum or DSS samples, respectively. Comparison of methods using Bland-Altman analysis indicated agreement between both methods with an intra-individual mean difference for TBS of 22.1 μmol (4.5%).

Conclusions: TBS can be determined using serum spot samples in field settings, thus reducing the costs and limitations of shipping serum samples on dry ice and reducing the need for -80°C storage in field stations.

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