



medical
systems

Sustainable Medical Cold Chain

The need of the hour for last-mile vaccine potency

Jesal Doshi

Deputy CEO – B Medical Systems

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!





B

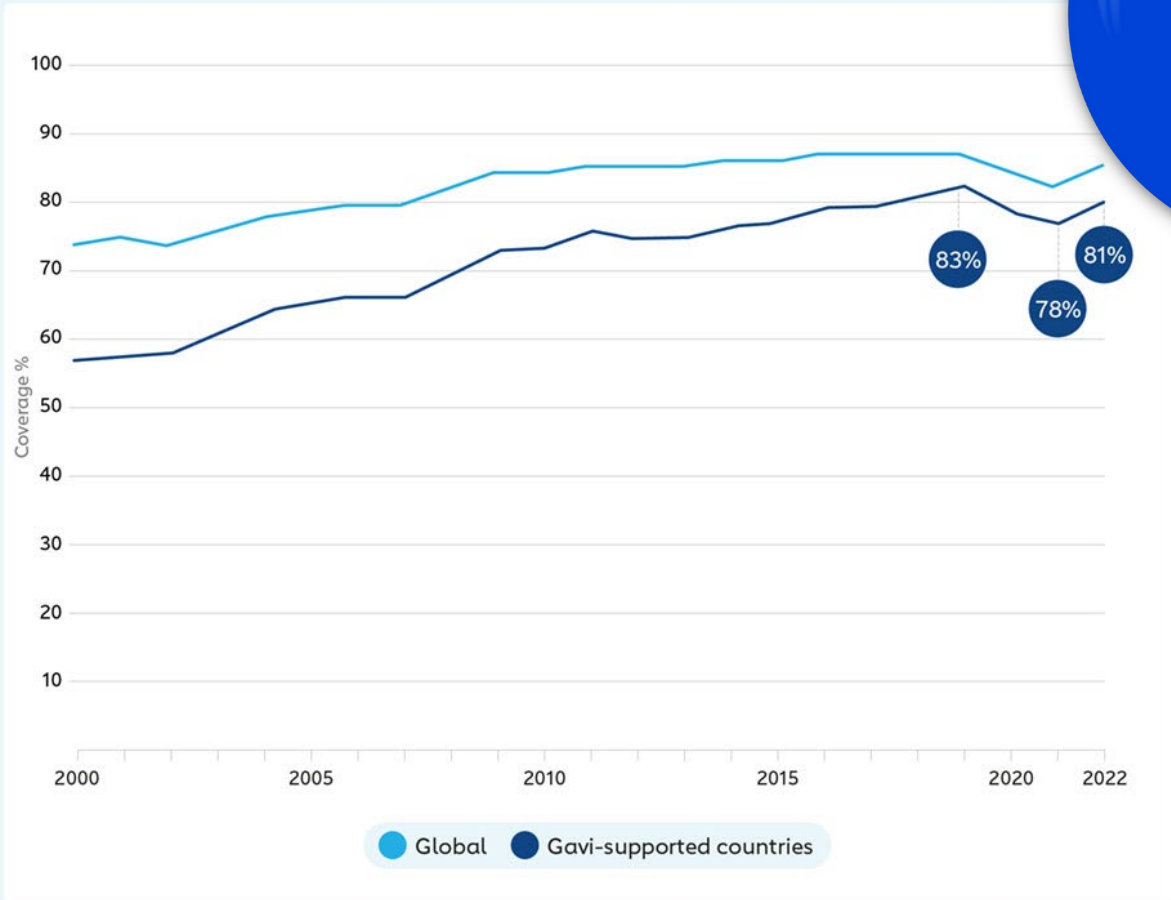
B Medical Systems



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

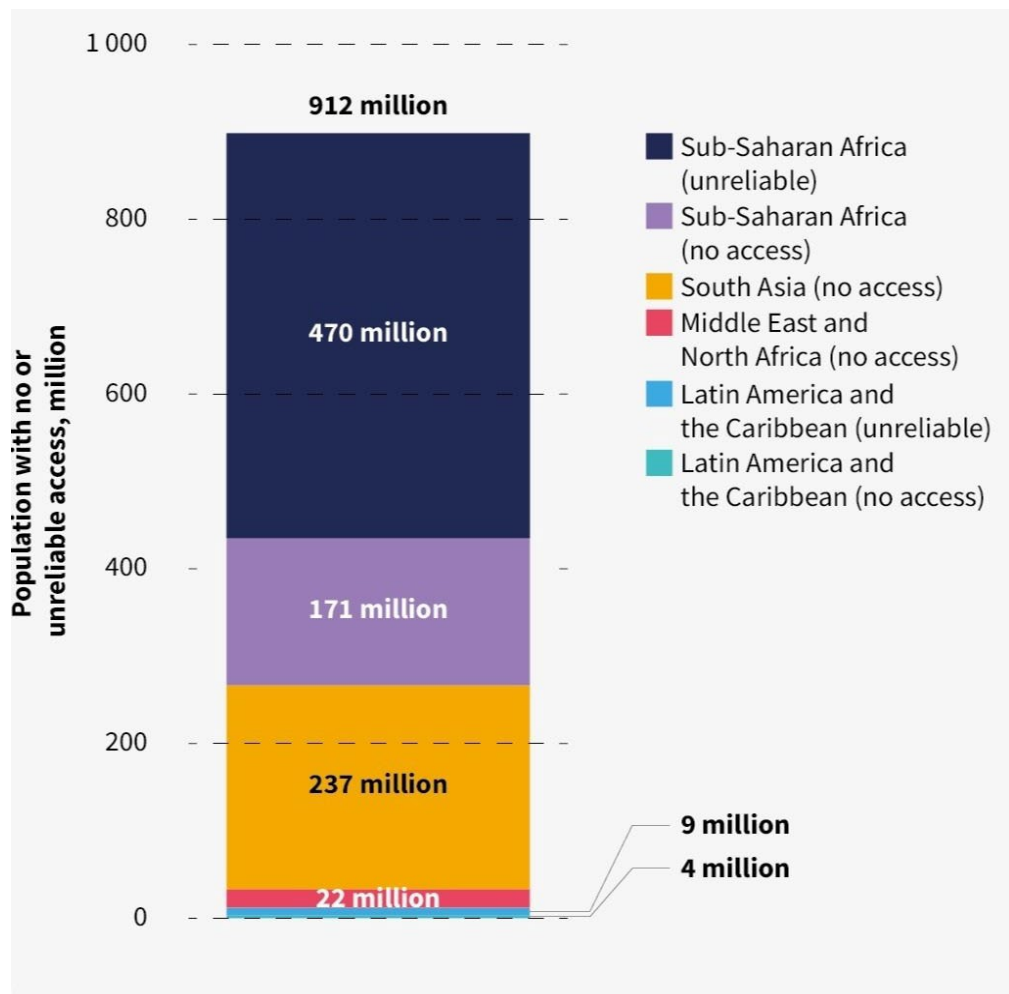
High Vaccine Coverage & Equity



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

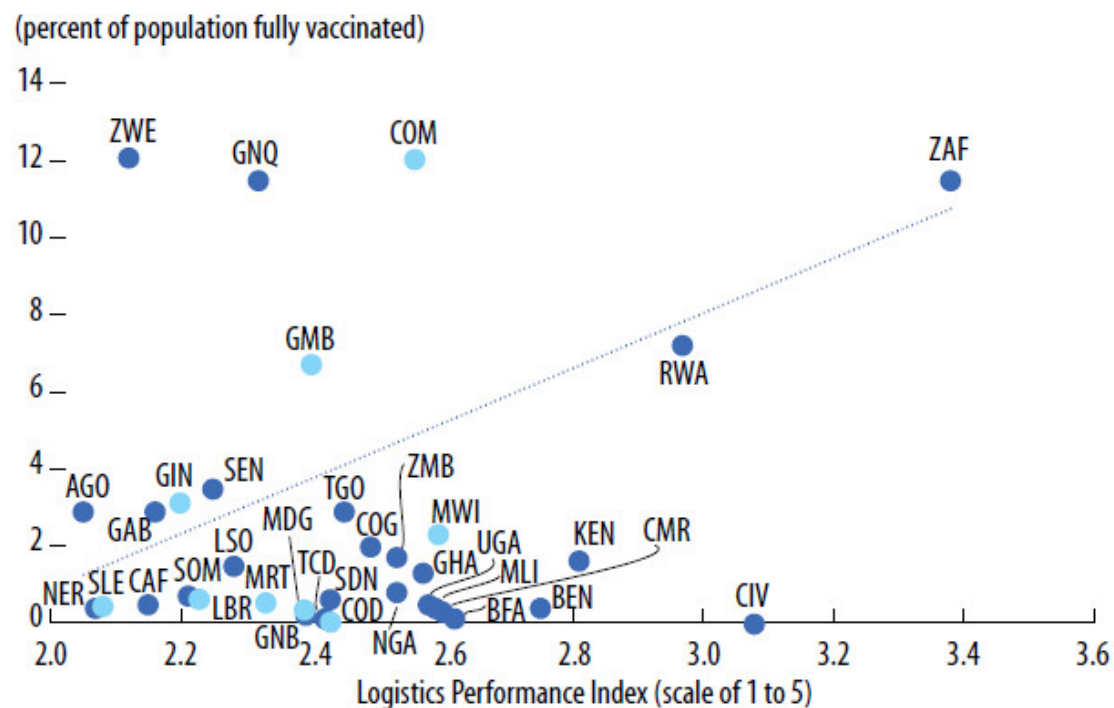
12%

Of health-care facilities lack any access to electricity

Challenges to Programmatic Sustainability - (2/3)

Challenge 2: Logistical Challenges

Countries with poorer logistics performance generally have lower vaccination rates



Source: Share of people fully vaccinated is from Our World in Data (<https://ourworldindata.org/coronavirus#coronavirus-country-profiles>). Logistics Performance Index data are from World Bank, *World Development Indicators*.

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.

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

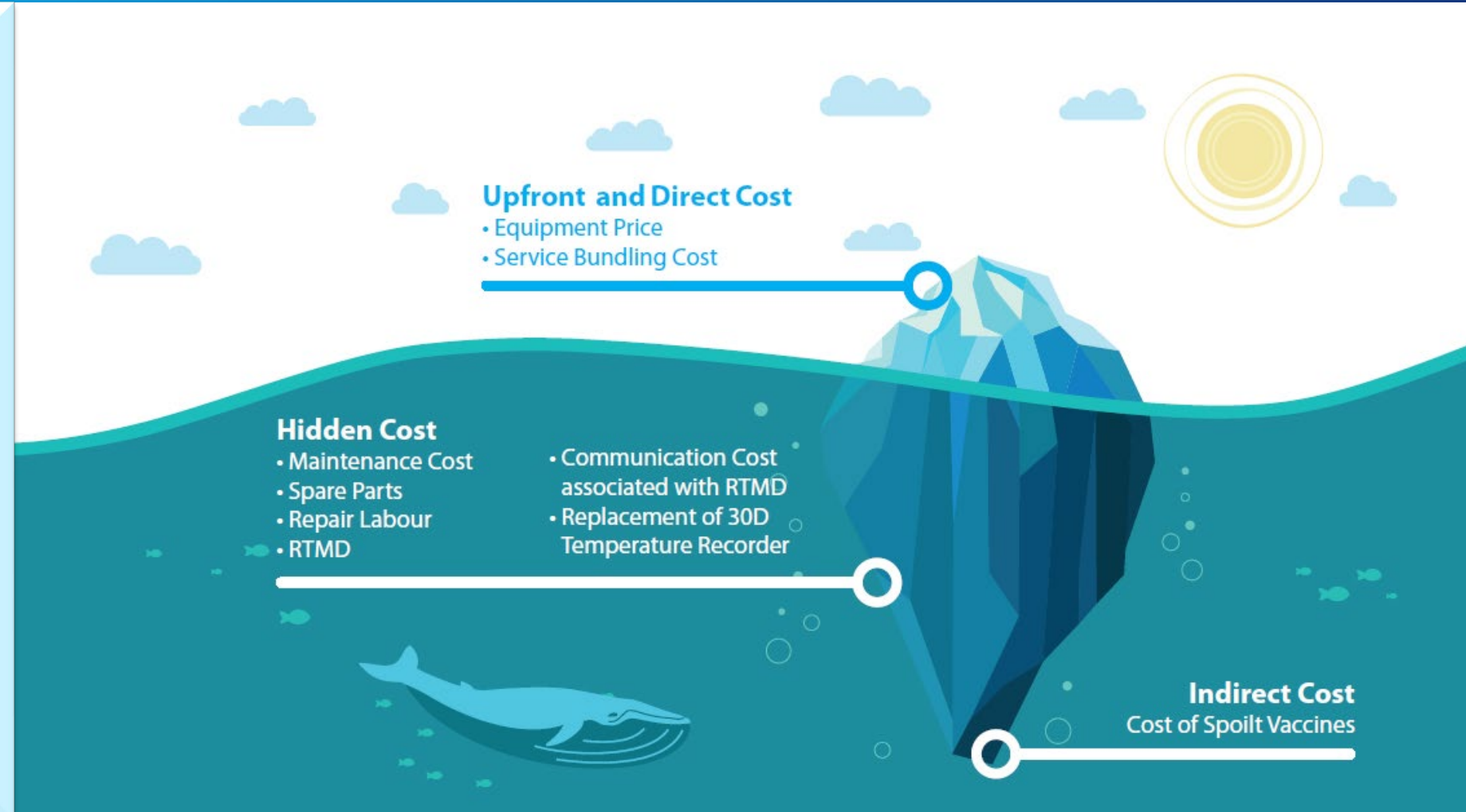
Source: IMF

Challenge 3: Hidden Costs

Cost associated with owning a CCE through its lifespan

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



Immunization programs need to be ecologically sustainable as well, as they contribute to CO₂ emissions



Estimated total emissions for delivering immunization program globally



350,125 Ton CO₂

**(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



Several players involved

Various forms of transport modes involved

Various temperature conditions

If not managed properly, the cold chain can create wastage, health issues, and significant emissions



Impact of unreliable cold chain equipment

Wastage



Health Issues



Environmental Impact



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

A broken cold chain can result in critical health issues...

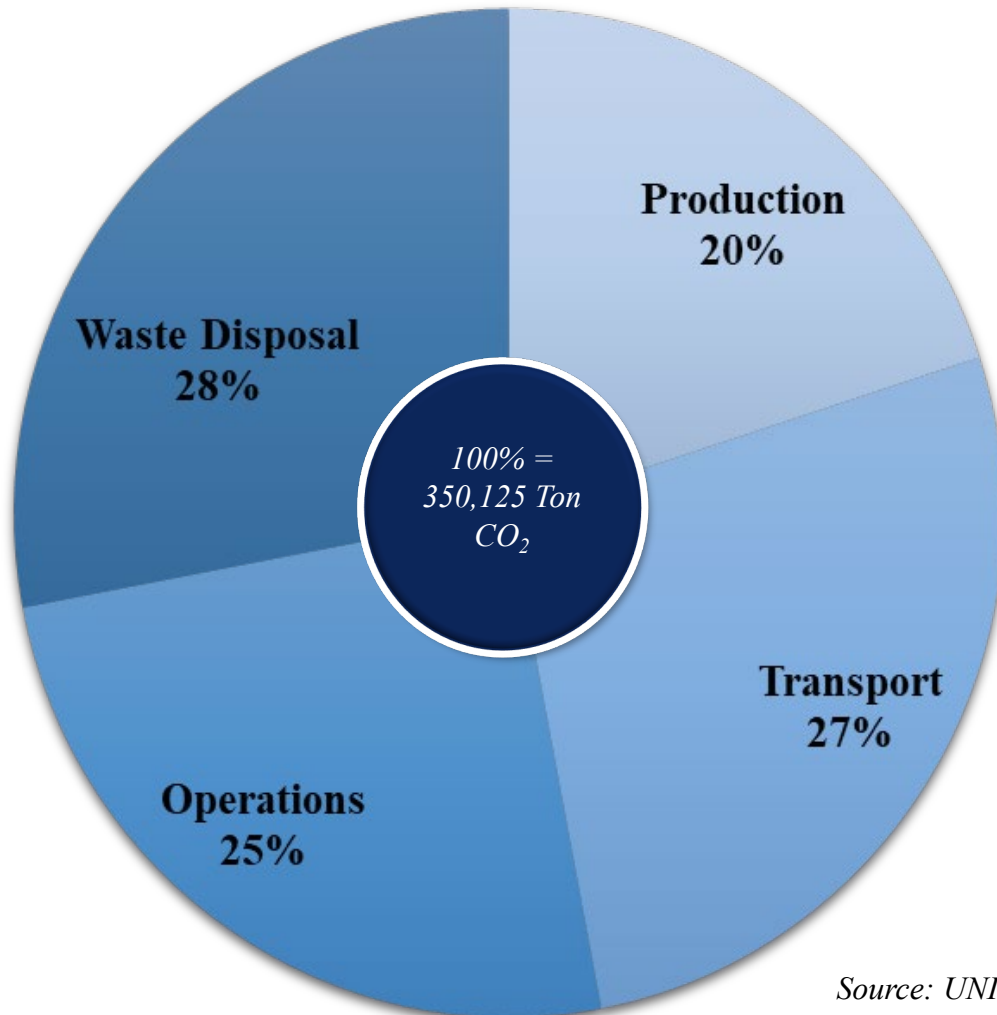
Ohio Fertility Clinic Says 4,000 Eggs
And Embryos Destroyed When Freezer
Failed

BELAGAVI: An investigation to find out what lapses had led to the death of three children after they were administered measles-rubella vaccines has found out that vials of vaccine were stored in a hotel refrigerator by an auxiliary nurse, who did not put these back in the mandatory cold storage within 12 hours of taking them out.

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

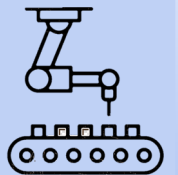


Source: UNICEF

~32%: CCE Contribution

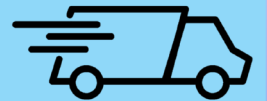
Production

~37% associated with CCE



Transport

~0.4% associated with CCE



Operations

~100% associated with CCE

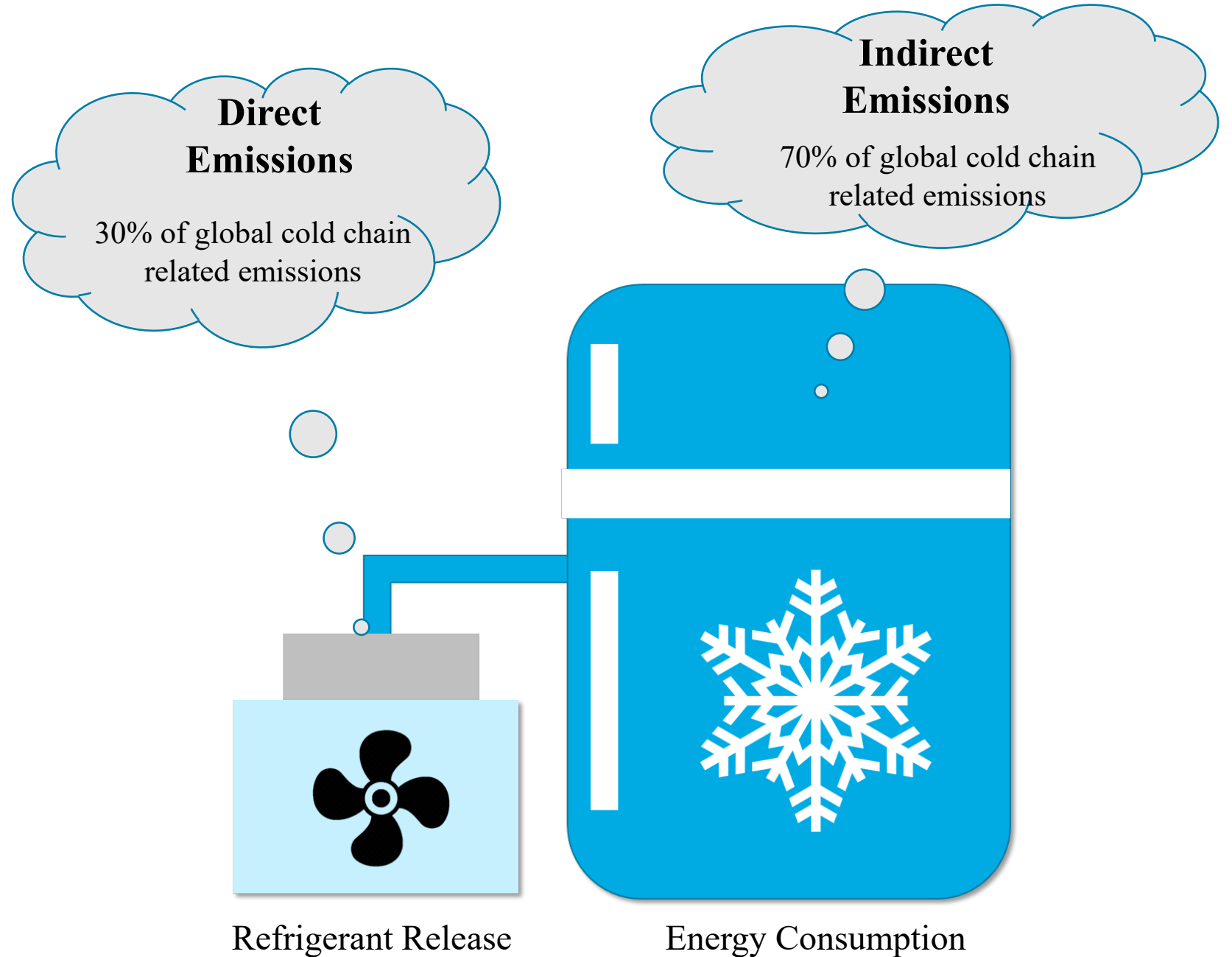


Waste Disposal

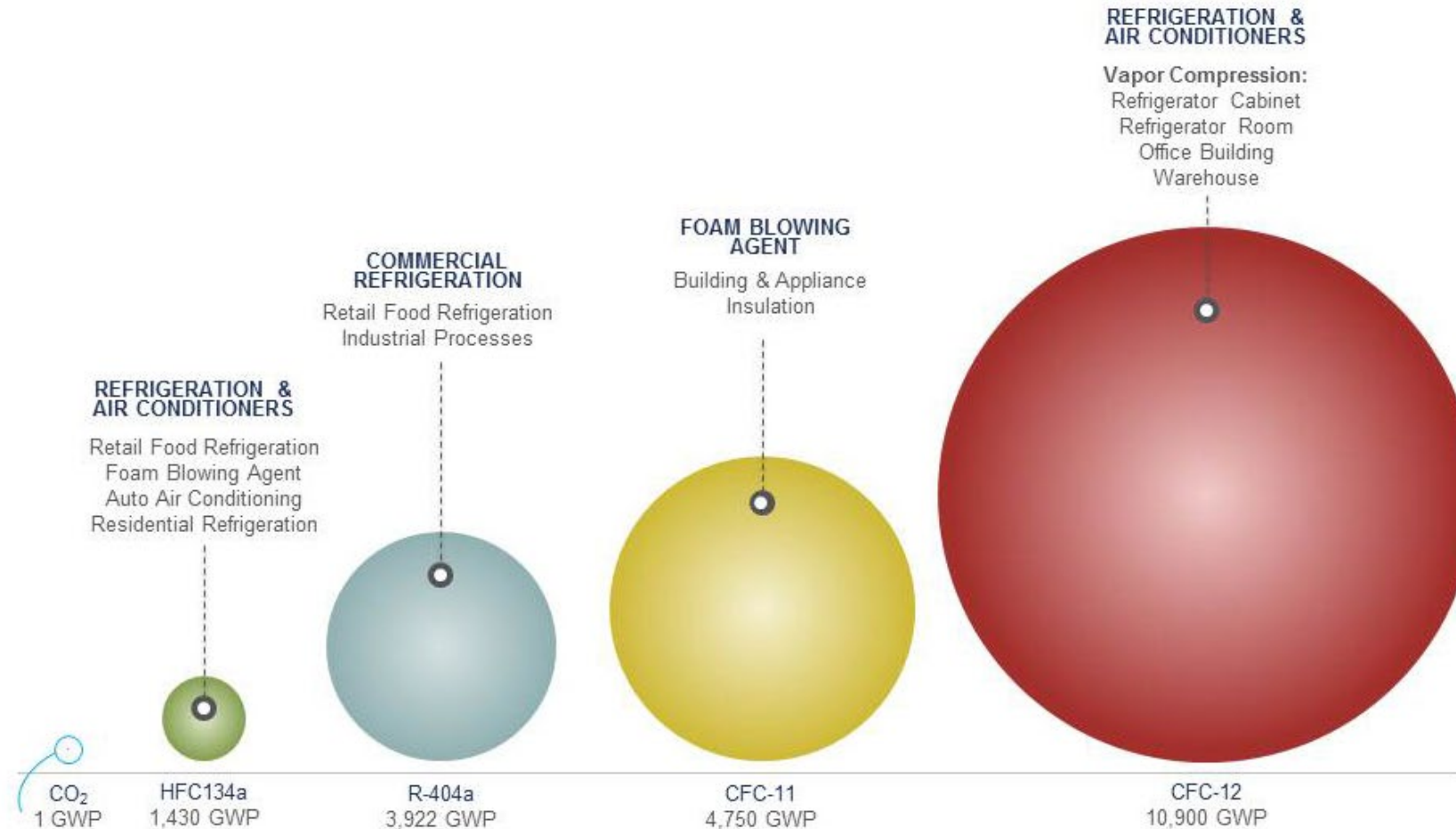
~0.1% associated with CCE



Cold Chain generates both direct and indirect emissions



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 large warehouse or storage facility filled with rows of blue medical cold chain storage containers. The containers are arranged in long, parallel rows on wooden pallets, extending into the distance. The containers have a grid-like base and a lid with a handle. The floor is a light-colored concrete or polished floor. In the background, there are some electrical conduits and a white wall.

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



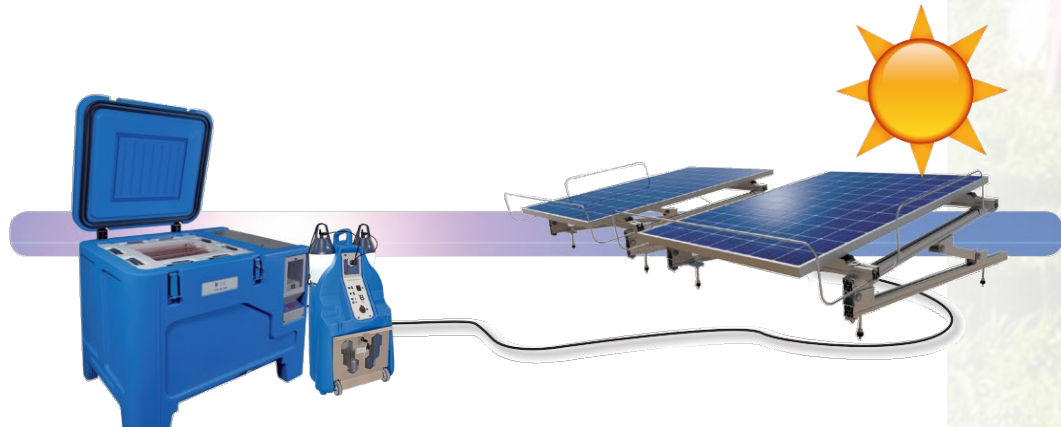
Supports last-mile health centers where unreliable electricity is an issue



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



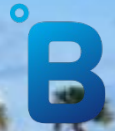
Ability to perform at extreme temperatures (SN/T)



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



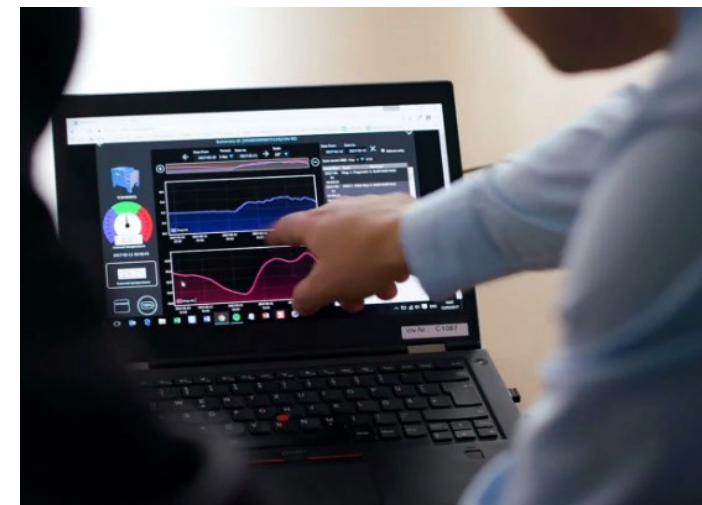
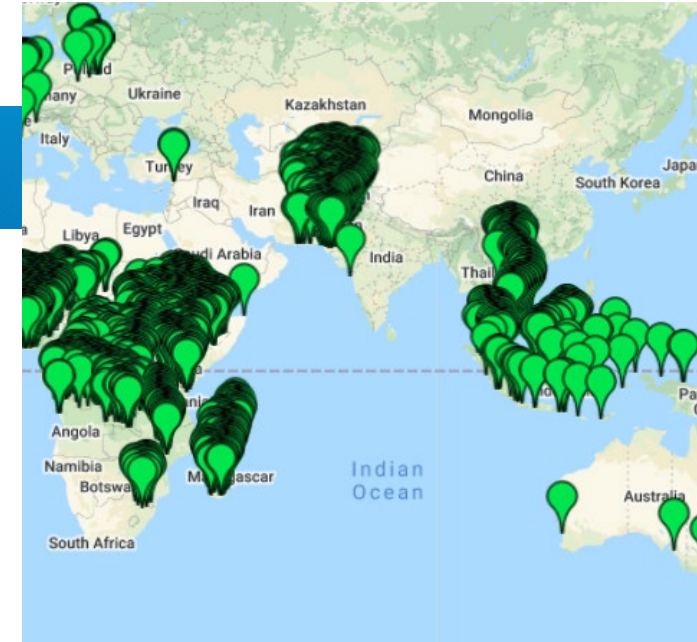
Boosts productivity as it reduces redundancy and helps avoid errors associated with oversight



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**



Our Locations

B Medical Systems North America LLC
Noblesville, United States

- US Sales Office and Warehouse
- HC: 10

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

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DCVMN
Annual General Meeting
in Cape Town!**



24TH DCVMN
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ACCELERATING SUSTAINABLE REGIONAL VACCINE
MANUFACTURING THROUGH GLOBAL PARTNERSHIPS

19 SEPT 21 SEPT

CAPE TOWN, SOUTH AFRICA

The poster features a central graphic of a globe with a map of Africa, surrounded by colorful dots and decorative patterns. The text is arranged in a clean, modern layout with a mix of bold and regular fonts. The dates and location are highlighted in colored boxes.



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