BLACKFROG® TECHNOLOGIES

Emvólio®
Precision Refrigeration for Healthcare

EXECUTIVE SUMMARY

Emvólio is a patented rapid cooling technology for safe last-mile transport of vaccines, insulin, blood serums and various biologicals that are monitored and regulated to minimize the freeze-thaw cycles.
Emvólio brings in the most reliable cooling technology in order to maintain the effectiveness of biologicals by blanketing them in air that is strictly preset temperature with an accuracy of 0.5°C. It is a rugged & all weather backpack/sling-bag compatible solution with an inbuilt IoT system that aids the last-mile delivery of sensitive biologicals.

This system has been developed by Blackfrog Technologies Private Limited, an ISO 13485 Medical device manufacturing company with its roots in Manipal, Karnataka (India). Blackfrog specializes in the development of patented technologies for precision cold chain and vaccine traceability systems with the support of BIRAC (DBT, Govt. of India), Qualcomm Technologies and other leading impact investors in the nation including Venture Centre (NCL, Pune), CCAMP, Social Alpha to provide logistical support in the last-mile delivery of vaccines. Emvólio has successfully delivered over 200,000+ efficacious vaccines in over 16 states of India in the most 'hard to reach areas'. Emvólio is currently being deployed in Africa to vaccinate children as part of the routine immunization program.

CE · ISO 9001:2015 · ISO 13485 Quality Management System · IEC 62133 R-62002925 · WHO Approved

CHALLENGE

9 out of the 15 vaccines commonly administered today are freeze-sensitive. They need to be strictly maintained between 2 and 8 degrees Celsius. However, the currently used cold boxes (Ice/gel-packs based) do not provide assured temperature control.

65% Freeze-sensitive vaccines are exposed to freezing temperatures by the time they make it through the supply [1]

25% Vaccines go to waste every year in India due to poor cold-chain management[2]

A significant deterrent to the effective delivery of vaccines to remote locations in tropical & and sub-tropical countries is the lack of a mechanism to maintain their cold chain. Since the immunization drive relies heavily on bringing vaccines to the people, rather than vice-versa, there is scope for vaccine wastage in transit during the 'last mile' (from the healthcare center to the location of administration), due to exposure to non-optimal temperatures. Even if the central facility effectively manages the refrigeration, typically health workers carry vaccine vials in passive carriers with ice packs and in extreme cases, even picnic coolers with a few cubes of ice placed in the bottom.
Evidently, there is no way to monitor or regulate the temperature in such a setup nor is there any accountability. Further, current refrigeration systems focus more on stockpiling rather than on transit

SOLUTION

Emvólio®
Precision Refrigeration for Healthcare

- Uniform Cooling
- IoT based device monitoring
- 13+ hours of independent operation
- Rapid Temperature Stabilization
- 1.8 Liters Capacity
- IP 55 Rating
- Solar Compatible

[1] Murhekar MV, Dutta S, Kapoor AN et al. Frequent exposure to suboptimal temperatures in vaccine cold chain system in India: results of temperature monitoring in 10 states.
Bulletin of the World Health Organization.2013;91(12):906-13

[2] MOHFW(N.D).National Vaccine Wastage Assessment. GOI.
Available at: https://www.unicef.org/india/media/6686/file/National%20Vaccine%20Wastage%20Assessment.pdf

IMPACT

1. Minimizing Vaccine Wastage

One rural hospital in Southern India using Emvólio for over 2 years now has documented over INR 13,000 (USD 160) worth of vaccines saved (Routine vaccines) every month due to longer cold life. With COVID-19 vaccines, the savings are to the tune of INR 100,000 (USD 1200).

2. Preventing Breakthrough Infections

A major reason for breakthrough infections, i.e. when a vaccinated individual becomes infected with the illness, has been attributed to improper storage and transport of vaccines. The last-mile is especially susceptible to loss of accountability and this puts zero-dose children at grave risk. Emvólio assures controlled refrigeration and 100% visibility in storage conditions up until the vaccine is administered.

3. Continuous monitoring

Emvólio allows the end user to continuously monitor the assets on the ground by tracking location, trajectory, temperature and battery conditions. This can also be presented as a report to the health officials regularly to inform value chain decisions and judiciously allocate resources during epidemics. In case of a loss of network, Emvólio can store the data up to 2 years and send them to the dashboard as soon as there is network connectivity. On board Emvólio, Qualcomm's BG96 module ensures that all the 26 parameters recorded within the device are transmitted to the dashboard providing remote visibility and sending temperature, location and low battery alerts to the end user. This ensures continuous visibility and that the vaccines and biologicals are never at risk of being exposed to sub-optimal conditions.

4. Improved vaccination coverage

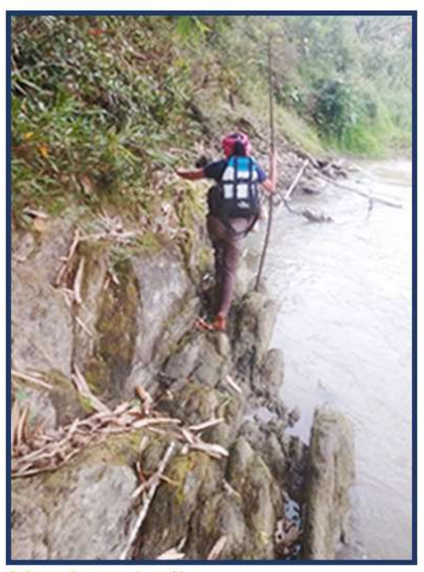
Most of the immunization programs by Emvólio have been able to extend the campaign duration by 6 to 12 hours due to the efficient active cooling technology and increased cold life. This allows more beneficiaries in remote and rural regions to get efficacious vaccines at the earliest to avoid the spread of infection.

5. Emvólio fighting COVID-19 and other diseases

Emvólio was used in administering over 200,000+ vaccination doses for routine and COVID-19 across 16 states in India. The product has been found to be reliable and maintaining 12+ hours of safe temperatures in the most inaccessible regions across varied geographies - the cold mountains of Manipur & Meghalaya, the hot arid regions of Rajasthan and the humid coast of Karnataka and Tamil Nadu.

Health workers carrying Emvólio to deliver vaccines to the beneficiaries.

Assam, India



Manipur, India

Samburu, Kenya

GSM-GPS system transmits live vital statistics like temperatures, location, and usability patterns to an online dashboard

Emvólio being used for institutional and outreach immunization sessions

Karnataka, India

Manipur, India