



UZBEKISTAN ZOLL VENTILATOR PROGRAM FACILITY-LEVEL ASSESSMENT ROUND 2: FINDINGS AND RECOMMENDATIONS

TECHNICAL REPORT

March 2022



Photo: USAID Local Health System Sustainability Project

Local Health System Sustainability Project

The Local Health System Sustainability Project (LHSS) under the USAID Integrated Health Systems IDIQ helps low- and middle-income countries transition to sustainable, self-financed health systems as a means to support access to universal health coverage. The project works with partner countries and local stakeholders to reduce financial barriers to care and treatment, ensure equitable access to essential health services for all people, and improve the quality of health services. Led by Abt Associates, the five-year, \$209 million project will build local capacity to sustain strong health system performance, supporting countries on their journey to self-reliance and prosperity.

Recommended Citation: The Local Health System Sustainability Project (LHSS) under the USAID Integrated Health Systems IDIQ. March 2022. *Uzbekistan ZOLL™ Ventilator Program Facility-Level Assessment Round 2: Findings and Recommendations*. Rockville, MD: Abt Associates.

Date: March 2022

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USAID Contract No: 7200AA18D00023 / 7200AA19F00014

This report was produced for review by the United States Agency for International Development. It was prepared by the Local Health System Sustainability Project under the USAID Integrated Health Systems IDIQ.



Introduction

COVID-19 has put tremendous pressure on Uzbekistan’s health system. Following the first recorded case on March 15, 2020, the country experienced significant waves of incidence in June–December 2020 and again in April–November 2021. From the outset, the pandemic has highlighted the need to reinforce the public health system with intensive care supports, including increased provision and operational rollout of mechanical ventilation. In July 2020, the U.S. government donated 200 ZOLL EMV+® mechanical ventilators to the Government of Uzbekistan. In September 2020, about half of these were allocated and delivered to medical facilities, with the other half held in reserve by Reliance Group (ZOLL’s proprietary vendor in Uzbekistan) for future deployment.

USAID mobilized the Local Health System Sustainability Project (LHSS) during this rollout process to conduct assessments at selected facilities, support Reliance Group’s bioengineering-focused training, lead LHSS-supported clinical training, and provide technical assistance to end users. A first round of 11 facility-level assessments (FLAs) in December 2020 and January 2021 demonstrated that sites receiving ZOLL ventilators had diverse operational and staffing profiles and varied competencies in COVID-19 protocols. The FLAs also showed that many ventilators had not yet been deployed, were deployed to unknown locations, or were not in use due to a lack of ZOLL brand circuits, bacterial/viral (B/V) filters, and other commodities.

Findings and reports from FLA Round 1 were disseminated to USAID and the MOH in early 2021. This report summarizes findings from a second round of FLAs, conducted in September and October 2021, and presents recommendations to simplify and support the Uzbek government’s use of the donated ZOLL ventilators in the long term.

Deployment of ZOLL Ventilators

According to the agreement between the U.S. and Uzbek governments, the Ministry of Health (MOH) took responsibility for deploying the 200 donated

ventilators. For the initial rollout in September 2020—perhaps due to the unknown nature and progression of the national epidemic—the ventilators were initially deployed to 40 public health facilities across six regions. Regions received anywhere from 5 ventilators (Jizzakh and Syrdarya regions) to 70 (Tashkent region); individual facilities received between 1 and 60 ventilators. As the epidemic evolved and COVID-19 centers were temporarily shuttered and re-opened during the epidemiological waves, ZOLL ventilators were moved to other medical facilities, districts, and locations. Some of this movement was not tracked at the MOH level, although Reliance Group has been monitoring ventilator placement per its maintenance contract.

Several types of medical facilities received ZOLL ventilators during deployment and redeployment, including permanent and non-permanent locations (see Box 1).

Box 1: Facility Types Receiving ZOLL Mechanical Ventilators

- Permanent specialized COVID-19 centers (e.g., Zangiata-1)
- Temporary specialized COVID-19 centers (e.g., Barkamol Avlod)
- Non-specialized medical entities (that do not routinely use mechanical ventilators) turned into temporary COVID-19 centers (e.g., Nazarbek and regional infection clinics)
- Non-specialized medical entities (that do routinely use mechanical ventilators) turned into temporary COVID-19 centers (e.g., RRCEM branches, Fergana City Hospital #2)

FLA Round 2

The purpose of this second round of FLAs is to help inform the MOH’s long-term planning for the ZOLL ventilator program, given the ongoing evolution of the



COVID-19 epidemic in Uzbekistan and the unknown status of ZOLL ventilator use throughout the country.

The LHSS team carried out 14 FLAs (8 new facilities and 6 previously assessed facilities; see the annex for details). These assessments focused on facilities that had received at least three ventilators. The FLA process included interviews with staff, application of the *UCSF Critical Care Facility Assessment Tool* (see *Annex*), and a rapid inventory of ZOLL inventory and storage conditions. To inform facility-level and MOH operational recommendations, LHSS discussed the findings with facility personnel during and after the assessment.

Findings

Staff knowledge

The ZOLL EMV+ mechanical ventilator brand and technology are new to Uzbekistan. Thus, there was a broad need to train bioengineers and intensive care specialists to use the equipment. After initial deployment of the ventilators, Reliance Group and LHSS conducted joint training sessions to educate health personnel on two overall topics:

- How to operate the ventilator (Reliance Group)
- Broader knowledge related to using ventilators for intensive care of COVID-19 patients (LHSS)

Due to COVID-19 protocols, the team conducted the sessions via Zoom. Several participants stated that although the training provided sound theoretical and technical learning, the online setting was not ideal for their practical learning on the ZOLL ventilator, a completely new technology. The initial training round in February 2021 had two webinars, provided by Russian and Uzbek trainers. Additional lectures were held in March 2021.

One positive finding at Barkamol Avlod (a temporary COVID-19 center in Namangan region) is that almost all medical staff received the training at the same time they began using the ventilators. This led to sustained and appropriate use of the 30 ventilators placed at that facility. However, MOH deployment of medical

personnel changed throughout the pandemic, resulting in “ZOLL-trained staff” being rotated away from some COVID-19 centers. Due to the online nature of the trainings, full records of all attending trainees and subsequent staff movement are not available or easily correlated. It has therefore been difficult to determine on an ongoing basis which facilities, in possession of ZOLL ventilators, have staff with sufficient training.

Heavy operational toll on ventilators

Due to the uncertainty of the situation and the urgent need to respond to COVID-19 in mid-2020, the MOH proceeded with broad deployment immediately upon receiving the ZOLL ventilators. There was a strong rationale for doing so; however, given the rapid evolution of the national epidemic, several facilities began using the ventilators before receiving training or before their sites had been fully assessed.

Staff at several facilities -- e.g., Fergana Republican Research Center of Emergency Medicine (RRCEM) branch, Barkamol Avlod, Namangan -- noted that the ZOLL ventilators were needed urgently when they arrived in September and October 2020 and contributed to some of the first actions to support the surge of patients requiring intensive care interventions for COVID-19. The initial deployment of ventilators relieved the initial demand at intensive care units (ICUs) but took a toll on the equipment. One staff member at the RRCEM branch in Fergana said the ventilators had been “work[ing] hard from patient to patient, 24/7, for several months, never being switched off.” Staff at all three sites in Kokand city listed heavy use as one of reasons some ventilators failed (along with high turnover rate of “ZOLL-trained staff,” absence of Uzbek- or Russian-language user manuals at the facility when the ventilators arrived, lack of training, and absence of brand-compatible consumable commodities).

Movement or non-use of ventilators

The FLAs found there has been significant movement of some of the ventilators from their initial location of placement. For example, the Andijan Dermato-venerology center initially received 10 ZOLL



ventilators, but the FLA found that four had been reallocated to oncology and traumatology clinics, where it was assumed they could be used more routinely during COVID-19 surge and low periods. Further, there are ventilators that have been deployed to locations but have yet to be put into operation at the facility. For example, up to 60 of the ventilators deployed to Zangiata-I are still in the facility's warehouse.

Access to consumable commodities

A significant challenge for all facilities receiving ZOLL ventilators was the limited number of appropriate circuits delivered along with them. Following the “one patient – one circuit” protocol, initial supply was spent shortly after delivery of the ventilators. After exploring ways to decontaminate the circuits, it was determined to be impossible due to the location of the exhaust valve. It is also not possible to use standard ventilation circuits with the ZOLL EMV+ ventilator, which features an inhalation valve on the unit itself and an exhalation valve on the circuit. Staff at several facilities reported trying to use circuits from other manufacturers without success; an emergency tranche of generic circuits ordered through LHSS were also not compatible.

Over the past several months, the LHSS team and other USAID implementing partners have worked with Reliance Group to source and purchase the correct circuits, B/V filters, continuous positive airway pressure masks, and other consumables. Nonetheless, this initial delay in sourcing an emergency supply of ZOLL-compatible consumables—and the lack of a clear way forward in sourcing them for the longer term—has been a major barrier to solidifying the ZOLL ventilator program.

Challenges with equipment use

The first several months of ZOLL ventilator use in Uzbekistan saw some facilities using the ventilators in heavy rotation and other facilities using them temporarily or not at all. Several factors either aided or hampered the use of the ventilators at individual facilities, as highlighted in Box 2.

- Some facilities reported a lack of information on where to obtain technical support for ventilator operation and maintenance that affected their comfort in using the ventilators.
- At some non-specialized medical facilities that do not routinely use ventilators, the ZOLL equipment was kept in storage. Preservation and storage of these “temporarily not in use” units were moreover found to be substandard, with units taken out of their boxes and kept on storage room floors without protection from dust.
- In Kokand city, it was reported that after the ventilators arrived in October and November 2020, they started to “fail” (show error messages) in high numbers. USAID and Reliance Group worked together in late 2021 to export several of these broken units to ZOLL USA for functional assessment. It was determined by ZOLL that only a small number of these units were faulty, and rather dusty operational and storage conditions were responsible for malfunction. This underscored this reports finding that biomedical-engineering training and sufficient equipment maintenance staffing is needed to ensure units are cleaned and maintained long-term.
- In late 2020, Zangiata-I (Tashkent region), received 60 ZOLL ventilators. However, the FLA in September 2021 found that 40 of these were in hospital storage and 20 were stored in the ICU's chief nurse stock room. Staff at this facility took part in the Reliance Group/LHSS online training and reported feeling confident in operating the equipment. The FLA found that ventilators were not being used due to clinicians' lack of trust in their efficacy. To address this concern, the LHSS consultant conducted a live demonstration of the ZOLL unit at Zangiata-I. Following this demonstration staff reported feeling more likely to use the ZOLL units on-hand. This underscored the need for practical training to supplement virtual training as COVID-19 restrictions allow.
- Some facilities reported decreasing use of the units over time, due to depleted supplies of circuits or other ZOLL consumable supports.



Box 2: ZOLL EMV+ Ventilator Deployment: October 2021

- 58 ventilators (at ZOLL-trained facilities with minimal staff turnover) are working well.
- 62 ventilators are not in use (44 confirmed defective, 8 awaiting testing by Reliance Group, and 10 units whose status could not be confirmed).
- 80 ventilators are being held at the Reliance Group warehouse awaiting deployment.
- Bioengineers are present only at regional health districts and RRCCEM branches.
- Regular maintenance/storage during downtime is not performed routinely.

Bioengineering

Due to staff rotation and ventilator redeployment, it is unclear to what extent Reliance Group and LHSS have been able to cover the training needs of bioengineers and clinical personnel at all facilities in possession of ZOLL ventilators.

According to technical requirements, each ZOLL unit's preventive maintenance kit should be replaced once a year; and only trained, authorized personnel are allowed to perform this activity. Reliance Group, under its current support contract, will perform this role through the end of 2021, with the MOH taking responsibility for ZOLL equipment service and support in 2022. The ministry is considering whether it is preferable to maintain the equipment using its own resources or to continue contracting with Reliance Group for their bioengineers. It should be noted that unauthorized third parties outside of the ZOLL vendors network may not purchase preventive maintenance kits. As a result, it is imperative that long-term preventative maintenance is discussed

between the MOH and Reliance Group as soon as possible.

Information management

The FLAs found weak or absent information flows about ZOLL ventilator use among the medical facilities with the ventilators, regional health districts, and the MOH. The ministry does not receive regular updates on equipment status, location, or deployment; as a result, it is likely that regional health districts know only the location of the equipment, without the ability to track functionality or obtain regular information on use. Reliance Group has been tracking ventilator locations, but it is unclear to what extent the MOH is in receipt of this information or able to use it strategically, given current information gaps.

Recommendations

Establish ZOLL asset monitoring

Given the lack of information flowing from facilities with ZOLL ventilators to regional health districts and onward to the MOH, it will be extremely difficult for the ministry to manage these ventilators until an asset monitoring system is established under the Department of the Formation of the Need for Medicines and Medical Products in State Institutions (or other MOH entity taking responsibility). This is also true for other medical equipment, as has been raised at the MOH. For the short term, LHSS recommends that the ministry work with Reliance Group to finalize and confirm Reliance Group's current asset monitoring tracking sheet. As a minimum standard, this sheet should be shared with regional health districts and MOH central leadership to ensure they have the current asset list and can correct any regional discrepancies. This short-term asset monitoring activity would also help inform other recommendations, such as strategic reallocation of ZOLL ventilators.

In the longer term, ZOLL ventilators should be included in broader efforts to develop medical asset tracking in Uzbekistan—a subject that is under discussion at the MOH.



Consider strategic redeployment of ZOLL ventilators

It has been approximately one year since ZOLL EMV+ ventilators were first deployed. At that time, a general lack of mechanical ventilation necessitated broad distribution of this equipment to temporary and permanent COVID-19 centers. The epidemiological situation and needs for mechanical ventilation have since changed, presenting an opportunity to reassess where ZOLL ventilators can be optimally managed for highest impact.

As outlined above, the FLAs found that, at present, several health facilities are not using the ZOLL ventilators they received. Others are using theirs only periodically, based on patient volumes. It is unclear whether all these facilities will use the ventilators in the future; further, many ZOLL ventilators are being stored incorrectly during periods of downtime.

To simplify the ZOLL ventilator program for the MOH over the long term, LHSS recommends that the ministry consider a concentrated redeployment of these ventilators to select facilities—in a manageable geographic area—that use lung ventilation in their routine practice. This will enable the MOH to target training activities, consumable purchases, equipment maintenance, and overall operation of the program.

As a first step toward optimizing MOH management of the ZOLL ventilator program, strategic concentration could be considered. Although it is not advisable to recall or reallocate all ZOLL ventilators, a situation analysis conducted by the Department of the Formation of the Need for Medicines and Medical Products in State Institutions, and other partners as needed, is required to clarify the current location of these assets and their consumable needs long-term. Such an analysis would allow the ministry to deploy the ventilators to facilities that can best use them, with optimal management in coordination with regional health districts.

Support lower-level facilities

If ZOLL ventilators remain at lower-level health facilities that routinely provide mechanical ventilation,

then regional health districts and facilities will need targeted support on rational use of the ventilators. Several facilities (not assessed by LHSS) have received a single ventilator, and it is unclear how these facilities will be integrated into a long-term asset and commodity management system and supply chain. In other cases, a region was allocated a larger number of ventilators that have since been reallocated to other facilities. Although Reliance Group, LHSS, and the MOH have all provided strong support to the larger facilities using the ZOLL ventilators, it will be necessary to prepare specific strategies to support lower-level facilities with fewer ventilators, if they remain at those sites.

Clarify a long-term plan to supply ZOLL consumables

At present, special and temporary COVID-19 centers are not using ZOLL ventilators due to a calmer COVID-19 situation and access to other brands of ventilators. In addition, 80 remain at the Reliance Group warehouse awaiting deployment. However, this should not be perceived as a permanent situation, particularly considering new variants and ongoing evolution of the national epidemic. As we saw at the peak of the first wave, even 200 ventilators can represent solid assistance for the health system; it is thus reasonable to maintain an emergency stock of circuits, B/V filters, and preventive maintenance kits for future emergencies that require mobile medical support and lung ventilation (even for non-COVID-19 patients).

LHSS thus recommends, based on Reliance Group information, that the Department of the Formation of the Need for Medicines and Medical Products in State Institutions (or other entity identified within the MOH) consider quantifying and forecasting ZOLL consumables for both routine and surge needs, and explore ways to purchase them routinely via Reliance Group using ministry and/or donor funds. Facilities using ZOLL ventilators in their routine medical practices should also be able to purchase these commodities.



Emphasize ongoing staff training

Concentrating the ZOLL ventilators in fewer locations will assist in rolling out and continuing training efforts. Geographic concentration of the equipment will also reduce the impact of turnover as “ZOLL-trained staff” staff move to other sites.

With the recent creation of Uzbek and Russian translations of the ZOLL ventilator user guides, each facility receiving ZOLL ventilators should receive these materials, along with information on how to activate warranty or repair requests.

As Zangiata-I FLA respondents noted, an online (theory-focused) training approach is more effective when supported by hands-on practical training. As one solution, LHSS developed a distance learning training platform including virtual 3D instruction on the use of the ZOLL ventilator—including numerous reference materials and protocols—that can be accessed using a mobile phone application. Emphasizing the use of virtual platforms to support nationwide access to this information, while reinforcing practical training on the ZOLL ventilators

at the facilities that use them, will provide a strong foundation for ongoing learning.

Conclusion

From the outset of the COVID-19 pandemic, strategic allocation of health system capacities has been critical to remaining nimble in the face of an evolving pandemic. The U.S. Government’s donation of 200 ZOLL EMV+ ventilators has undoubtedly supported the Government of Uzbekistan’s national response and provided patients with life-saving intervention. However, as the pandemic evolves, it is clear that continued strategic allocation, tracking, and maintenance of the ZOLL EMV+ assets also need to evolve. Centralizing the assets in facilities with sufficient human resources, bioengineering, and links to ongoing ZOLL consumable commodity supply will likely simplify and benefit the ZOLL EMV+ program moving forward. It is encouraged that Reliance Group, the MOH, and USAID work closely to promote ongoing rationalization of ZOLL ventilator placement and use as part of supporting the ongoing national COVID-19 response.



Annex I: Initial and current locations of ZOLL ventilators

REGION	FLA ROUND 1	FLA ROUND 2	INITIAL DISTRIBUTION (SEPT. 2020)	CURRENT STATUS (SEPT. 2021)*
Andijan	Regional Dermatology Dispenser	Regional dermatology dispenser**	10	6
	Andijan Traumatology Branch			2
	Andijan Oncology Center			2
	Central Hospital, City Health District	Central Hospital, City Health District	10	10
	Andijan Branch of Republican Specialized Scientific and Practical Medical Center of Oncology and Radiology (RSCOMP)	Andijan Branch of RSCOMP	5	5
	Andijan Medical Institute	Andijan Medical Institute	2	2
	Andijan Maternity Clinic #2	Andijan Maternity Clinic #2	1	1
	Cardiologic Clinic	Cardiologic Clinic	2	2
Namangan	Barkamol Avlod	Barkamol Avlod	30	30
Jizzakh	Jizzakh Branch of RSCOMP	Jizzakh Branch of RSCOMP	1	1
	Jizzakh, Regional Management Office (RMO) Dustlik	Jizzakh, RMO Dustlik	1	1
	Jizzakh, RMO Zafarobod	Jizzakh, RMO Zafarobod	1	1
	Jizzakh, RMO Forish	Jizzakh, RMO Forish	1	1
	Jizzakh, Center for Pulmonology and Pathobiology	Jizzakh, Center for Pulmonology and Pathobiology	1	1
Fergana	Fergana RSCOMP Branch	Fergana RSCOMP Branch	3	3
	Fergana Region Inf. Hospital #2	Fergana Region Inf. Hospital #2	3	3
	Fergana Regional Endocrinology Dispenser	Fergana Regional Endocrinology Dispenser	3	3
	Fergana city, City Hospital #2	Fergana city, City Hospital #2	3	3
	Kokand city, Inf. Hospital	Kokand city, Inf. Hospital***	18	18
	Kokand RRCEM Branch	Kokand RSCOMP Branch	5	5
	Kokand city Central Hospital	Kokand city, Central Hospital	2	2
	Fergana region, Altyaryk RMO	Fergana region, Altyaryk RMO	1	1
	Fergana region, Bagdad RMO	Fergana region, Bagdad RMO	1	1
	Fergana region, Besharyk RMO	Fergana region, Besharyk RMO	1	1

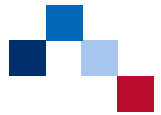


REGION	FLA ROUND 1	FLA ROUND 2	INITIAL DISTRIBUTION (SEPT. 2020)	CURRENT STATUS (SEPT. 2021)*
	Fergana region, Buyaydo RMO	Fergana region, Buyaydo RMO	1	1
	Fergana region, Dangara RMO	Fergana region, Dangara RMO	1	1
	Fergana region, Kuvasay RMO	Fergana region, Kuvasay RMO	1	1
	Fergana region, Kuva RMO	Fergana region, Kuva RMO	1	1
	Fergana region, Kushtepa RMO	Fergana region, Kushtepa RMO	1	1
	Fergana region, Margilan CMO	Fergana region, Margilan CMO	2	2
	Fergana region, Rishtan RMO	Fergana region, Rishtan RMO	1	1
	Fergana region, Sokh RMO	Fergana region, Sokh RMO	1	1
	Fergana region, Tashlak RMO	Fergana region, Tashlak RMO	1	1
	Fergana region, Uzbekistan RMO	Fergana region, Uzbekistan RMO	1	1
	Fergana region, Uchkurprik RMO	Fergana region, Uchkurprik RMO	1	1
	Fergana region, Fergana RMO	Fergana region, Fergana RMO	1	1
	Fergana region, Furkat RMO	Fergana region, Furkat RMO	1	1
	Fergana region, Yazvan RMO	Fergana region, Yazvan RMO	1	1
Syrdarya	Syrdarya Regional Hospital	Syrdarya Regional Hospital	2	2
	Gulistan city, City Health District Hospital	Gulistan city, City Health District Hospital	3	3
Tashkent	Zangiata-I Multidisciplinary Infectious Diseases Hospital	Zangiata-I Multidisciplinary Infectious Diseases Hospital	60	60
	Nazarbek Sanatorium	Nazarbek Sanatorium	10	10
	Ministry of Internal Affairs		2	0
	Ministry of Health		3	1
Samarkand		Samarkand Branch of RRCEM		2
Termez city		Termez City Medical Union		1
Marianna Krasnenkova - trainer				1

* Based on information from Resilience Group.

** Cells shaded in grey indicate facilities that received an LHSS FLA in Round 1 and/or Round 2. White cells indicate facilities that received less than three ZOLL ventilators and did not receive an FLA.

*** Medical staff were not interviewed; only a medical technician was available for interview in Kokand city.



Annex 2: University of California San Francisco (UCSF) Critical Care Facility Assessment Tool

Instructions to Assessment administrators: This assessment should be completed with input from healthcare providers with current, firsthand knowledge of the facility’s intensive care and oxygen infrastructure.

The following providers are most likely to be needed to answer the survey questions:

- Physician who staffs the ICU at this facility
- Anesthesia provider
- ICU nurse
- Biomedical engineer

Please complete as many of the questions below as possible, with emphasis on those questions with an “*”.

Terminology:

- High dependency unit (HDU) - hospital unit for patients who need more frequent management than a regular ward, but less than the intensive care unit.
- Intensive care unit (ICU) - hospital unit where critically ill patients are located and managed.
- Critically ill patients - those with shock, respiratory failure, trauma or other imminently life-threatening conditions that require frequent monitoring and active management.

Section I. General		
1	*Country (location of healthcare facility being surveyed):	
2	City/town (GPS Coordinates if known):	
3	*Facility name:	
4	*Respondent name(s):	
5	*Respondent email(s):	
6	Which of the following terms best describe this facility? (select all that apply)	<input type="checkbox"/> Designated COVID Treatment Center <input type="checkbox"/> Public /Government hospital <input type="checkbox"/> University-affiliated hospital <input type="checkbox"/> Private hospital <input type="checkbox"/> NGO, faith-based or charity hospital <input type="checkbox"/> Other
7	Which of the following age ranges does this hospital serve?	<input type="checkbox"/> Neonate (<1 month) <input type="checkbox"/> Child (1 month to 14 years of age) <input type="checkbox"/> Adult (> 14 years of age) <input type="checkbox"/> All of the above

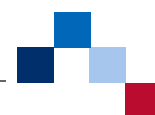


8	What language(s) are understood by healthcare staff:	<input type="checkbox"/> English <input type="checkbox"/> French <input type="checkbox"/> Spanish <input type="checkbox"/> Arabic <input type="checkbox"/> Portugese <input type="checkbox"/> Other _____
9	Approximately how many intubations have been performed in this facility in the past 2 months? (do not include operating theatre cases)	<input type="checkbox"/> 0 <input type="checkbox"/> 11-60 <input type="checkbox"/> 1-10 <input type="checkbox"/> >60
10	*Approximately how many patients were placed on mechanical ventilators at this facility in the past 2 months? (do not include operating theatre cases)	<input type="checkbox"/> 0 <input type="checkbox"/> 11-60 <input type="checkbox"/> 1-10 <input type="checkbox"/> >60
11	Can this facility provide emergent dialysis for intensive care patients?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
12	Does this facility <u>accept</u> transferred patients from other health facilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
13	Can this facility <u>transfer</u> patients to higher level care via an ambulance (that includes at least oxygen and pulse oximetry in the ambulance)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
14	Is this facility actively trying to purchase or receive donations of additional ventilators?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
15	With the facility’s current resources, approximately how many critically ill patients can this facility provide mechanical ventilation for at the same time?	
16	*If this facility received more ventilators, then approximately <u>how many additional</u> critically ill patients could your facility safely provide mechanical ventilation for at the same time?	
17	Does the facility have a supply chain capable of procuring consumables and accessories required for mechanical ventilators?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
18	Notes:	



Section II. Infrastructure & Equipment

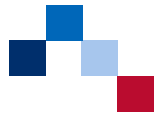
19	Where does this facility provide care for critically ill patients who have been admitted to the facility?	<input type="checkbox"/> Intensive care unit <input type="checkbox"/> Post-operative recovery unit <input type="checkbox"/> Regular ward <input type="checkbox"/> High dependency unit <input type="checkbox"/> Other
20	*How many <u>inpatient beds</u> does this healthcare facility have?	
21	*How many <u>Intensive care unit (ICU) beds</u>?	
22	How many <u>high dependency unit (HDU) beds</u>?	
23	How many <u>operating theatres/rooms</u>?	
24	Does this facility provide Internet access to healthcare workers?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
25	Does the facility have reliable piped water servicing all wards, which meet <u>WHO Guidelines for Water Quality</u> with a detectable chlorine residual?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
In this facility, what percent of the time are the following <u>available & functioning*</u> for provision of intensive care:		
26	*Oxygen	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%
27	Electricity 220-240v	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%
28	Electricity 100-120v	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%
29	*Electricity from the public grid	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%
30	Voltage stabilizers	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%
31	Surge suppressors/protectors	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%
32	Backup power supply	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%
33	Portable suction units	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%
34	Pipeline suction/vacuum system	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%
35	Sterile processing (i.e. autoclaves)	<input type="checkbox"/> 0% <input type="checkbox"/> 1-50% <input type="checkbox"/> 50-99% <input type="checkbox"/> 100%




Monitoring Equipment						Quantity
In this facility, what percent of the time are the following <u>available</u> & <u>functioning*</u> for provision of intensive care:						
36*	*Continuous pulse oximeter (with adult probes)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
37	Continuous pulse oximeter (with pediatric and neonatal probes)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
38	Colorimetric CO2 detection device	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
39	Continuous waveform or numerical capnography	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
40	Continuous ECG/EKG	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
41	Thermometer	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
42	Adult non invasive blood pressure measurement (manual or automated) with cuffs	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
43	Peds non invasive blood pressure measurement (manual or automated) with cuffs	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
44	Invasive blood pressure measurement	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
45	Defibrillator	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
Airway & Misc Equipment						
In this facility, what percent of the time are the following <u>available</u> & <u>functioning*</u> for provision of intensive care:						
46	Adult oral or nasopharyngeal airways	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
47	Pediatric oral or nasopharyngeal airways	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
48*	*Adult Laryngoscopes	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
49	Adult endotracheal tubes	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
50	Pediatric Laryngoscopes	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
51	Pediatric endotracheal tubes	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	




52	Endotracheal tube introducer, bougie and stylet	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
53	Video laryngoscopy	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
54	Adult intravenous or intraosseous catheters	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
55	Peds intravenous or intraosseous catheters	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
56	Adult intravenous or intraosseous infusion tubing	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
57	Peds intravenous or intraosseous infusion tubing	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
58	Infusion pumps	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
59	Central venous catheters	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
60	Chest tubes	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
61	Crash cart	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
62	Orogastric or nasogastric feeding tubes	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
Diagnostics					
In this facility, what percent of the time are the following <u>available & functioning*</u> for provision of intensive care:					
63	Radiology, including portable chest x-ray	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
64	Point of care ultrasound	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
65	Clinical chemistry labs	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
66	Clinical hematology labs	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
67	Microbiology labs (e.g. urine, blood and sputum/bronchial gram stain and culture)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
68	Arterial blood gas	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
69	COVID testing (PCR)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%



Oxygen Delivery Equipment						Quantity
In this facility, what percent of the time are the following <u>available</u> & <u>functioning</u> * for provision of intensive care:						
70	Adult non-invasive mechanical ventilators (CPAP or BiPAP)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
71	Pediatric CPAP or Bubble CPAP	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
72	Oxygen blender/mixer	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
73	*Mechanical ventilators (capable of volume control ventilation)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
74	Anesthesia machines with functional ventilators	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
75	Flow-splitter, for oxygen supply	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
76	Oxygen flowmeter (aka Thorpe tube) 	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
77	Adult High flow nasal cannula (delivery device and patient circuit, capable of ≥20 liters per minute)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
78	Pediatric High flow nasal cannula (delivery device and patient circuit, capable of ≥20 liters per minute)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
79	Adult Low flow nasal cannula/prongs	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
80	Pediatric Low flow nasal cannula/prongs	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
81	6 or 8 FG nasopharyngeal catheter (~40cm)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
82	Nasal catheter	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
83	Adult Face masks	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
84	Pediatric Face masks	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	



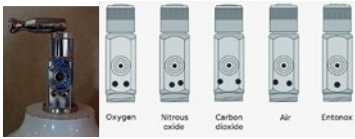






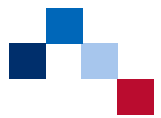
85	Adult Face masks with reservoir bags	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
86	Pediatric Face masks with reservoir bags	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
87	Venturi masks	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
88	*Viral filters for invasive & non-invasive ventilators	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
89	Sterile or distilled water	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
90	Adult ventilator patient circuits	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
91	Pediatric ventilator patient circuits	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
92	Humidity conservation filter (Heat and Moisture Exchange filter)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
93	Oxygen heat and humidification system 	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
94	Adult In-line suction equipment (for intubated patients)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
95	Peds In-line suction equipment (for intubated patients)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#: _____
96	Yankauer sucker	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
97	Adult self-inflating bags	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
98	Pediatric self-inflating bags	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
99	Tubing for oxygen delivery	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
Oxygen Supply						
100	How many portable oxygen concentrators ~5 LPM capacity?					
101	How many portable oxygen concentrators ~10 LPM capacity?					



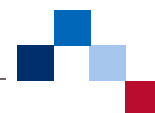
102	How many portable oxygen concentrators 4bar/50psi capable?				
103	<p>*Which of these oxygen sources are available at your facility?</p> <p>(Select all that apply)</p> <p>*PSA= Pressure Swing Adsorption; VSA=Vacuum Swing Adsorption</p>	<input type="checkbox"/> Oxygen cylinders <input type="checkbox"/> Oxygen generating plant on site (PSA* or VSA*), supplied to hospital via cylinders <input type="checkbox"/> Oxygen generating plant on site (PSA* or VSA*), supplied to hospital via pipes <input type="checkbox"/> Liquid oxygen (vacuum insulated evaporator), supplied to hospital via pipes <input type="checkbox"/> Other _____ <input type="checkbox"/> None			
104	<p>*What is the primary source of oxygen used to deliver oxygen to the intensive care unit?</p> <p>(Select one)</p> <p>*PSA= Pressure Swing Adsorption; VSA=Vacuum Swing Adsorption</p>	<input type="checkbox"/> Oxygen cylinders <input type="checkbox"/> Oxygen generating plant on site (PSA* or VSA*), supplied to hospital via cylinders <input type="checkbox"/> Oxygen generating plant on site (PSA* or VSA*), supplied to hospital via pipes <input type="checkbox"/> Portable oxygen concentrators (PSA* with max capacity of 5-10LPM) <input type="checkbox"/> Portable oxygen concentrators capable of delivering ~4bar/50psi <input type="checkbox"/> Liquid oxygen (vacuum insulated evaporator), supplied to hospital via pipes <input type="checkbox"/> Other _____ <input type="checkbox"/> None			
105	How many oxygen cylinders >6000L capacity (≥1.5 meter height)?				
106	*What is the maximum amount of oxygen in liters per day that your facility can supply?				
107	Have you confirmed your oxygen supply has a fraction of oxygen content > 80%?	<input type="checkbox"/> Yes <input type="checkbox"/> No			
108	In this facility, what percent of the time are the following <u>available</u> & <u>functioning*</u> for provision of intensive care:				
109	Compressed medical air	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
110	Oxygen concentration analyzer	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
111	Pressurized oxygen at ~4bar/50psi	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
112	Back-up power the oxygen generating plant	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
113	What are the barriers to increasing your facility's capacity for administering oxygen to patients? (select all that apply)	A. Delivery devices (e.g. nasal cannulas, facemasks, ventilators) B. Power C. Storage (e.g. tanks and cylinders) D. Oxygen generator capacity E. Healthcare worker staffing F. Engineering G. Policy H. Other _____			



114	Does your facility have an identified supplier of oxygen?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
115	What type of connector do you commonly use for connecting ventilators to oxygen sources? (Select images) <input type="checkbox"/> Diameter Index Safety System (DISS) <input type="checkbox"/> Ohio Quick-connect system (OQC) <input type="checkbox"/> Pin Index Safety System (PISS) <input type="checkbox"/> Quick connect (schrader) system used in UK <input type="checkbox"/> Non-interchangeable screw threaded (NIST) <input type="checkbox"/> G5/8 connector (commonly referred to as 'Bull Nose' connection) <input type="checkbox"/> Nipple nut and stem 'Christmas Tree'	      
116	Notes:	

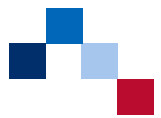


Section III. Infection Prevention & Control		
117	In your facility, where are patients with diagnosed or suspected COVID-19 cared for (or planned to be cared for): (select all that apply)	<input type="checkbox"/> ICU/HDU for COVID-19 only <input type="checkbox"/> ICU/HDU mixed with COVID-19 and non COVID-19 patients <input type="checkbox"/> Shared rooms or open wards for COVID-19 patients only <input type="checkbox"/> Shared rooms or open wards for COVID-19 and non COVID-19 patients <input type="checkbox"/> Private rooms on ward for COVID-19 only <input type="checkbox"/> Private rooms on ward for COVID-19 and non COVID-19 patients <input type="checkbox"/> Negative pressure rooms (i.e. ≥ 12 air changes per hour)
118	Is there a designated triage station or separate screening tent at the facility entrance to identify potential COVID-19 patients?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
119	Is there a designated area for immediate isolation of patients presenting to the hospital with suspected COVID-19?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
120	Which of the following types of Personal Protective Equipment (PPE) are available for intensive care in this facility? (select all that apply)	<input type="checkbox"/> Surgical/medical mask - healthcare worker (type II) <input type="checkbox"/> Surgical/medical mask - patient (type I) <input type="checkbox"/> N95 or KN95 or KF94 or FFP2 respirator masks <input type="checkbox"/> Powered air purifying respirator (PAPR) <input type="checkbox"/> Face shields or goggles <input type="checkbox"/> Disposable non sterile examination gloves <input type="checkbox"/> Disposable sterile gloves <input type="checkbox"/> Disposable gowns <input type="checkbox"/> Reusable fluid resistant gowns <input type="checkbox"/> Gumboots
121	Are there protocols for reuse or resterilization of any the following protective personal equipment (PPE) at your facility? (select all that apply)	<input type="checkbox"/> Surgical/medical mask - healthcare worker (type II) <input type="checkbox"/> Surgical/medical mask - patient (type I) <input type="checkbox"/> N95 or KN95 or KF94 or FFP2 respirator masks <input type="checkbox"/> Powered air purifying respirator (PAPR) <input type="checkbox"/> Face shields or goggles <input type="checkbox"/> Disposable non sterile examination gloves <input type="checkbox"/> Disposable sterile gloves <input type="checkbox"/> Disposable gowns <input type="checkbox"/> Reusable fluid resistant gowns <input type="checkbox"/> Gumboots
122	Have all staff in your facility received training on how to put on, remove and dispose of PPE?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
123	Have staff in your facility received fit testing for N95 or comparable respirator masks?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure



124	*Which of the following agents are available at this facility for environmental surface disinfection?	<input type="checkbox"/> quaternary ammonium compounds <input type="checkbox"/> alcohol (ethyl or isopropyl) <input type="checkbox"/> chlorine-releasing agents (e.g. bleach, sodium or calcium hypochlorite) <input type="checkbox"/> improved hydrogen peroxide
125	*Which of the following agents are readily available for hand hygiene?	<input type="checkbox"/> Soap and water <input type="checkbox"/> Alcohol based hand rub
126	Are environmental cleaning protocols available?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure
127	Notes:	

Section IV. Medications					
In this facility, what percent of the time are the following <u>available</u> & <u>functioning*</u> for provision of intensive care:					
128	*Succinylcholine/suxamethonium	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
129	*<u>Any of the following non-depolarizing muscle relaxants: rocuronium, vecuronium, cisatracurium, pancuronium, or atracurium</u>	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
130	Dopamine	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
131	Epinephrine/adrenaline	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
132	norepinephrine/noradrenaline	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
133	Atropine	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
134	Calcium Chloride	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
135	Amiodarone	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
136	Furosemide	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
137	Sodium bicarbonate	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
138	Propofol	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
139	*Diazepam, Lorazepam <u>or</u> Midazolam	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
140	Etomidate	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
141	Thiopental	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%



142	Heparin <u>or</u> low molecular weight heparin	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
143	Intravenous Antibiotics	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
144	Antacids	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
145	Intravenous fluids (e.g., Normal saline, lactated ringers)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
146*	*Fentanyl or morphine	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
147	*Ketamine	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
148	Dextrose 50% <u>and</u> insulin	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
149	Notes:				

Section V. Human Resources					
150	How many physicians with intensive care medicine certification are employed full time at your facility?				
151	*How often is a physician trained in the management of mechanically ventilated patients available at your facility?	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
152	*How often is a trained provider available for emergency intubation, either in-hospital or on-call from home?	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
153	Which type of healthcare provider(s) most often intubates critically-ill patients in your facility?	<input type="checkbox"/> Physician specialist in anesthesia <input type="checkbox"/> Physician specialist in Intensive Care <input type="checkbox"/> Non-physician anesthesia provider (e.g. nurse anesthetist) <input type="checkbox"/> Other physician _____ <input type="checkbox"/> Other, non-physician provider _____			
154	What proportion of nurses in the intensive care unit (ICU) have completed a certified training program in intensive care nursing?	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%
155	*On average, what is the approximate <u>nursing provider to patient</u> ratio in the ICU? (1:1 = 1 nurse per 1 patient)	<input type="checkbox"/> 1:1 <input type="checkbox"/> 1:2	<input type="checkbox"/> 1:3 <input type="checkbox"/> 1:4	<input type="checkbox"/> 1:5 <input type="checkbox"/> >1:5	



156	*Does this facility have protocols for ventilator management?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unsure		
157	*How often does this facility have a biomedical engineer/technician capable of servicing equipment including mechanical ventilators and patient monitors?	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	
158	How often are the following provider types available at this facility, and how many providers are employed? (count both full-time and part-time)					
	Physician specialist in anesthesia	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Physician specialist in Intensive Care	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Physician specialist in Internal Medicine	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Physician specialist in Pediatrics	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Physician specialist in Surgery (e.g. surgeons)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Physician specialist in Emergency Medicine	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Non-physician anesthesia provider (e.g. nurse anesthetist)	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Nurse	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Respiratory therapist	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Pharmacist	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Lab tech	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Nutritionist	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Rehab therapist	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
	Radiologist	<input type="checkbox"/> 0%	<input type="checkbox"/> 1-50%	<input type="checkbox"/> 50-99%	<input type="checkbox"/> 100%	#:_____
159	Notes:					



Section VI. Other	
160	Are there any other challenges with equipment, monitors, workforce or other factors that are limiting intensive care capacity in your facility? If so, please comment (free text)
161	What resources are most needed to improve your facility's ability to manage COVID-19 patients safely?
162	Based on the facilities current human resources and infrastructure, what equipment for oxygen therapy would be most useful to expand care to COVID-19 patients?

Cleared: May 31, 2020, June 12, 2020

Last updated: June 17, 2020