Reorganization and Progressive Expansion of Health Services for the Response to the COVID-19 Pandemic

Technical Working Document

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<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>CBMU</td>
<td>Centralized bed management unit</td>
</tr>
<tr>
<td>COVID-19</td>
<td>Coronavirus Disease 2019</td>
</tr>
<tr>
<td>CPU</td>
<td>Critical patient unit</td>
</tr>
<tr>
<td>EMT</td>
<td>Emergency medical team</td>
</tr>
<tr>
<td>EOC</td>
<td>Emergency Operations Center</td>
</tr>
<tr>
<td>FLC</td>
<td>First level of care</td>
</tr>
<tr>
<td>HAIs</td>
<td>Health care-associated infections</td>
</tr>
<tr>
<td>ICTs</td>
<td>Information and communications technologies</td>
</tr>
<tr>
<td>ICU</td>
<td>Intensive care unit</td>
</tr>
<tr>
<td>IMCU</td>
<td>Intermediate care unit</td>
</tr>
<tr>
<td>ITU</td>
<td>Intermediate treatment unit</td>
</tr>
<tr>
<td>EMS</td>
<td>Emergency Medical Services</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>PAHO</td>
<td>Pan American Health Organization</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal protective equipment</td>
</tr>
<tr>
<td>RSV</td>
<td>Respiratory syncytial virus</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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I. Introduction

Recent experience with the SARS-Cov2 coronavirus has shown that the case-fatality rate is decisively impacted by the response capacity of the health care network, especially in terms of early detection of cases\(^1\) and availability/access to critical care provided by sufficient numbers of competent health workers. It is important to consider the heavy impact on people over 60 years of age and those living with chronic diseases, and the fact the young people can also present severe and critical infections and can even die.

The experience gained, expert criteria, and current literature all recommend nonpharmacological interventions in the community aimed at flattening the curve of COVID-19 cases.

This document makes recommendations for implementing operational plans in health services networks, both at the first level of care (including home care) and in hospitals in order to reorganize health care delivery and seek efficiency in managing and expanding the supply of beds, considering the growing complexity of cases. These recommendations are focused on management of the health services to reorganize and expand their response according to the evolution of the epidemic.

This working document will be updated based on the evolution of new knowledge and evidence as it relates to the SAR-COV2 and its recommendations ought to be adapted to each country realities, taking into consideration the characteristics of its health system.

**Saving Lives**

The main objective of health services in the response to COVID-19 is to Save Lives, a country’s capacity to respond to the pandemic will depend on multiple factors that affect the spreading of the virus in the population; accordingly, all actions that reduce the number of patients in a given time period will help prevent the collapse of the health services. Nonpharmacological or public health measures such as social distancing, quarantine, and infection control in the population are aimed at breaking the chains of transmission, in hopes that infection does not spread beyond specific limits in space and time.

There are various scenarios in which the COVID-19 epidemic curve, the response capacity of the health services, and the implementation of control measures will define the impact of the virus in the population. As first scenario considers that in the absence of nonpharmacological measures there will be an exponential growth of cases in only a few weeks, which will cause the collapse of the health services, and a large number of deaths.

A second scenario considers the early implementation of nonpharmacological measures that are maintained over time, produces a reduction of the spreading that allows to buy time for health services the reorganization and progressive expansion, mitigating the impact of the pandemic until a vaccine or treatment is available.

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\(^1\) Case definitions of 2019-nCoV can be consulted at: https://www.who.int/publications-detail/surveillance-case-definitions-for-human-infection-with-novel-coronavirus-(ncov).
Reorganization and progressive Expansion of the Health Services

It is important to emphasize that the adaptation of health services is not limited to increasing the number of beds or increasing their complexity; it involves a set of actions deployed at the first level of care to increase the capacity for case detection and control, monitoring of patients at home, early detection of complications, triage, patient referral, and public education, as well as maintaining services for patients with other acute and/or chronic conditions who require priority care. This should be coordinated with actions to reorganize and expand hospital capacities, and to mobilize and effectively manage human resources, supplies, technologies, and financial resources, while maintaining conditions that protect and ensure the safety of all personnel.

Objective

The objective of this document is to offer recommendations to strengthen the response of the health services in order to save lives and guarantee timely response capacity through the reorganization and progressive expansion of services in the context of the COVID-19 pandemic.

Profile of the challenge

- Significant volume of COVID-19 patients and contacts who could remain at home in isolation, but whose social conditions do not allow it.
- High volume of COVID-19 patients, reaching or exceeding the daily operational capacity of health centers and emergency services.
- Increased number of COVID-19 patients who require hospitalization and/or highly complex clinical care (in critical care units).
- Increased number of patients with chronic health conditions negatively affected by lack of access to care.

Table 1: Context, according to epidemiological stages

<table>
<thead>
<tr>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cases</td>
<td>Sporadic cases</td>
<td>Cluster</td>
<td>Community spread</td>
</tr>
<tr>
<td>Surveillance and control is activated at airports, ports, and land border crossings.</td>
<td>Surveillance and control of airports, ports and land border points are maintained and reinforced.</td>
<td>Surveillance and control is maintained and strengthened at airports, ports, and land border crossings.</td>
<td>Surveillance and control is maintained at airports, ports, and land border crossings.</td>
</tr>
<tr>
<td>Health services maintain their routine organization, but Infection Protection and Control activities are strengthened.</td>
<td>The health services have dedicated community teams prepared for COVID-19.</td>
<td>At minimum, hospitals in the area of the cluster have a triage team and external referrals can be handled by EMTs or hospital staff.</td>
<td>The health services network is strengthened through reorganization and progressive expansion of capacities.</td>
</tr>
<tr>
<td>Activation of surveillance, monitoring and follow-up of patients with respiratory symptoms. Identification and monitoring of vulnerable groups.</td>
<td>Surveillance teams, First Level Care (FLC) and hospital facilities have been identified for COVID 19 emergency response, including capacity for pre-triage and triage.</td>
<td>Implementation of COVID-19 hospitals (whole hospital, ward, section of a building, or separate floor to prevent mixed management of patients).</td>
<td>Expansion of community quarantine and general measures for social distancing.</td>
</tr>
<tr>
<td></td>
<td>Activation of protocols for: Ambulance referral and transfer system activation. Identification of respiratory symptoms, cases (case definition) and contacts.</td>
<td>Sanitary cordonning and community quarantine measures.</td>
<td>Case surveillance and contact monitoring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Monitoring of groups in conditions of vulnerability and patients in homes or alternative isolation.</td>
</tr>
</tbody>
</table>
Epidemiological investigation and surveillance, Identification and monitoring of vulnerable groups, Home isolation, Hospital isolation, Cases and contacts monitoring. Preparatory measures for progressive expansion are initiated.

Case and contact monitoring. Monitoring of groups in conditions of vulnerability and patients in homes or alternative isolation. Implementation or reinforcement for the expansion of services.

Progressive implementation of measures to expand hospital capacity for patient care with moderate and critical conditions: COVID-19 Hospitals Hospitals for the management of non-COVID-19 patients Deployment of EMTs Alternative sites such as hotels.

The situation will differ depending on the strength of leadership of the national health system, the organization of health services networks, their response capacity, and the designation of referral centers, for example:

- Service networks whose first level of care lacks response capacity and are centred around hospitals.
- Service networks whose first level of care has response capacity and weak coordination with district, regional or national referral hospitals.
- Service networks whose first level of care has response capacity and is coordinated with district, regional and national referral hospitals.
- A network with several hospitals where one hospital is designated to receive all COVID-19 patients (patients with other conditions are referred to other hospitals).

A network with a single hospital in a territory that serves general demand as well as COVID-19 cases.

The following recommended measures for the reorganization and progressive expansion of the response capacity of health services can be applied in any of the situations listed above.

1. Reorganization and strengthening of response capacity at the first level of care.
2. Centralized bed management.
4. Separate flows for triage, care, and diagnostic testing of patients with respiratory symptoms compatible with suspected COVID-19.
5. Retrofitting, certification, and added complexity for beds, according to clinical risk and nursing care needs.
6. Strengthening of home hospitalization, with or without telehealth.
7. Coordination with prehospital health care services network (emergency care and transportation, ambulances).
8. Networking of clinical management for continuity of care and efficient use of hospital resources.
9. Reorganization, recruitment, and training of personnel, with emphasis on safety and personal protection.
10. Strengthened supply chain.

The success of these measures depends on strengthening the governance of the health system, with health management in all subsystems and sectors put under the national health authority, with adequate risk communication to all citizens.
II. Recommendations for the reorganization and progressive expansion of health services

1- Reorganization and strengthening of first level of care response capacity

a. Strengthen the basic health care team at the first level of care

In order to control the spread of the epidemic, the basic health care team at the first level of care should be strengthened with medical and nursing personnel; community health workers; medical, technological, and logistical tools; and the facilities needed to carry out the following activities:

- Call Centre services, with counseling and protocolized guidance
- Individual and community education on self-care, prevention measures, isolation, and quarantine
- Support for epidemiological surveillance and investigation, and monitoring of cases and contacts in communities and homes
- Identification and monitoring of the health of at-risk persons and groups
- Consultation with patients whose chronic conditions become acute, non-hospitalizable emergencies
- Drug monitoring and dispensing to patients with chronic conditions (HIV, acute hypertension, etc.) and those receiving home-based hospital care
- Maintenance of care for sick patients, with enhanced infection control measures (hand sanitizer, separation or masks for patients with cough)
- Pre-triage of patients with respiratory symptoms, with adequate personal protective equipment and infection control measures (see Annex 1)
- Consultation with other levels and patient referral
- Communication and coordination of patient transfers by ambulance, depending on the patient’s pathology
- Intersectoral coordination with other government entities with shared responsibility and action within the region or territory of the network
- Promotion and coordination of the participation and involvement of community organizations and leaders and nongovernmental organizations in community communication, dissemination, and education activities and in support of monitoring and follow-up of persons at-risk and home hospitalization patients.

a. Reorganization and strengthening of the response capacity at the first level of care facilities.

- The expansion of emergency and hospital services requires a reorganization of the healthcare network, in areas or districts with the highest population and/or case and contact density, by converting several first level of care facilities into centers with the capacity to perform triage and specimen collection in isolated areas, provide emergency services with extended hours and ambulance transportation, and coordinate with hospital bed managers or with the centralized bed management unit (CBMU) to arrange the referral and transfer of patients via 911 or prehospital services.
Reorganization and progressive Expansion of the Health Services

- These centers, given their response capacity, should be able to continue providing care for sick patients, with enhanced infection control measures, and should serve as referral centers for first-level basic care teams for all patients who need to be referred.

- This means increasing or strengthening their response capacity, with specialized medical personnel (emergency care personnel, internists, family physicians, gynecologists, pediatricians, radiologists, psychiatrists); nursing professionals and nursing assistants; psychologists; nutritionists; social workers; laboratory, radiology, and pharmacy professionals; statistics and computer support staff; office workers; drivers; and cleaners.

- The greatest possible use should be made of ICTs, with professional protocolized assistance for telehealth or teleconsultation (see Annex 3), through social media such as Skype®, Webex® or WhatsApp®, in order to enable interconnection and communication with basic health care teams and hospital services. Greater incorporation of ICTs would enable the use of teleradiology, for which the specifications and requirements are different.

- Provide facilities with the necessary equipment, personal protective equipment, medicines and supplies; transport logistics; and the physical structure necessary to carry out separate management of patients, with enhanced infection control measures.

- All hospitals should maintain close contact with their network of referral centers at the first level of care and ensure overall coordination, as well as coordination through the bed manager or the CBMU, of the admission of referral patients in order to avoid as much as possible the phenomenon of "roving" patients and ambulances in search of beds, with infected patients in serious condition.

- This same coordination should occur for the referral of patients who do not need to be hospitalized or patients whose condition enables them to leave the hospital and move to home hospitalization.

- Protocols should be put in place to ensure proper management of the transfer of patients with suspected or confirmed cases, with protection for health personnel and enhanced infection control measures.

- At the health region or district level there should be local intersectoral coordination to support the identification of people in conditions of vulnerability; the management of shelters, hotels, or facilities for people in quarantine; food supply and safety; communication and information systems; and transportation of health workers.

- Ministries of health should manage the logistics of getting drugs and supplies to facilities; information and communication technology support; and maintenance and repair of technological equipment, either through their own personnel or through contractual services.

- Where possible, a geo-referenced computerized system is recommended in order to use available data on all cases and contacts to map people who are in home hospitalization, conditions of vulnerability, and domiciliary quarantine.

b. Integrate outpatient services of the social security system, private sector, and health sciences faculties and schools

The expansion of health services will require functional integration and coordination with all possible resources from the social security system, armed forces, Red Cross, private companies, nongovernmental organizations, universities with faculties and schools of medicine and health sciences; professional medical, nursing, and health associations; and professionals from the fields of psychology, social work, engineering and architecture, among others. All of this will support the work of the ministry of health and the health services network in the following areas:
• Community education and guidance in self-care and prevention and isolation measures
• Follow-up and monitoring of patients with other pathologies at the first level of care and by basic health care teams
• Protocolized outpatient care of patients with chronic conditions or patients receiving home-based hospital care as part of the first-level care network
• Pre-triage and triage in accordance with the capacity of the facilities in the network of services
• Consultations and patient referral between facilities
• Communication and coordination of patient transfer by ambulance, according to the patient’s pathology
• Use of ICT for telemedicine whenever possible, using Skype®, Webex®, WhatsApp® and other platforms to interconnect and communicate with basic health care teams and hospital services
• Designation of health professionals to serve as liaisons and manage patient flows in a timely manner

2. Centralized bed management mechanism.

   a. Integrate to the extent possible all national capacities, especially for critical care

Referral of patients, especially critical care patients, requires the integration of the various public, private, and other health care actors to improve timely access to hospital beds (especially critical care beds), with collaboration between hospitals and networks.

Avoid duplication of care services between hospital facilities that are functionally integrated into the network, and have plans to expand and reorganize facilities by redefining their function (see Annex 2): designate hospitals that are solely for the management of patients with COVID and hospitals dedicated to managing emergencies, patients with chronic conditions and other non-respiratory acute diseases, and high-risk pregnancies and childbirth.

   b. Establish a centralized bed management mechanism

Each hospital facility and network should have a “hospital bed manager” who update records of the bed situation at the national level on a daily basis. The national health authority should decide the location of this centralized bed management mechanism (ministry of health, focal point, emergency operations center [EOC], or elsewhere). This mechanism should maintain records on the inventory, occupancy, and movement of hospital beds.

In the absence of a hospital bed management information system, the tool designed by PAHO/WHO provides a cost-free alternative. To that end, the country’s centralized hospital bed management mechanism must have accurate information on the daily availability of all beds in intermediate and critical care units, whether they are in the public services, social security services, private hospitals, armed forces hospitals, university hospitals, etc.

   c. Arrange for referral and admission of patients in accordance with protocols

The centralized bed management mechanism manages, in accordance with established protocols, the referral of patients when there is greater demand for beds and arranges for transfers in conjunction with 911 or the prehospital network.

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2 Online bed management tool for free use. PAHO technical advisors can ask the HSS/HS technical team for access to view and analyze country data, like the managers of national agencies are able to do. https://hsvce.paho.org/public/analysis_beds
Hospital bed managers will carry out at least the following functions:

- Daily reports to the central level on the number of hospital beds available in intermediate and critical care units in their facility
- Reporting daily on the number of patients who are waiting to be admitted to the service they require, based on their level of complexity
- Arranging with heads of clinical services for the timely discharge of patients, keeping a record of the number of days the patient was hospitalized and of divergences from averages
- Arranging with the first level of care or with the health service network for patients who are recovering to be moved to hospitals of lower complexity or to home care, working with liaison personnel who facilitate this coordination between levels of care

The centralized bed management mechanism:

- Keeps daily records of available beds in intermediate and critical care units at the national level and informs the health authority
- Coordinates with the emergency medical services or the prehospital care network to determine the best place to hospitalize patients, collaborate on the transfer of critical patients, etc.
- Collaborates with the health authority to establish critical thresholds for activating other services such as mobile hospitals and equipping other facilities to provide basic hospital services. For this purpose, the country can utilize the tool developed by PAHO/WHO to estimate hospital bed needs and health service personnel hours
- Monitors, through local hospital bed managers, that all available beds are “working”—i.e., have been put in condition to be used
- Keeps a daily record of patients who are hospitalized in units at an inappropriate level of complexity and informs the authority

3. **Specimen collection from patients with suspected cases of COVID-19**

- Implement suppression or mitigation measures and proceed with the detection of infected persons, following the protocols recommended for collecting specimens and performing laboratory tests.
- Testing sites should be located outside designated first-level or hospital facilities, not in emergency services in order to avoid the gathering of people, overburdening of health personnel, and greater potential for contagion.
- Areas designated for testing should strengthen infection control measures and the personnel involved should be provided with the recommended personal protective equipment.
- Ensure the supply and availability of reagents, supplies, and devices needed for specimen collection and laboratory testing.

4. **Separate flows for triage, care, and diagnostic testing of patients with respiratory symptoms suggestive of COVID-19**

In most cases, first-level and hospital facilities will serve COVID-19 patients while continuing to provide care for other health needs. It is therefore necessary to set up separate flows and strengthen protocols for personal protection, infection control, and safe handling and disposal of hospital waste generated by care and treatment of COVID-19 patients.
• Create an emergency room separate from the general emergency room, with very clearly marked patient flow routes.
• Separate the waiting and outpatient areas for symptomatic respiratory patients (who should wear masks) from those for patients being treated for other pathologies.
• Ensure the availability of trained and protected personnel to triage and identify the level of risk and type of care required by each person.
• Designate hospital isolation wards in order to determine, through the bed manager, where COVID-19 patients should be hospitalized, avoiding transfers of such patients to other parts of the hospital, which could increase the risk of contagion for other patients and for health personnel.
• Implement isolation by cohorts if the epidemiological situation so requires.

5. Repurposing, retrofitting, and upgrading beds based on clinical risk and level of nursing care required
   a. Reorganization of clinical services by level of complexity

Most hospital facilities serve patients of varying complexities, who can be classified on the basis of level of risk (associated with clinical diagnosis) and dependent on nursing care requirements. These criteria will change in the course of the patient’s hospital stay, depending on whether the patient’s condition worsens or they show signs of recovery. Accordingly, the following is recommended:
• Exercise flexibility in moving from a “rigid” model in which there are only basic care beds and intensive care beds to a dynamic model that adapts to patients’ varying need for care in order to efficiently and effectively provide the level of care required. (2)
• Implement bed management by complexity to ensure that each patient is admitted to the right ward or service based on their condition, thus providing timely, quality care and avoiding long (sometimes unnecessary) stays in ICU beds.
• Establish four levels of bed complexity.

Given the diversity of inpatient bed classifications based on complexity, we will use a general classification to reflect needs with regard to personnel, staffing numbers, and patient complexity. Beds are classified in categories, from type A (most complex) to type D (least complex). This classification is based on the characteristics of a framework of progressive complexity. See Table 2.

Basic care bed units – Type D beds
These beds are intended for patients who are at some stage of an illness (assessment, diagnosis, treatment, and/or recovery) and require the use of hospital facilities for medical and nursing care, access to procedures, and/or minor surgeries. They are low-risk patients who require part-time nursing care or are self-sufficient.

Recommendation for COVID-19:
Reduce beds at this level to a minimum, moving them to the next level of complexity (intermediate level of care), where there are more staff and technological resources. Opt for home hospitalization for low-risk and recovering patients.

Intermediate care bed units – Type C beds
These beds are intended for the care of patients of intermediate complexity who are in an acute phase of illness that is expected to resolve within a few days and who come from emergency units or have been transferred from critical care bed units because they are in recovery. Their medical risk is moderate and they are highly dependent on nursing care. They receive close and regular monitoring of their vital signs and comprehensive care and have high demand for nursing care. This level requires a chief physician and nurse supervisor and the provision of personnel in accordance with the country’s regulations.

**Recommendation for COVID-19**

These beds can be very useful for COVID-19 patients who require monitoring and support measures such as oxygen therapy, hydration, non-invasive mechanical ventilation, management of medications, and other care. They can also be used for more complex care at the next level—intermediate care for critical care patients—by increasing staff training, increasing their number, and adding equipment such as mechanical ventilation, invasive hemodynamic monitoring systems, and others, if necessary.

**Critical patient units – Type A and B beds**

These units have beds for the care of critically ill patients with conditions affecting one or more systems that pose a serious immediate or potential threat to their lives but whose condition is reversible. Beds at this level are organized in:

- Intermediate care units – type B beds
- Critical care units – type A beds

**Recommendation for COVID-19**

These are the beds that are most limited but in highest demand for treatment of COVID-19 patients. It is important to ensure that patients remain at this level for the shortest possible time and that they can be moved to intermediate care beds. It is also important that patients be able to transition between intensive care and intermediate care units, which means improving staffing and equipment such as mechanical ventilators.

**Table 2: Types of beds by complexity**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>Unstable critical condition</td>
<td>Critical condition</td>
<td>Unstable non-critical condition that require constant monitoring and care</td>
<td>Stable condition</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Medical personnel</th>
<th>Medical specialist (internist, emergency care physician, infectious disease specialist)</th>
<th>General practitioner</th>
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</thead>
<tbody>
<tr>
<td>Intensive care physician</td>
<td>Nurse trained in specialized care</td>
<td>Professional nurse</td>
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<tr>
<td>Intensive care nurse</td>
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<table>
<thead>
<tr>
<th>Ratio</th>
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<tbody>
<tr>
<td>One permanent medical team for every 6 beds:</td>
</tr>
<tr>
<td>1 intensive care physician</td>
</tr>
<tr>
<td>2 nurses</td>
</tr>
<tr>
<td>3-4 nursing assistants</td>
</tr>
<tr>
<td>One permanent medical team for every 12 beds:</td>
</tr>
<tr>
<td>1 intensivist on call</td>
</tr>
<tr>
<td>1 specialist (internist, emergency care physician, infectious disease specialist)</td>
</tr>
<tr>
<td>2 nurses</td>
</tr>
<tr>
<td>3-4 nursing assistants</td>
</tr>
<tr>
<td>One permanent medical team for every 18 beds:</td>
</tr>
<tr>
<td>1 specialist</td>
</tr>
<tr>
<td>2 nurses</td>
</tr>
<tr>
<td>3-4 nursing assistants</td>
</tr>
<tr>
<td>One permanent medical team for every 18 beds:</td>
</tr>
<tr>
<td>1 physician</td>
</tr>
<tr>
<td>1 nurse</td>
</tr>
<tr>
<td>3-4 nursing assistants</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mechanical ventilators</td>
</tr>
<tr>
<td>• Medical gas network with oxygen, air, and vacuum</td>
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<tr>
<td>• Secondary oxygen supply system</td>
</tr>
<tr>
<td>• Continuous monitoring</td>
</tr>
<tr>
<td>• Availability of invasive monitoring</td>
</tr>
<tr>
<td>• Crash cart with defibrillator and pacemaker</td>
</tr>
<tr>
<td>• Drug administration by infusion pump</td>
</tr>
<tr>
<td>• Portable x-ray machine</td>
</tr>
<tr>
<td>• Availability of portable sonography</td>
</tr>
<tr>
<td>• Mechanical ventilators</td>
</tr>
<tr>
<td>• Medical gas network with oxygen, air, and vacuum</td>
</tr>
<tr>
<td>• Secondary oxygen supply system</td>
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<tr>
<td>• Continuous monitoring</td>
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<td>• Crash cart with defibrillator and pacemaker</td>
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<td>• Portable x-ray machine</td>
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<tr>
<td>• Medical gas network with oxygen, air, and vacuum</td>
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<td>• Non-invasive monitoring</td>
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<tr>
<td>• Measurement of oxygen saturation</td>
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<tr>
<td>• Crash cart with defibrillator</td>
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<tr>
<td>• Drug administration by infusion pump</td>
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<tr>
<td>• Access to oxygen therapy</td>
</tr>
<tr>
<td>• Availability of crash cart with defibrillator and pacemaker</td>
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<td>• Measurement of oxygen saturation</td>
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<thead>
<tr>
<th>Support equipment</th>
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<tbody>
<tr>
<td>• Respiratory therapy</td>
</tr>
<tr>
<td>• Availability of anesthesia</td>
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<td>• Availability of tracheostomy surgery</td>
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<td>• Measurement of arterial gases</td>
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<td>• Respiratory therapy</td>
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<td>• Availability of anesthesia</td>
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<td>• Availability of tracheostomy surgery</td>
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<td>• Measurement of arterial gases</td>
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<td>• Access to oxygen therapy</td>
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<td>• Availability of crash cart with defibrillator and pacemaker</td>
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<td>• Measurement of oxygen saturation</td>
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b. Bed conversion

- Tackling COVID-19 will require conversion of the maximum possible number of beds (see Annex 2), replacing basic beds with home hospitalization or taking patients to a hospital designated for “pre-discharge” of patients. Here, it is important to predetermine, insofar as possible, the allocation, utilization, and function of existing resources in all public, social security, and private hospitals to prevent the duplication of services among institutions.

- Insofar as possible, designate strategically located day hospitals, health centers or second-level hospitals with augmented physician and nursing staff, drugs, and supplies for the management and hospitalization of predischarge patients who cannot be at home, are pregnant, have dengue or urinary tract infections, need dialysis, etc.

- Designation of units or hospitals that guarantee the admission of pregnant women with obstetric risk, preventing their exposure to the risk of infection

- Begin the conversion or designate hospitals for acute-care patients, with intermediate-care and CPU beds. To this end it will be necessary to:
  - Suspend elective care in those hospitals
  - Suspend admissions for diagnostic studies except in the case of oncological pathology or risk to the patient
  - Maintain the operations of the hemodialysis, oncology, chemotherapy, and all other units whose shut-down would imply risk to patients. If patients cannot be transferred to other facilities, keep them completely separate from the units in which COVID-19 patients circulate.
  - Limit the family visitation program, imposing strict control measures to prevent exposure to the infection.
  - Suspend the circulation and rotation of students in clinical areas to control the potential for infection and the spread of the disease.

6. Strengthening of home care – Telehealth

- The experience of China and Italy experience in managing COVID-19 cases indicates that 40% to 80% of patients with the infection will be mild or moderate stable cases that can be managed with isolation in home care\(^3\), permitting the use of these hospital beds for patients who need them most.

- At the same time, hospital beds can be freed up through the early discharge of patients with other conditions or pathologies, with instructions for basic teams to monitor them or follow up through liaison professionals and the first level of care.

- Begin strengthening basic first level of care teams, (physicians, nurses, health promoters, students in the final stages of their medical, nursing, pharmacy, psychology, social work, and nutrition education), that visit patients with less-complex conditions.

- Identify patients who develop complications of COVID-19 or another pathology

- Guarantee drug and supply logistics.

- Improve patient self-care and the training of community caregivers, tightening home quarantine measures.

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7. Coordination with the prehospital care network (emergency care units and medical transport, ambulances)

National contingency plans in the event of excessive demand for primary and secondary medical transport.
- Training and preparation for the transfer of critical patients, giving priority to mechanical ventilation.
- Conversion to an advanced mobile fleet staffed with a physician and adequate personnel for transfers of critical patients, based on demand.
- Operational early alert centers (911-type emergency coordination centers) to improve transfer times and the referral of critical patients.

8. Clinical management within the network for continuity of care and efficient use of hospital resources

Aimed at boosting response capacity: early discharge, suspension of elective hospital care, conversion of beds for more-complex care, first level of care liaison personnel and support for home hospitalization, day and low-complexity hospitals, health centers, nursing homes, and mobile hospitals.

In the current growing COVID-19 pandemic:
- Early discharges with hospital monitoring mechanisms, completion of less-complex therapies at home or in day hospitals and health centers.
- Greater frequency of medical visits, 7 days a week.
- Suspension of elective hospital care.
- Conversion of beds for more-complex care
- Primary care liaison personnel
- Support for home hospitalization
- Integration of nursing homes, mobile hospitals, and other facilities in the network. The authorization of new beds in facilities other than hospitals, including field hospitals, should follow PAHO/WHO and IAAS protocols and staff protection protocols. When such authorization is required, it is recommended that the facilities be used for patients with less-complex conditions and problems other than COVID-19 to free up hospital beds.

9. Reorganization, recruitment, and training of health workers

It is important to consider how to care for the rising number of COVID-19-positive patients and avoid disruptions in the care of uninfected chronically ill patients as much as possible. Since hospitals will be prioritizing the care of COVID-19-positive patients, care for patients with chronic conditions should be handled by the first and secondary level of care, which means reorganizing and transferring professionals...
and specialists to different levels of care. Otherwise, the increase in patients with worsening chronic conditions will not only pose a significant health risk but will increase hospital demand. Therefore:

- Call on retired health workers trained in critical or intermediate care to provide phone or virtual telehealth consultations to prevent their exposure.
- Train pediatric intensivists and emergency care physicians in the management of adults.
- Train internists, anesthesiologists, surgeons, otolaryngologists, nurses, and other health professionals to manage critical patients, especially in the areas of assisted ventilation and respiratory therapy, and improve training in infection prevention and control measures for the COVID-19 pandemic, with special attention to proper use of personal protective equipment.
- Support the hiring and onboarding of physicians, nurses, and nursing assistants, respiratory therapists, and physical therapists for hospital management of patients and community management of people with chronic noncommunicable diseases (CNCD). Use recent graduates awaiting internship and students in their final undergraduate year (professional practice or social service) as support personnel in community activities, home visits, patient orientation, data collection, and general examinations.
- Transfer professionals whose functions are not on the first line of COVID-19 control (speech pathologists, occupational therapists, surgeons, otorhinolaryngologists, ophthalmologists, etc.) to the first level of care or second-level hospitals to boost capacity in these facilities, shortening waiting lists and wait times and collaborating in the management of patients with chronic conditions in the community.
- Guarantee activities and systems to monitor the health of human resources involved in the COVID-19 response.
- Implement protocols for the management and monitoring of suspected and confirmed cases among the human resources involved in the COVID-19 response.

**10. Guarantee supply management for the operation of facilities and units.**

The viability of the measures to expand services depends on the guaranteed supply and availability of drugs, inputs, and supplies throughout the health-care network.

- Provide personal protective equipment (PPE) to all exposed health personnel, including health students and all pertinent staff. Quantify the needs (per health worker per day for at least 3 months).
- Basic hygiene supplies for all staff and patients, cleaning and maintenance of facilities, adhering to infection control standards and procedures.
  - Drugs and clinical supplies for managing cases of COVID-19 and other pathologies.
  - Equipment and supplies for the conversion of beds, reorganization of primary care, home hospitalization, and hospitals.
  - Repair and maintenance services for the equipment in use, including support services such as radiology, respirators in disuse that can be salvaged.
  - Continuity of basic supply services to maintain the autonomy of hospital systems such as water, oxygen networks, electricity, climate control, negative pressure systems, exhaust fans, etc.

To ensure the adequate supply needed in all health facilities, the following action must be taken immediately:

1. Identify the critical products that can run out in the country due to transport or production issues or lack of suppliers. Jointly with the public service networks, drug regulatory authorities, and United Nations agencies, coordinate efforts to facilitate the procurement and transport of the needed products.
2. Implement the list of essential drugs and supplies necessary for patient care and the protection of health workers, based on the level of care and infection control.

3. Review and evaluate the inventories of useful drugs and medical supplies (excluding drugs that will expire before their use) in central, regional, and local warehouses (for facilities in the health services network), identifying those at risk of stock-outs (<3 months of inventory), or drugs or supplies with zero stocks that are critical to patient care, the protection of health workers, and infection control.

4. Estimate needs, including drugs and supplies in transit, and resupply facilities in the service network.

5. Have a list of providers that meet the quality and eligibility criteria established in the country’s regulations and investigate product availability, waiting periods, and estimated prices.

6. The regulatory authority should have emergency procedures for priority registration and licensing of vital goods for the emergency that are not marketed in the country.

7. Establish a technical committee to support emergency procurement to ensure quality, timeliness, and control of processes. In coordination with other public and private institutions, civil society, national emergency committees, drug and other regulatory authorities, and entities, this committee will acquire drugs and supplies through donation or purchase.

8. Establish at the national or institutional levels drug distribution or dispensing systems in specific health centers for patients with chronic conditions or in need of special drug therapies (e.g., patients with hypertension or heart or lung disease; people with HIV, diabetes, tuberculosis, kidney failure, etc.), identifying easily accessible health establishments that have the facilities and human resources to dispense the drugs and are not exposed to risks of infection, establishing the necessary distribution procedures and controls.

9. Open satellite pharmacies with continuous schedules in emergency or special services to serve COVID-19 patients, offering a defined stock of drugs and supplies based on established protocols.

10. Conduct routine inventories at least twice a month to study demand behavior versus programmed estimates and make the necessary adjustments.

11. Create a periodic distribution plan/map for inputs and drugs vital to the COVID-19 response, establishing the minimum stocks at the various levels; minimum stocks of 6 months at the central level, 3 months at the intermediate level, and 2 months at the services level are recommended.

12. When inventory management information systems are deficient, make a push distribution, calculated in the central services, with a focus on maintaining the minimum stocks.

13. Special attention should be given to the blood supply and its availability in all hospitals. The following is therefore recommended:

- At the national, regional, or local level, as appropriate, activate the emergency blood management plan to: permanently monitor the availability of blood and components on a daily basis; activate networks and reference centers with greater capacity to collect/process blood, including collection by apheresis; mobilize blood from areas where the virus is not circulating or where blood is widely available; and shift blood drives to areas with no viral circulation, avoiding the congregation of donors.

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4 As its name indicates, PULL distribution is the pulling of inventory from a warehouse, based on the demand expressed by the health center. PUSH distribution is the pushing of drugs in emergencies when there is no time or information; needs are calculated from the central level using other methods. For example, the number of cases per protocol or service or per population is calculated. PUSH distribution is more inefficient; when health centers are well-trained, they are better able to calculate what they need. One methodology is to keep the pipeline full at all levels with a minimum inventory and monitor the inventory through consumption reports.

- Shorten the interval between donations, increase collection hours through donor appointments or even visits to donor homes by the blood bank to ensure a workflow that prevents the congregation of large groups of donors and workers. Finally, continue distributing information about the importance of ongoing donation, given the needs of patients who chronically require transfusions, such as transplant recipients or leukemia or cancer patients. Transfusion services should remain in continuous contact with the network of blood banks (blood suppliers) and should strictly manage the blood inventory, shorten blood storage times, activate the transfusion committee, transfuse according to institutional clinical guidelines, reprogram elective surgeries, and evaluate the use of alternative medicines: FVIII-FIX – erythropoietin.

- Maintain two-way communication between blood services and the national emergency response team in order to: report on the availability of blood, plan the mobilization of blood products and/or donors, report on needs or the shortage of supplies for collecting and processing blood and blood components, and report on affected areas, potential areas for blood drives, and other measures introduced during this emergency.
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ANNEX 1

FIRST LEVEL OF CARE: Pre-Triage

When COVID19 is suspected or patients have respiratory symptoms, the general practitioner or family doctor should conduct:

a. A physical examination focusing on the respiratory and cardiovascular system, including:
   - Body Temperature
   - Lung auscultation: (abnormal)
   - Checking for presence of crepitus (indication of pulmonary infiltration)
   - Normal respiratory rate: 12 to 16 per minute (over 30 is abnormal)
   - Normal heart rate: 60 to 100 per minute
   - Normal arterial blood pressure equal to/or below 140/90
   - Oxygen Saturation:
     - Normal > 95
     - Abnormal is < 93

b. Confirm presence of the following symptoms:
   - Labored breathing (dyspnea)
   - Fever
   - Cough
   - Sore throat
   - Nasal dripping or secretion
   - Assessment of general state of health

In addition to the set of symptoms, confirm other risk factors:
   - Age
   - Chronic diseases: cardiovascular, hypertension, diabetes mellitus
   - Epidemiological linkage

c. Home isolation:
   Patient suspected of COVID-19 who presents mild symptomatology and no other physical changes, based on a physical examination, particularly in the respiratory system.

d. Referral for triage and hospital admission:
   When, in addition to the symptoms, there are changes in the respiratory system.

e. Coordinate transfer, with case manager and ambulance
   - List of outpatient centers or hospitals designated for triage and hospitalization, according to the case severity, and telephone number of case manager, hospital beds manager, or hospital beds management unit.

f. Diagnostic equipment and essential supplies:
   1. Sphygmomanometer
   2. Stethoscope
   3. Thermometer
   4. Masks
   5. Gloves
   6. Hand sanitizer gel
   7. Oximeter
ANNEX 2

Increasing hospital expansion capacity during the COVID-19 pandemic in the Region of the Americas

Evidence

Increasing hospital response capacity means developing and implementing strategies to provide care and treatment and effectively manage the growing numbers of COVID-19 patients [1]. These strategies can be grouped in four main categories: human resources, equipment, physical spaces available to support the hospital’s response to COVID-19, and risk assessment of the situation and of the level of preparedness in the hospital and surrounding communities.

The purpose of this report is to provide guidance to hospitals on matters that strongly affect their ability to increase capacity during the response phase of the current pandemic.

Human resources

A hospital must have trained human resources to perform all the essential functions needed to respond effectively to the impact of the COVID-19 pandemic. These workers are on the front line in providing care for those affected by the disease and in combatting the pandemic.

Effective strategies for increasing the capacities of a hospital’s personnel include:

- Reassigning personnel from other specialties and services within the hospital to support functions specific to COVID-19 [2].
- Requesting support from retired personnel and from volunteers with medical experience.
- Recruiting certified physicians and nurses.
- Requesting support from medical and nonmedical military personnel.
- Ensuring the availability of psychosocial support teams for families of personnel and patients (psychologists, social workers, counselors, etc.) [3].
- Using cohort methodology: assign groups of staff to specific functions and areas [4].
  - Example of cohorts:
    - Cohort 1 - Working with patients who tested positive for COVID-19
    - Cohort 2 - Working with patients whose clinical assessment suggests COVID-19 but who have not yet received test results
    - Cohort 3 - Working with patients whose clinical signs are inconsistent with the disease and who tested negative
- Considering extra hours and extended shifts for personnel working in the COVID-19 units, as well as rotating them.

Equipment

The increased demand for medical care and treatment for people infected with COVID-19 means that hospitals must have greater supplies of equipment to respond effectively. The allocation of equipment should be a priority, and it should be organized to maximize efficient use and to optimize outcomes for the greatest possible number of patients.
Strategies to increase the supply of necessary medical equipment in a hospital:
- Transfer medical equipment from nonessential or non-functional departments to essential/functional departments to provide care for patients with COVID-19 [5].
- Ensure the ongoing commitment of authorities, providers, and organizations to acquire essential supplies [6].
- Develop and maintain an up-to-date inventory of all equipment, supplies, and pharmaceutical products, and institute a shortage/stockout warning system.
- Coordinate with authorities and providers to ensure uninterrupted provision and delivery of equipment, supplies, essential drugs, and other items for which a shortage may be foreseen, drawing on institutional supplies from central warehouses and/or using emergency purchase agreements with local providers and national and international aid agencies.
- Establish a physical space within the hospital for storing additional supplies, taking into account easy access, safety, temperature, ventilation, exposure to light, and moisture levels.
- For drugs and supplies that require refrigeration, ensure the presence of an uninterrupted cold chain.

**Physical Space**

The pandemic response phase creates a sudden need for more physical space to accommodate the large numbers of patients who are admitted and need medical care.

Effective strategies for creating more usable physical space in a hospital include:
- Early discharge: identify patients who are in stable condition and discharge them. This not only makes more physical space available for people affected by COVID-19, but also reduces the risk of exposure for those patients (see discharge criteria below) [7].
- Prepare other hospital departments that are not essential for the response (endoscopy and post-anesthesia units, outpatient surgery areas, etc.), in order to provide hospital care that is comparable to ICU care.
- Suspend all elective procedures and surgeries to reduce the risk of exposure of surgical patients, increase the physical space available for treatment, and leave usable space free in case emergency surgeries are necessary.
- Use areas of the hospital that are not normally used for patient care. These can include spaces such as parking areas, auditoriums, hallways, cafeterias, etc.
- Make transportation/transfer resources available (ambulances, helicopters, beds, etc.) for intra- and inter-hospital movements in the event of an emergency.
- Coordinate with local authorities to identify additional places that can be used as patient care units (nursing homes, hotels, community centers, etc.) [8].
- Convert private rooms to double rooms [9].

**Criteria for discharging hospital patients:**
- Patient is clinically stable
- Patient’s hospital care requirements are limited to a few parenteral drugs (according to the situation)
- Patient can be transferred to lower complexity facilities

**Criteria for not discharging patients from hospital:**
- Patients with chronic diseases (hemodialysis, need for infusions, etc.) [10]
- High-risk pregnant women and women in labor
- Patients admitted for other emergency services unrelated to COVID-19
The application of The Hospital Readiness Checklist for the response to COVID-10 in hospitals. A virtual tool is available to facilitate the use of the checklist.


ANNEX 3

TELECONSULTATION DURING A PANDEMIC

Teleconsultation: an essential tool for use during a pandemic

When a pandemic has been declared, feelings of anxiety and uncertainty can overwhelm people, and health systems may find it challenging to deal with exponential demand that is out of control. Without adequate planning and mitigation measures, health services risk collapsing due to an overload of consultations that could instead be conducted virtually. Health care facilities can be overwhelmed and find themselves without the capacity to provide adequate treatment for those who need it most. Teleconsultations are a safe and effective way to assess suspected cases and guide patient diagnosis and treatment, while minimizing the risk of transmitting disease. Teleconsultations enable many key clinical services to continue operating regularly and without interruption, both in preparation for a public health emergency and during the emergency itself.

What is telepresence?

Telepresence allows patients to feel as if they were present with the physician, although not physically in the same place. Technology allows patients and physicians to interact virtually.

What is teleconsultation?

Teleconsultation, also known as remote consultation or telehealth, refers to interactions between a physician and a patient for the provision of diagnostic or therapeutic advice through electronic media.

What are the minimum requirements for conducting a teleconsultation?

Holding a teleconsultation requires basic knowledge of how to use the relevant technologies, an awareness of the limitations inherent in teleconsultation, and knowing when face-to-face consultation is preferable. It is necessary to know how and where to connect (what institutions are offering teleconsultation) and what hardware and software to use, since several types exist; however, their functionalities are the same and most of them are highly intuitive.

What is the minimum technology needed to conduct a teleconsultation?

Teleconsultation usually requires an internet connection, a computer with audio and video capacity, transmission capacity. Internet connection should be fast and stable, using broadband (ADSL, fiber optic, cable, 4G or equivalent; and speeds of at least 1MB/300kb). It is also necessary to know how to use specific software (conferencing tools such as Webex®, Skype®, Zoom®, Elluminate®, MS Teams®, and FaceTime®, among others) that facilitate telepresence, and have an internet provider that offers service of the minimum quality required. It is highly advisable to have a telephone in the event that communication is interrupted during video conferencing. Lastly, it is important not to have other applications open that interfere with the speed of the internet connection or communication.

When can teleconsultations be used?

Teleconsultations are a useful approach for evaluating patients and reducing unnecessary visits to emergency services. Scheduled teleconsultations can be used to assess, monitor, and follow up with patients who do not require face-to-face evaluation. Depending on what technological infrastructure is available, however, some services cannot be replaced by telepresence; thus, it is important to determine when telepresence is an option and when it is not.

What are some of the services that can be provided through teleconsultation?
Teleconsultations create multiple possibilities in a pandemic situation during which authorities may request or impose isolation on the community, close borders, limit means of transportation, etc. Telepresence in health care can be used to provide telecare (remote care), and can facilitate administrative patient management, as well as classification, monitoring, meetings, and technical discussions between physicians in different locations, etc.

**Where can I find technical information on telemedicine?**

- PAHO/WHO eHealth Conversations (P. 99 – Telemedicine, Management and Evolution of Networks)
- PAHO/WHO Framework for the Implementation of a Telemedicine Service
- PAHO/WHO Defining evaluation indicators for telemedicine
- WHO Guidelines on Digital Health Interventions
- Value of Telemonitoring and Telemedicine in Heart Failure Management
- Journal of Telemedicine and Telecare

**Contact information**

Phone: +1 (202) 974 3531 – FAX: +1 (202) 775 4578 – email: emergencies@paho.org

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