Commentary: Vitamin A policies need rethinking

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Vitamin A interventions, including 6-monthly, large-dose vitamin A capsule distribution, reduce early childhood mortality and blindness in undernourished populations. Governments seeking to scale back capsule use first need...
evidence that vitamin A deficiency (serum retinol <0.70 μmol/l) is under control (≤5%) and dietary vitamin A adequacy exists among vulnerable groups. Policy recommendations with a clear rationale exist to guide this process.

In setting public policy to control vitamin A deficiency, no interventions should be necessary if normal vitamin A status is sustained from a diversified diet. Among groups vulnerable to inadequate dietary vitamin A, food fortification represents a proven effective approach to assure vitamin A adequacy.\(^1\) Provitamin A biofortification of staple crops is also emerging as a viable option.\(^2\) However, absent adequate coverage by any of these strategies, vitamin A capsule (VAC) distribution represents a last resort that does not address the root problem, but does control the major health consequences of childhood vitamin A deficiency: blindness and mortality.\(^3\)

In their recent paper, Mason et al.\(^4\) do not recommend changing this strategy. They recommend moving away from VAC distribution to food fortification and dietary diversification when safe to do so. This is in line with existing recommendations, the evidence for which was extensively reviewed in 2012.\(^1,5\) Present thinking is that where supplementation is now practised, governments should assure that vulnerable, recipient populations have a sustained, normal dietary intake and status with respect to vitamin A, based on serum retinol as a population indicator, prior to scaling back this intervention.

Specifically, a serum retinol concentration <0.70 μmol/l provides a reliable guide for assessing the extent and severity of deficiency and health risk in a population.\(^6\) Despite its sustained health impact (for ~6 months), semi-annual VAC delivery does not sustain a rise in serum retinol for more than 8–12 weeks.\(^1\) Therefore, in the presence of VAC distribution, if underlying dietary intake has not adequately improved, serum retinol levels of children will, on average, return to below 0.70 μmol/l midway through the 6-month VAC delivery interval. To date, only an adequate dietary intake of vitamin A over time has been shown to sustain serum retinol levels within a normal range.\(^3\)

The evidence required for a country to scale back VAC distribution can be obtained by conducting two serum retinol surveys, a year apart, both of which must reveal the prevalence of vitamin A deficiency (<0.70 μmol/l) to be ≤5%, greatly strengthened by evidence of dietary change. With these conditions met, universal VAC delivery can be safely withdrawn because a dietary safety net exists and there may be little further health gain with continued capsule distribution\(^1\). The approach enables each country in question to decide to shift policy when its conditions permit. Whereas it may be argued that serum retinol surveys are expensive and difficult, they are less costly than a continued national VAC distribution programme. Further, more portable methods to assess serum retinol or retinol-binding protein are under development, which will likely lessen sample logistics, costs and time to analysis in the near future.

We had looked forward to the paper by Mason et al.\(^4\) offering practical alternatives. None were forthcoming. In fact, the paper obfuscated present policy and its rationale.

The rationale for vitamin A interventions in undernourished populations is the incontrovertible evidence from large, rigorously conducted community trials in South Asia and Africa that semi-annual VAC distribution, food fortification with vitamin A or, more intensively, weekly, low-dose vitamin A supplementation can reduce preschool child mortality by ~25–30%.\(^3,7,8\) The impact is particularly striking on fatality not only from measles, as mentioned in Mason et al., but also from more common diseases such as diarrhoea, dysentery and other infectious illnesses.\(^3\) All approaches that assure adequate vitamin A intake will also prevent xerophthalmia and its blinding consequences.\(^3\) Findings of VAC programme evaluations by various designs in Nepal,\(^9\) South Africa,\(^10\) the Philippines and Viet Nam\(^11\) have been consistent with the broad child health impact that has been established in population-based efficacy trials.

Only one study, the Deworming and Enhanced Vitamin A (DEVTA) programme evaluation,\(^12\) highlighted as providing new evidence by Mason et al.,\(^4\) showed no benefit to child survival, for good reasons. Investigators attempted to evaluate a semi-annual vitamin A delivery programme in Uttar Pradesh, India, during the years 2000–04. Important to note, the study was not a vitamin A biological efficacy trial. Apart from confusing evaluating a programme with testing biological efficacy, the design and conduct of the DEVTA study did not meet prerequisites of either.\(^13\) The first prerequisite of a randomized programme evaluation is evidence that the intervention is worth evaluating at great expense. At the time, the Uttar Pradesh programme was one of the worst-performing statewide vitamin A delivery programmes in India, reaching only 6% of target-aged children in the 6 months prior to the National Family Health Survey in 2005–06.\(^14\) It is not surprising to have found no benefit. The second criterion for programme impact evaluation is that the biological efficacy of the intervention that is delivered is assured. Otherwise one cannot tell if the lack of effect reported by DEVTA is due to lack of efficacy or poor delivery. The DEVTA trial claimed it was testing efficacy, so this second prerequisite was not met.

The prerequisites for a biological efficacy trial were also not met. This is evidenced in widespread criticism by the international community which found the study uninformative,\(^15–17\) based on decades of experience with previous vitamin A efficacy studies. For all of these reasons, the DEVTA findings should neither supplant nor be combined with data from rigorously conducted efficacy
trials.\textsuperscript{18} We were, therefore, surprised that Mason et al.\textsuperscript{4} even mentioned this study.

Vitamin A deficiency has plagued human society throughout history. It will not disappear until vulnerable populations have achieved normal vitamin A status by sustained changes in dietary vitamin A intake. We must all strive to improve the diets of those who are now vulnerable. Until then, periodic large-dose vitamin A delivery has a vital public health role in protecting child health and survival.

Conflict of interest: None declared.

References


Reply to West et al. Vitamin A policies need rethinking

From John Mason,\textsuperscript{1*} Ted Greiner,\textsuperscript{2} Roger Shrimpton,\textsuperscript{1} David Sanders\textsuperscript{3} and Joshua Yukich\textsuperscript{1}

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We have the following points to make in response to the commentary by Dr West and his distinguished colleagues.\textsuperscript{1}

The first premise in our paper was that response to vitamin A capsule (VAC) intervention (as with most others) depends on context, in this case on disease patterns and prevention, especially immunizations. For example, Prentice et al. state: ‘Vitamin A provides a good example of how supplementation may have quite different effects in different