

Q&A #	Question	19/05/2021 00:00 Asker Name	Asker Email	
1	How many countries are facing oxygen shortage?	kalgundi Naveen	kalgundi.naveen@yahoo.com	India
2	can we use industrial oxygen for the pandemic?if the concentration is more than 96%? also can anyone elaborate what is the major difference in medical and industrial oxygen	Bashir ahmad Ahmad	bashir_bme@yahoo.com	Tanzania
3	Is physician training for LMICs sufficient? Much of the literature that emerged from Europe (Italy & Germany), and the US (NYC, Boston) suggested that oxygen therapy needs to be carefully minimized, and sometimes avoided, to optimize patient survival.	Elliot Sloane	ebsloane@gmail.com	USA
4	From the literature, it seems that in many cases, "proning" of patients very, very early may be more successful and safe than oxygen administration.	Elliot Sloane	ebsloane@gmail.com	USA
5	Also, outcomes from ventilator treatment seemed to be far less successful with Coronavirus patients than other typical ICU patients. Possibly this is due to multi-systemic pathology complications that are unique to COVID-19. i.e., the underlying question of the above is whether we run the risk of focusing on oxygen instead of clinical optimization. The risk seems, perhaps, similar to the opioid pain management overshoot, and then overdose deaths, when caregivers resorted to excessive use of opioids to try to eliminate all pain. I am not a physician; simply asking the question for discussion.	Elliot Sloane	ebsloane@gmail.com	USA
6	what is the difference between PSA and VSA which one is preferred for medical oxygen supply?	Bashir ahmad Ahmad	bashir_bme@yahoo.com	Tanzania
7	Different question: Are we also estimating ongoing sustaining Oxygen needs on a country, region, and national basis? If we overbuild O2 capacity to meet peak/surge needs, will half of the O2 facilities need to be decommissioned when the pandemic is over? As mentioned at the beginning of the webinar, ongoing operational costs and human resource needs, are significant.	Elliot Sloane	ebsloane@gmail.com	USA
8	Hello Alex. Thank you (PATH) for creating this useful tool. I have a question: in order to estimate the gap of oxygen requirement around the world, I am guessing you must know the production capacities of each country. Do you (PATH) have access to this type of data? If so, is it possible to share it?	Alfonso Rosales	rosalesalf@paho.org	Costa Rica
9	Please show the Nepal Oxygen need in clear graph	DEEPAK ADHIKARI	deepakad@gmail.com	Nepal

10	<p>And, to be clear, I think the work all of the panelists are doing is brilliant. As Alex said, we are working in reaction to the O2 crisis, and to other COVID-19 complexities like vaccines, long-term rehabilitation, and other matters.</p> <p>How, when, can we create a global community of clinical technology experts (engineers, physicians, policy makers, funders) to respond to future pandemic crises.</p>	Elliot Sloane	ebsloane@gmail.com	USA
11	<p>As we all understand that there is a greater delay in deliveries from the supplier to the end user how is this improved?</p>	Jehan Andrew Gerreyn	oehtraders@gmail.com	Sri Lanka
12	<p>From a cost-effectiveness approach, what are 2 factors to consider to diversify oxygen sources by including liquid, PSA/VSA plants, and 10LPM concentrators built for 220V/60Hz, in LMIC countries?</p>	Rossana Rivas	rossana.rivas@upch.pe	Peru
13	<p>Another discussion point: life-cycle cost (LCC) of ownership of oxygen systems is 3-5x the initial acquisition and installation costs. We have many papers and books that document the reality of LCC for medical technologies. However, historically, aid provided to LMICs for medical technology acquisition only supports the purchase and installation, and perhaps a short warranty period. What can we do to work together to ensure that LMICs can have sustainably affordable -- and safe -- use of a critical resource like medical oxygen? (Jason has mentioned a bit of that related to surge capacity, but it really exists for long-term maintenance of medical technologies.)</p>	Elliot Sloane	ebsloane@gmail.com	USA
14	<p>In the country like Nepal, oxygen consumption wasn't significant before covid. Commercial plants used to operate 3 days a week. Now every institution is planning by the installation of PSA plants at hospitals. Relatively, under such situation and context, what would be the best approach: multiple decentralized PSA plants or smaller capacities or high capacity centralized liquid oxygen plants?</p>	Ram Chandra Thapa	ram.zenertech@gmail.com	Nepal
15	<p>For better utilizing of the oxygen concentrator, the training is needed for Biomedical Engineers or biomedical technical . How do you think this can be addressed ?</p>	Abebe Bekele	abebebekele11@yahoo.com	Ethiopia
16	<p>Absolutely and what I experienced is that when the company is ready supply then there is no shipper to ship to that designated country and vice versa therefore, in order to be proactive could we have a streamlined path, long term or a flexible path to negotiate and bridge this crucial gap.</p>	Jehan Andrew Gerreyn	oehtraders@gmail.com	Sri Lanka
17	<p>Hello Jim Ansara, when you mentioned that the O2 was successfully installed in the ER in Haiti and that wasn't that expensive, could you let us know approx. the costs?</p>	Eunice Conceição	eunice.conceicao@gmail.com	Portugal
18	<p>what would be the cost for a oxygen cylinder</p>	Jehan Andrew Gerreyn	oehtraders@gmail.com	Sri Lanka
19	<p>The question of % of oxygen is a bit more complex. If the only contaminant is nitrogen, it is one thing. However, trace amounts of contaminants in oxygen can be extremely toxic. e.g., carbon monoxide, nitrous oxide, nitric oxide, volatile hydrocarbons, and others. Unfortunately, impurities are difficult to detect without proper equipment, training, and maintenance. Some contaminants occur due to incorrect handling of high pressure tanks, too, because their valves need to be closed at or before completely empty. Otherwise the tanks "breathe" ambient air and contaminants as temperatures rise and fall if the valve is left open.</p>	Elliot Sloane	ebsloane@gmail.com	USA

20	<p>As the PSA plant has oxygen of +/-93% purity, will all OEM ventilator and Anesthesia machine will operate, or we will have calibrate every now then as the purity varies.</p> <p>What is the recommendation to operate PSA + LMO + Cylinder manifold ? i.e. which one should be primary source ?</p>	SHUBHANK THAKUR	shubhank.thakur@fortishealthcare.com	India
21	<p>Biomedical engineers have classically worked with traditional medical devices, have been adding oxygen systems and PPE as a result of COVID since last year</p>	SHUBHANK THAKUR	shubhank.thakur@fortishealthcare.com	India
22	<p>If it were possible to offer 3 training groups on the topic of oxygen, which, in your view, should be the topics? Could you please make any suggestions?</p> <p>How long do you think it is necessary to invest in each one?</p>	Alfonso Rosales	rosalesalf@paho.org	Costa Rica
23	<p>Mass consumption of Oxygen (15 LPM-60LPM) may result in the increase of atmospheric oxygen levels. Increased Oxygen Levels of more than 23% is potentially biggest factor of catching/spreading FIRE in case of Electrical short Circuits / Sparks. What are the recommendation to control excess of oxygen in ICUs?</p>	SHUBHANK THAKUR	shubhank.thakur@fortishealthcare.com	India

Answer(s)

Check the upcoming PATH presentation for an answer here

There is great confusion about the purity of medical oxygen. WHO will answer this during Q&A.

Elliot the importance is to measure oxygen saturation level then provide oxygen as soon as possible, what needs to be minimized is the invasive ventilation. sometimes non invasive is better, that depends on the clinical situation of the patient. will place in the chat the clinical guidance for COVID patients.

•conditional recommendation for the use of awake prone positioning in patients with severe COVID-19 that are hospitalized requiring supplemental oxygen or non-invasive ventilation;

is described in the latest version of the WHO clinical management guidance.

<https://www.who.int/publications/i/item/WHO-2019-nCoV-clinical-2021-1>

<https://www.who.int/publications/i/item/WHO-2019-nCoV-clinical-2021-1> Elliot, this is a "living guideline" that includes the care pathway. last version published 25 of January. All medical devices in the priority medical device book are linked to the approved clinical guideline and will be updated as more evidence is available, thanks

There are different views about which is better Bashir. Take a look here

<https://www.trimechindia.com/blog/oxygen-plants-whats-difference-psa-vpsa-oxygen-plant/>

In most of Low and middle income countries, were lacking oxygen for many years, were not even able to have safe surgeries or treat pneumonia cases, it has been more than 10 years ago that we were advocating for oxygen supply but only COVID came to demonstrate the huge needs! and investment willing to happen. so we must all benefit from this initiative to provide oxygen to those that need the most and have been in need for many many years.

live answered

Daily (18 May) oxygen need for Nepal is 391,444 cubic meters (=55,921 large cylinders).

Just click on the map of Nepal and the numbers come up.

<https://www.path.org/programs/market-dynamics/covid-19-oxygen-needs-tracker/> You can screenshot the image and share it as we do often here

<https://twitter.com/JustACTIONS/status/1388124513834082305>

Elliot you have a lot of great questions. Hoping we can address some of them in the Q&A later.

WHO, UNICEF and others, inviting various manufacturers and requesting increasing the production of equipment but a very difficult and complicated situation not just manufacturing but supply, delivery to the final user, installation and training. Being very complex and involving interdisciplinary expert teams to adapt to the local setting.

Depending on the setting, the available infrastructure and the urgency, different initiatives can be taken. the most cost effective are VSA, PSA plants but if they cannot be installed quickly or if there is no possibility of building piping, then oxygen concentrators, (not for use of high flow nasal canulas or other types of invasive ventilators) and they are various sizes <(5 , 8 or 10 lts) and voltaje will have to be according to the country/ setting. I see Jason is responding so will leave it here for him to complement. thanks

Ram we will pick this one up in the Q&A shortly.

yes, there are many online training videos (WHO is developoing some) and to ask the suppliers or local experts

Excellent point.

Aproxiamety \$18,000 USD for 44 outlets

we started a survey, we will continue to collect information and share

Take a look here. PATH will go through this shortly <https://www.path.org/programs/market-dynamics/covid-19-oxygen-needs-tracker/>

Our Preference in LMIC's based on the capital cost and ease of service in PSA technology. VSA uses less energy but is more expensive and more complex to service.

There have been efforts in multiple countries to understand how much capacity is available and we have been doing such work in our focus countries. Some of this information has been published to help partners work effectively and we have used that information to estimate the gap globally, for example in Zambia and Malawi.

Electricity prices are a primary driver of PSA operating costs--whether that's grid electricity or solar systems / generator costs. Power costs can represent around 40% of the operating costs for PSAs--so if your power costs are low, PSAs can be a very cost-effective option. The other major piece in my mind is your capacity utilization. A plant operating at 50% capacity has an effective unit cost for oxygen that is substantially higher than one that is using 80% - 90%. Waste plays into calculation--so if you are losing oxygen to your piping system or you have a system that doesn't scale to actual spot demand you are effectively paying for oxygen that you aren't using whenever you operate that PSA. The same goes for concentrators: if you are using a 10lpm concentrator to deliver mostly 5 lpm flow, you are wasting 50% of the capacity you are paying for.

For bulk gas or liquid, the main pieces are volume and transport costs. Low-volume or one-off purchases attract much higher price tags: manufacturers are managing their capacity utilization, so they incentivize large, recurring orders and give discounts for long-term contracts with minimum volumes. Transport costs can be surprisingly low *if* there are strong road networks between the hospital and the production / storage facility. If the transport infrastructure is weak, then the cost of delivery will be high.

We just installed 115 O2 Outlets in Haiti with a all Haitian Team for \$35k