

**All India Solution for an All India Problem: Dr Narayana Holla, Prof & HOD,
Dept of Community Medicine, KVG Medical College, Sullia.26-07-2021**

A Feed forward for Post “Graduation”

Proem: In public health, timely identifying the right problem is doing half the job and giving solution is finishing complete job – as stated by Chicago University who felicitated with best podium presentation award for identifying and solving problem of Hep-B birth dose administration in a rural Medical College.

Currently in the COVID Vaccination with SputnikV™ Vaccine requiring sub-zero temperature for storage and transportation we [team India] got the opportunity of identifying the crux of the all India problem and also to share all India solution for which we feel proud and privileged to share the following gift for the country.

Govt of India is extraordinarily committed both for the nation and the world, even donated vaccine to the needy countries. India approved utilization of Russian made SputnikV™ Vaccine – needs to be stored at a temperature of -18°C to -20°C , currently administered by private CVCs. Govt is gearing up to include it in the National COVID vaccination programme stating that **“ -18°C to -20°C cold chain is not a deterrent because that is also the temperature at which the polio vaccine [OPV] is stored”**. However OPV is “amphibious”, open vial policy [Multi Dose Vial Policy-MDVP] is applicable decorated with Vaccine Vial Monitor [VVM-2]. As per study, it can undergo a number of freezing-thawing cycles without necessarily losing its initial potency. Vaccine that has been thawed 3 or 4 times can still be **refrozen** as long as the temperature has at no time exceeded 8°C and the aggregate of periods during which the vaccine was thawed is no greater than 24 hours. But SputnikV™ Vaccine once thawed, **should not be refrozen** for eventual use as per current Sputnik & DRL SOPs.

In our country almost all planning units are provided with ILR [Ice Lined Refrigerator] for keeping UIP vaccines requiring 2 to 8°C and Deep Freezers [DF] primarily meant for making ice-packs between -15 to -20°C . OPV is stored in minus temperature at regional / state & higher stores in the walk-in freezers below -15°C . In all the planning units it is stored in the ILRs between $+2$ & $+8^{\circ}\text{C}$; whereas the currently available Sputnik needs to be stored at **-25°C , thawing is allowed only once** as per SOPs.

All India problem – A) Public sector:

Following are the current generation Ice-Line free Deep Freezers in the public sector. Frost formation inside the DF is an unwelcome almost unavoidable phenomenon as long as ambient air has water vapor. **While defrosting, there is a threat of sacrificing vaccine either through breakage or through thawing or both.**



The left model has 2 baskets; each basket [L42xB21xH18cm] can accommodate 150 secondary cartons of 5 ampoules each=750 dosesx2=1500 doses in 2 baskets. Ideally, minimum indenting is 1200 doses in one celsure / multiples of 1200 doses to be indented - generally.

The right model with 125L cabinet space has 4 baskets; each basket [L34xB11xH30cm] can accommodate one group carton containing 60 secondary cartons of 5 ampoules each=300 dosesx4 baskets=1200 single dose ampoules.

CVC / planning unit need to procure one celsure each of Component 1 & Component 2, two DFs of 125L cabinet space are needed. If block can get main stock and distribute small number of doses say 500 per indent, needs to be transported <20 °C.

All India problem – B) Private Sector



Deep Freezer with vertical door: cabinet temperature sharply rises even with short opening as heavy cool air from the cabinet space slips down and warm room air fills the cabinet resulting in Temperature Excursion with every opening like domestic refrigerator.



DF without Ice Lining, welcomes early frost formation, through large windows of grill baskets, the cartons slip down to the bottom, get matted, CCH may not remove till the stock gets over or while removing & or defrosting ampoules may get broken

or may get tahwed loosing potency or both – a preventable loss of both vaccine and money.

All India Solution: Sharing from a Private CVC

“AddressHealth (AH)” is private CVC in Bengaluru of Karnataka procured made in India Ice Lined Deep Freezer (**ILDF**) [**C**old **C**hain **C**ontrols – **C**oimbatore; nick named as **C4 Model** by the author] for keeping SputnikV™ Vaccine at recommended temperature well

below -18°C . **Temperature range** of this 500L ILDF with 350L cabinet space is critically set between -25°C & -23°C . It has **secondary ice-lining** to discourage frost formation and augment cold-hold-over time in case of power failure for sufficient hours sparing power inverter / generator. However, a **contingency plan** is also ready with the AH.

This ILDF is provided with sliding perforated trays for keeping vaccines ensuring adequate free space for air circulation. There is adequate space for keeping gel ice-packs for freezing both for keeping in the **Vaccine Carrier of 2.9L size** (can hold 12-14 secondary cartons=60-70 ampoules) and prolonging cold-hold-over time. Total of ~4800 doses of component-1 and component-2 [2400 each] can be accommodated. ILDF has vertically opening horizontal lid, on partially opening for short duration of ~10 seconds by the dedicated CCH, the cool air in the cabinet space is least disturbed causing minimum rise of temperature unlike the one with horizontally opening vertical door wherein the cabinet temperature sharply shoots up on opening even for short duration of ~10 seconds. This ILDF prevents matting of the cartons and facilitates easy removal. It is fitted with two temperature monitors: 1. Continuous Digital display and 2. Temperature logger – can record temperature minute wise. Data is transferrable to the computer for storing, retrieval, surveillance [specific information for specific action], validation, sharing on required basis and **Operational Research**: answered all our 15 questions on DF for maintaining sub-zero temperature.



Minimal Frost, horizontal toplid ILDF with sliding trays, provides adequate free space for air circulation maintained in a private CVC Bengaluru, Karnataka, India.

Hence, all the currently available DFs in India meant primarily for making ice-packs have to do **“Post Graduation”** for housing vaccines requiring sub-zero temperature though it is not at all a deterrent for the Government if strengthened with universal strong sustained supportive supervision taking care of both the sectors. This is a bright opportunity to enter in to a new era in storing and transporting vaccine at sub-zero temperature in both the sectors.

Alternatively, Sputnik Vaccine requiring $+2$ to $+8^{\circ}\text{C}$ can be included in the National COVID Vaccination programme as the HCWs are well acquainted with 0++ cold chain.

Acknowledgement: I sincerely thank AH team and the attached Govt. planning units for sharing the photos and their practical experiences for sharing and capacity building.