

schoolers, despite the lowered diphtheria and tetanus toxoids antigen contents.

The booster vaccine is gaining global acceptance (including in Europe and North America) for use in all age groups above the age of 4 years, with the data indicating non-inferiority when used as a booster for protection against diphtheria-tetanus and pertussis, compared to available alternatives(4). An Indian Academy of Paediatrics publication states it may be used in pre-schoolers and is preferred after age 7 years(5). We believe the good safety and reactogenicity profile demonstrated in our study will help the vaccine contribute to the control of diphtheria and pertussis in India.

**S K Datta,
A P Dubey*,**

**Maulana Azad Medical College, Delhi
and
GSK Biologicals, Belgium.
E-mail: sanjay.k.datta@gsk.com.*

REFERENCES

1. Decker MD, Edwards KM. Acellular pertussis vaccines. *Pediatr Clin North Am* 2000; 47: 309-335.
2. Cherry JD. Pertussis: the trials and tribulations of old and new pertussis vaccines. *Vaccine*. 1992; 10: 1033-1038.
3. Kosuwon P, Warachit B, Hutagalung Y, Borkird T, Kosalaraksa P, Bock HL, *et al*. Reactogenicity and immunogenicity of reduced antigen content diphtheria-tetanus-acellular pertussis vaccine (dTpa) administered as a booster to 4-6 year-old children primed with four doses of whole-cell pertussis vaccine. *Vaccine* 2003; 21: 4194-4200.
4. Frampton JE, Keating GM. Reduced-antigen, combined diphtheria, tetanus, and acellular pertussis vaccine (Boostrix): a review of its use as a single-dose booster immunization. *Bio Drugs* 2006; 20: 371-389.
5. Chitkara AJ, Dutta AK, Narain NP. DTP vaccines: DTwP, DTaP, Td, Tdap. *In*: Ghosh TK, Kundu R, Ganguly N, Mitra M, Choudhury J, Ghosh-Uttam K (eds). *Controversies answered: A Monograph in Vaccinology*, 1st edn. Calcutta: IAP Infectious Diseases Chapter; 2007; pp 16-21.

Management of Severely Malnourished Children

We read with interest the IAP guidelines 2006 on the hospital based management of severely malnourished children adapted from the WHO guidelines(1). We really appreciate the effort of the IAP Task Force for making these guidelines widely available through the Indian Pediatrics. The recommendations come at a time when despite the India's economic boom, the percentage of underweight children younger than 3 years has risen over the past 10 years(2). However, there are some discrepancies between the IAP and the WHO recommendations. Some of these discrepancies have been highlighted in the accompanying editorial(3). Also, the level of evidence should be mentioned for each recommendation, so that readers can make informed decisions. Keeping in mind the busy pediatricians, the guidelines should be simple, easy to use and unambiguous. We wish to raise the following points:

1. The IAP recommends the use of reduced osmolarity ORS with concentration of Na⁺ as 75 mmol/L, whereas WHO recommends even lower concentration of Na⁺ (ReSomal) with a sodium concentration of about 37.5 mmol/L. Giving high sodium could be inappropriate, and can cause complications, including death(4).
2. For the treatment of shock, IAP recommends (*Appendix-1*) intravenous bolus of 10 mL/kg over 20-30 minutes, and packed RBCs followed by a repeat fluid bolus over the same period, whereas WHO recommends 15 mL/Kg of fluid during the first hour, and then the blood, if required(1).
3. IAP recommends the simultaneous use of IV fluids and packed RBCs if the Hb is less than 10 g/dL or there is active bleeding. This is not feasible as blood is generally not available immediately. Furthermore, the cut off Hb for giving blood transfusion is quite high. This may cause unnecessary use of blood and volume overload in a severely malnourished child. Active bleeding

should also be defined further to improve clarity to the readers.

4. The IAP guidelines also do not clearly state the type and amount of maintenance fluid to be given after correction of shock or dehydration in a severely malnourished child who is not tolerating enteral feeds.
5. What is the basis of recommending steroids in severely malnourished children? This may result in unnecessary use of steroids in malnourished children who are already in a catabolic state.
6. It would be nice if certain Do's and Dont's in the treatment of severely malnourished are given in a boxed form for better understanding and implementation of the guidelines.

**Ashok Kumar,
Shalu Gupta,**
*Department of Pediatrics,
Institute of Medical Sciences,
Banaras Hindu University,
Varanasi 221 005, India.*

REFERENCES

1. Task Force of the Indian Academy of Pediatrics. IAP guidelines 2006 on hospital based management of severely malnourished children (adapted from the WHO guidelines). *Indian Pediatr* 2007; 44: 443-461.
2. Chatterjee P. Child malnutrition rises in India despite economic boom. *Lancet* 2007; 369: 1417 - 1418.
3. Ashworth A, Jackson A, Uauy R. Focussing on malnutrition management to improve child survival in India. *Indian Pediatr* 2007; 44: 413-416.
4. World Health Organization. The pocket book of hospital care for children. Guidelines for the management of common illness with limited resources. Geneva: WHO; 2005.

Reply

We thank Dr. Kumar and Gupta for raising important issues regarding management of severely malnourished child. The Task Force evaluated the WHO guidelines and reviewed literature for supporting the recommendations. For many of the issues, including some of those raised by the authors, there is little published evidence.

Following are the responses to the issues stated:

1. WHO recommends ReSoMal for malnourished

children(1). The solution is not available in India. There are no studies that have compared the reduced osmolarity ORS with ReSoMal in severely malnourished children with diarrhea. There is a study by Dutta et al that found reduced osmolarity ORS to be superior to standard WHO ORS in severely malnourished children with diarrhea(2). In absence of evidence and particularly for the purpose of program feasibility, the expert group recommended the use of reduced osmolarity ORS with added KCl. To ensure safe use in severely malnourished children, the Task Force has recommended that the ORS for rehydration is given over 8-10 hours(3). At the same time the guidelines have highlighted the WHO recommendations.

2. There is no evidence for the WHO guidelines for the management of septic shock; there is greater emphasis on use of blood after one fluid bolus which is not supported by any data and appears to be impractical. The Task Force has based its recommendations on the available guidelines on management of septic shock(4) but recommended a slower fluid infusion rate and the need for monitoring. The WHO guidelines appear to be based on kwashiorkor cases. Marasmic children with circulatory collapse may tolerate a rapid infusion of 10- 20 mL/kg of Ringer's lactate, and may need more, but should not continue to have rapid rates of infusion once the condition has improved.
3. The major emphasis in the management of a child with septic shock is on use of crystalloids. The recommendation to consider blood transfusion are based on the published guidelines for management of septic shock(4) and the rationale is to improve the oxygen carrying capacity to improve the tissue oxygenation. However, one may individualize the therapy based on the child's condition and availability of facilities for safe transfusions.
4. Once the shock is corrected, the malnourished child may receive maintenance fluids as N/5 in 5% or 10% dextrose with added KCl and need for further fluids is decided by the child's condition. If there are ongoing stool losses, the same should also be replaced with N/2 in 5% dextrose solution.
5. The guidelines recommend that steroids in low