

# COVID Management

## Managing the Oxygen Supply Chains

Haritha Saranga & Ananth Krishnamurthy  
IIM Bangalore

May 15 2021

*We have collected information available through public sources with the hope of supporting those providing solutions.  
Views expressed represent the personal opinions of the authors and not necessarily that of the institute.*

# Predicting and Managing Demand for Oxygen

- Short-term Solutions

- Use trends based on national/international data to predict demand by region in second wave
- Create adequate CCCs with appropriate triaging and preliminary care to reduce patients that reach a critical stage
- Train paramedics and even volunteers in CCCs to manage the oxygen supply efficiently, limit wastage
- Establish strict protocol for oxygen usage for hospitals and CCCs, and oxygen audit of per bed oxygen consumption

- Long-term Solutions

- Prevent large gatherings, ensure COVID protocols are followed strictly
- Enforce lockdown as soon as the infection rate goes beyond a threshold level
- Accelerate vaccination of the population
- Forecast what is the Oxygen requirement in various districts/hospitals/CCCs of the state during the third wave and beyond, and identify resources to meet this demand

# How to increase Supply of Oxygen

- Short-term Solutions

- Debottleneck the LMO production plants and ensure their operation 24/7
- Install Pressure Swing Adsorption (PSA) plants in government hospitals
- Create **Mobile PSAs** that can be used as mobile factories to meet shifting demands
- Invest in oxygen concentrators and promote creative usage in hospitals and CCCs
- Distribute **portable, large-scale Oxygen cylinders** to District hospitals, CHCs and PHCs
- Borrow from neighbouring states that have excess supply of oxygen

- Long-term Solutions

- Create oxygen concentrator production capacity within the country
- Increase the capacity of cryogenic tankers, oxygen cylinders
- Investigate innovations like converting LPG cylinders, fire extinguishers, etc to improve distribution of oxygen
- Engage scientists and corporates to test and invest in oxygen generation technologies in a small-scale and local environment

# Allocation and Distribution of Oxygen

- Short-term Solutions

- Limit need for long haul logistics using in situ solutions (PSAs and Concentrators)
- Use IAF aircrafts/high speed trains to transport empty tankers back to the production sites
- Use **RORO to carry trucks and tankers carrying oxygen inwards and outwards**
- Convert tankers such as nitrogen, argon, LNG etc. into LMO tankers
- Use “**hub-and-spoke**” model with smaller vehicles to transport LMO from large cryogenic tankers to demand points
- Create “**community oxygen filling centres**” for people to go and refill oxygen cylinders

- Long-term Solutions

- Increase the production of tankers and cylinders
- Increase the capacity of various production sites to match local demand
- Map out the capacity to demand points with **dedicated tankers and distribution vehicles**
- **Minimise the transportation distance** between the production sites and destinations using network optimization tools

# Monitoring and Execution

- **De-centralize** management and **empower** people in-charge to take decisions locally to the extent possible
- Create task force at the state/district level and empower them to take quick decisions based on their continuous monitoring of situation
- Maintain **emergency safety stocks** of oxygen at major hospitals and cities which can be rushed to the locations with shortage at a short notice
- Develop plans to address contingencies due to equipment failure, supply delays or spike in demands
- Add oxygenated beds & and **Tele Consultancy** to CHCs and PHCs
- In each district, create testing labs and dashboards that provide test results and info about ambulances, hospital beds, ventilators etc. and create 24/7 control rooms in each Taluka