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## *Immunization Dialogue*

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### Storage Temperatures for Vaccines

There have been various recommendations regarding the Immunization Schedule, but there should not be different recommendations for the storage of vaccines. There are different recommendations for the storage of various vaccines in four recent publications of interest(1-4). The recommendations for storage are in *Table I* along with the page number from the different publications(1-4). Interestingly three out of the four publications are IAP publications. I would like to know which recommendations should be followed?

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### REFERENCES

1. Immunization Programme in India: Need for a Change. Indian Academy of Pediatrics Committee on Immunization, Ahmedabad, 1989.
2. Mittal SK, Kukreja S. Immunization in Practice. Delhi CBS Publishers and Distributors, 1991.
3. Thacker N, Shendurnikar N. Polio Eradication; Operational Manual. Gandhidham, Indian Academy of Pediatrics, 1996.
4. John TJ, Parthasarathy A, Bhavé SY. IAP Guide Book on Immunization, Revised 1st edn. Mumbai, Indian Academy of Pediatrics, 1996.

**TABLE I**—Recommended Compartment of the Refrigerator for the Vaccines

Vaccine	Reference number			
	1	2	3	4
BCG	Middle (p 11)	Middle (p 21)	Middle (p 10)	Top (p 43)
OPV	Top (p 20)	Top (p 72)	Top (p 10)	Freezer (p 43)
DPT	Lower (p 14)	Lower (p 46)	Middle (p 10)	Middle (p 43)
Hepatitis B	Upper (p 39)	Upper (p 143)	—	Middle (p 43)
Diluent		Upper (pp 102-3)	Middle (p 10)	Lower (p 43)

### Reply

Dr. Yash Paul has identified an item of detail in various guidelines on immunization at variance with each other. It is all the more interesting and disconcerting that we

in IAP have ourselves issued guidelines without cross-checking earlier statements. Fortunately, the differences are of a minor nature and they do not affect the quality of service; all the same, it is a pointer to the facts that our professional colleagues do pay attention to details and that we must

be conscious of the importance of matters of detail. There is a saying that 'the devil is in the detail', meaning thereby that the 'devil' will use the opportunity to cause trouble (by way of confusion, disharmony or failure) when we do not pay attention to detail.

All vaccines in use in India are stable in the temperature range of 4 to 8 degrees Celsius, during its shelf-life. The shelf-life of each batch of vaccines is supplied by the manufacturer as the expiry date. Although the lower range may be 2° C, the chance of freezing increases when vials are stored below 3-4° C due to the fluctuations of the cooling effect of the refrigerator. Some vaccines must not be allowed to freeze; they are aluminium-adsorbed vaccines (DPT, DT, TT, Hepatitis B vaccine). If the thermostat is kept at high cooling or if frost forms at or just below the chiller (baffle) tray, these vaccines should not be stored on the top shelf. The middle shelf should be safe.

Some vaccines can be stored frozen within the shelf-life. They include the lyophilized vaccines (BCG, Measles, MMR) and the liquid live virus vaccine of OPV. They may be stored in the freezer compartment or the top shelf, or the middle shelf. Diluents for lyophilized vaccines are often supplied in less sturdy glass ampoules which might crack if frozen. If frozen, they must be thawed before drawing in the syringe. For these reasons they are best stored in the lowest shelf. When a vaccine package contains the diluent also, it may be stored on the lowest or middle shelf.

The refrigerator may be the single door type with the freezer compartment inside, or the double door type with an independent freezer. In the former type, the baffle tray is meant to be closed while in use and open when defrosting (to catch all water from the freezer). In that case, the tempera-

ture is lowest at the top and highest at the bottom. If the refrigerator is running with the baffle tray open, the coolest part will be at the bottom. At any rate, after the door is shut and the unit has run for several minutes, generally the temperature is fairly uniform inside. When the door is opened, the coldest air flows out at the bottom and room air enters at the top. In other words, except for the risk of freezing, vaccines can be stored on any shelf. As the maximum fluctuations occur on the door, the door shelves are not the best place to store them. In the two-door units the cold air is circulated by a fan; hence the temperatures are fairly uniform throughout the shelves.

With these ideas in mind, experts have suggested guidelines as to where to store vaccines and diluents. They are not rules. Some examples of rules are, adjuvanted vaccines must not be frozen; vaccines must not be used beyond expiry date; and BCG must be injected intradermally. Then there are recommendations such as: the site for BCG inoculation is the convex aspect of the shoulder; and in infants DPT is to be given at the anterolateral aspect of the thigh. Immunization schedules are recommendatory, to be modified according to individual circumstances or needs. In summary there is a hierarchy of instructions in which only the rules are mandatory.

Learning the principles is more important than learning the instructions. However, when experts formulate instructions, they should recognize that there is a hierarchy to be comprehended.

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