Sustainable Medical Cold Chain

The need of the hour for last-mile vaccine potency
Mr. Jesal Doshi possesses a wealth of knowledge in private equity, economic insights, and corporate strategy.

Since joining the company in 2015, Mr. Doshi has developed and implemented several initiatives that have transformed B Medical Systems from a regional/niche player to one of the most innovative companies in the medical refrigeration industry.

Mr. Doshi was instrumental in the strategic expansion of B Medical Systems into India and the US and has launched several initiatives to extend the company’s reach into new markets and customer segments, thereby contributing significantly to the growth of B Medical Systems.

Let’s connect!
Immunization programs are key drivers for coverage and equity

Basic vaccine coverage, as measured by coverage of three doses of diphtheria, tetanus and pertussis-containing vaccine (DTP3)

Social ROI
$54 for every $1 spent on immunization

Reaching the last-mile population is one of the biggest challenges in improving the coverage

Data Source: Gavi/WHO and UNICEF immunization efforts; Picture Source: Premium Times Nigeria
To Improve Last Mile Vaccine Potency, we need to focus on sustainability – both programmatically and environmentally

Programmatically + Environmentally Sustainable Programs

Last Mile Vaccine Potency

High Vaccine Coverage & Equity
Challenges to Programmatic Sustainability - (1/3)

Challenge 1: Unreliable Electricity

Estimated population served by healthcare facilities with no electricity access or with unreliable electricity in low- and lower-middle-income countries, disaggregated by region, 2015-2022

Population impacted

About 1 billion
People worldwide are estimated to be served by health-care facilities with no electricity access or unreliable electricity supply

Reliability

Only 50%
Of hospitals in sub-Saharan Africa report reliable electricity access

Access in sub-Saharan Africa

15%
Of health-care facilities lack any access to electricity

Access in South Asia

12%
Of health-care facilities lack any access to electricity

Countries with poorer logistics performance generally have lower vaccination rates.

Logistics plays a critical role as:

- Once fully thawed, vaccines have a shorter life.
- Failures of Cold Chain Equipment (CCE) cannot be addressed fast if logistical challenges exist in reaching the destination.
- Installation of CCE at the last mile can be a challenging task without a local network.
- Skeptical individuals have little incentive to get vaccinated if they must travel miles and spend hours to reach the nearest vaccination centers.

Source: IMF

**Note:** Countries that have destroyed or given away vaccines because they were unable to administer them fast enough are indicated in dark blue. Data labels use International Organization for Standardization (ISO) country codes.
There are several costs associated with running a successful immunization campaign:

- Key ones being vaccine cost, labor cost, etc.
- However, the cost associated with CCE is sometimes not taken into consideration and can create a substantial impact on the national budget. Some of the hidden costs are:
  - Operational cost
  - Maintenance cost
  - Spare Parts
  - Monitoring cost

**Challenges to Programmatic Sustainability - (3/3)**

**Challenge 3: Hidden Costs**

Cost associated with owning a CCE through its lifespan.
Immunization programs need to be ecologically sustainable as well, as they contribute to CO$_2$ emissions

350,125 Ton CO$_2$
(0.00094% of global carbon emissions)
equivalent annual emissions from delivering immunization programs

Annual emissions equivalent of 226,423
Passengers flying on Dubai- New York economy class

Source: UNICEF
Medical Cold Chain is complex and is critical for vaccine potency

- Suppliers
- Vaccine Manufacturer
- Warehouse
- Country Hubs
- Hospitals
- Last mile vaccination campaigns

Several players involved
Various transport modes involved
Various temperature conditions
If not managed properly, the cold chain can create wastage, health issues, and significant emissions.
The wastage caused by an unreliable cold chain is significant

- **30%**: Of scrapped pharmaceuticals can be attributed to logistics issues alone
- **$35B**: is what the biopharma industry loses annually to temperature failures
- **25%**: of vaccines reach their destination degraded because of incorrect shipping

Source: Sensire - https://www.sensire.com/blog/pharmaceuticals-cold-chain
A broken cold chain can result in critical health issues...

Unreliable or broken cold chain can result in textural degradation, microbial growth, loss of medical efficacy, and in extreme cases even death.
Cold Chain Equipment (CCE) again plays a key role as it contributes to ~32% of the emissions associated with delivering immunization programs globally.

Category contribution on total emissions for delivering immunization program globally:

- Transport: 27%
- Operations: 25%
- Waste Disposal: 28%
- Production: 20%

100% = 350,125 Ton CO₂

~32%: CCE Contribution

- Production: ~37% associated with CCE
- Transport: ~0.4% associated with CCE
- Operations: ~100% associated with CCE
- Waste Disposal: ~0.1% associated with CCE

Source: UNICEF
Cold Chain generates both direct and indirect emissions

Direct Emissions
30% of global cold chain related emissions

Indirect Emissions
70% of global cold chain related emissions

Refrigerant Release
Energy Consumption
Several cold chain solutions still use HFC based refrigerants and blowing agents thereby generating significant direct emissions

- HFC based refrigerants or blowing agents have high GWP
- E.g.: A commonly used refrigerant R-404A, has a GWP of 3992
A sustainable medical cold chain can solve these challenges and is the need of the hour.
1. Solar-powered vaccine cold chain equipment using natural refrigerants and a long warranty can meet the last-mile demands and reduce emissions

- Supports last-mile health centers where unreliable electricity is an issue
- Green refrigerants and blowing agents have zero ODP and minimal GWP
- Lowest Total Cost of Ownership (TCO)
2. Reliable and energy efficient medical-grade products that can withstand extreme and hostile conditions

- Reliable, sturdy, and durable. Avoids frequent breakdowns
- Ability to perform at extreme temperatures (SN/T)
- Versatile and high energy efficiency products
- Certified medical devices
3. Durable and reusable transport solutions ensure that vaccines are safe irrespective of the journey.

- High autonomy
- Reusability avoiding landfill
- Sturdiness to withstand long journey and hostile infrastructure
4. Real-Time Monitoring Devices (RTMD) enable the efficient safeguarding of the CCE investments

**Benefits of real-time monitoring**

- Real-time visibility on performance enabling quick corrective measures
- Boosts productivity as it reduces redundancy and helps avoid errors associated with oversight
- Automated monitoring, alerts, and notifications
- Efficient data management enables value-added services like analytics, data monetization, preventive maintenance, etc.
Sustainable Medical Cold Chain Devices save life and paves the way for a better tomorrow
Facilities in Luxembourg, India and USA

Our Locations

B Medical Systems S.A.R.L.
Hosingen, Luxembourg
- Global Headquarters
- Manufacturing Facility & Warehouse
- HC: 277

B Medical Systems India Pvt Ltd
- Manufacturing Facility: Mundra, Gujarat
- Offices: Mumbai, Ahmedabad and Delhi
- HC: 101

B Medical Systems North America LLC
Noblesville, United States
- US Sales Office and Warehouse
- HC: 10
Feel free to come and meet me at the DCVMN Annual General Meeting in Cape Town!