

No child should die for lack of oxygen: From Africa to the Pacific on the Teknon Oxygen Project

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Aim: Pneumonia is a leading cause of mortality in children, and oxygen treatment reduces mortality from severe pneumonia. However, conventional oxygen supply methods are unreliable, and oxygen is not available to many children in low and middle-income countries. This study addressed this gap by developing and field tested in The Gambia and Fiji oxygen supply solutions suitable for the realities of LMIC health facilities.

Methods: A Health Needs Assessment identified a technology gap preventing reliable oxygen supplies in Gambian hospitals. We used simultaneous engineering to develop two solutions: a Power Storage (PS) system consisting of an oxygen concentrator and batteries connected to mains power, and a Solar-Power Storage (Solar-PS) system (with batteries charged by photovoltaic panels) and evaluated them in facilities in The Gambia and Fiji to assess reliability, usability and costs.

Results: The PS system delivered the specified 82%+ oxygen concentration in 100% of 1-2 weekly checks over 12 months, which was available to 100% of hypoxaemic patients, and 100% of users rated ease-of-use as at least 'good' (90% very good or excellent). The Solar-PS system delivered 82%+ oxygen concentration on 100% of 1-2 weekly checks, was available to 100% of patients needing oxygen, and 100% of users rated ease-of-use at least very good. Costs for oxygen delivered from these systems were substantially less than the costs of oxygen from conventional cylinder supplies.

Discussion: Although the life-saving role of oxygen in severe childhood pneumonia is clear the technological and economic barriers to ensuring that it is available in LMICs has put oxygen into the 'too hard' basket. This need no longer be the case.

Conclusion: The Teknon oxygen systems delivered high-quality, reliable, cost-efficient oxygen in real LMIC contexts, and were easy to operate. Reliable oxygen supplies are realistically achievable in LMIC health facilities like those in The Gambia and Fiji.

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