Enhancing preparedness of health facilities: 
Using innovation, research and learning for emergency care systems

WHO Health facilities post-COVID-19 and beyond: safe, functional, climate-resilient and environmentally sustainable

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COVID-19 and climate change impact on non-communicable disease and injury (NCDIs)

- COVID-19 and climate change impact on cardiovascular disease (CVD), respiratory disease and mental health
- Increased demands on facility infrastructure, consumables, equipment and emergency care health care workers throughout the continuum of care
Example: DALYs / Deaths Attributable to Air Pollution in India: Global Burden of Disease Study 2019

- Need for enhanced emergency care system infrastructure as climate and respiratory pathogens converge to stress facility resources
- Task-shifting to anticipate and meet systems surges
- Equipment for COVID-19, CVD, respiratory disease require pulse oximetry, oxygen and skilled staff though the continuum of care
Impact of COVID-19 on health systems and how this contributes to indirect effects and excess mortality
Global decrease in healthcare service utilization in both HIC & LMICs

Irrespective of the degree of COVID-19 outbreak
  - e.g., Child health visits or EPI

~47% research to date includes only single health facility
  - 40% regional data and 13% national
  - Only 35% of studies representing LMICs

47% of studies on cardiovascular health outcomes (myocardial infarction and stroke)

Impact on health outcomes may take years to demonstrate
Example of Excess Mortality During COVID-19 - Mexico

Excess mortality during COVID-19: Number of deaths from all causes compared to previous years, Mexico

Shown is how the number of weekly or monthly deaths in 2020–2021 differs from the number of deaths in the same period over the years 2015–2019. The reported number of deaths might not count all deaths that occurred due to incomplete coverage and delays in death reporting.

Source: Human Mortality Database (2021), World Mortality Dataset (2021)
Note: Comparisons across countries are affected by differences in the completeness of death reporting. Details can be found at our Excess Mortality page.
COVID-19 Exacerbated the Burden for Oxygen on Hospitals

Gap
• ~20% COVID-19 patients require hospitalization and O2
• >500,000 COVID-19 patients in LMICs need O2/day
• 57% facilities in SSA have no (25%) or irregular supply (32%)

Sources of oxygen
• Cylinders, piped oxygen systems, concentrators (electricity)
• On-site oxygen plant – e.g., Ruhengeri Hospital, Rwanda

Human Resources
• Need biomedical engineers and technicians as well as HCW
• Task shifting oxygen care skills

Other Needs
• Transportation and electricity
• Need pulse oximetry supplies, protocols and training

Response
• Wellcome Trust, Unitaid, and WHO
  • COVID-19 Oxygen Emergency Taskforce, ACT-Accelerator Therapeutics pillar
• US $90 M is needed urgency for 20 LMICs /$1.6B target
Future Solutions: Solar-Powered Oxygen Concentrator

Solar-powered oxygen delivery: proof of concept

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Figure 1 Diagram of SPO2 delivery system. Numbered system components are described in detail in the text, and included 1) solar panels installed on the roof of the hospital ward; 2) a charge controller to optimise power output from the array of solar panels; 3) a bank of batteries to store the energy; 4) a DC→AC inverter to operate the concentrator; 5) a commercially available oxygen concentrator; and 6) oxygen stream delivered to patients via nasal cannula or mask. DC = direct current; AC = alternating current; SPO2 = solar-powered oxygen.

SPO2 system solar panels installed at a hospital in Jinja, Uganda
