

# Developing a hospital preparedness checklist to assess the ability to respond to the COVID-19 pandemic

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## Abstract

**Background:** During epidemics and pandemics, health systems, and especially hospitals, face many challenges in the management of patients and staff. Hospital preparedness measures are critical for hospitals to respond effectively to the admission and management of COVID-19 patients. Ministry of health policy for pandemics must cover the ability of hospitals to respond to COVID-19.

**Aims:** The aim of this study was to develop a checklist for evaluating the preparedness of hospitals to respond to the COVID-19 pandemic.

**Methods:** We searched for and reviewed available evidence, including the literature and guidelines presented by related organizations. Due to the COVID-19 outbreak, face-to-face interview was not possible so we used telephone and video connections, mobile applications and email for unstructured interviews. Checklist development was carried out by a multi-disciplinary panel of experts.

**Results:** After applying the opinions of the experts, the final checklist had 2 main domains: measures at national and measures at hospital level. Preparedness at national level was categorized into 3 aspects that are implemented by the health ministry. Preparedness at hospital level was categorized in 24 subgroups.

**Conclusion:** Hospital preparedness for admission and management of COVID-19 patients is essential. A checklist for the assessment of hospital preparedness for COVID-19 patient management and hospital management was designed and developed. Our preparedness assessment checklist is an expanded tool that provides clear and practical guidance that can be adapted for any hospital admitting COVID-19 patients.

Keywords: hospital preparedness, checklist, epidemic, pandemic, COVID-19

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## Introduction

Novel Coronavirus disease 2019 (COVID-19) is a potentially severe acute respiratory infection. The COVID-19 outbreak began in December 2019 in Wuhan City, Hubei Province, China (1). The COVID-19 pandemic has become a global health concern since it infects people worldwide (2). It spreads quickly, and many countries have now reported laboratory-confirmed cases. The World Health Organization (WHO) has confirmed 16 495 309 cases and 654 327 deaths have been detected globally (28 July 2020). During disease outbreaks, health systems, especially hospitals, may face many challenges, including shortages of hospital personnel, medical supplies and support services, which all make it difficult for managers to effectively manage hospital overcrowding. Hospital preparedness activities are an essential component of hospital disaster preparedness for mass casualty incidents and need to address all hazards, including infectious disease outbreaks and pandemics (3). Due to the main role of hospital preparedness, especially, in response to outbreaks, it is important to focus on hospital and personnel preparation. Recently, looking at the situation of hospitals in the face

of the COVID-19 pandemic (4–6), and based on studies that have been carried out, it is clear that most hospitals across the world are not prepared for the biological emergency and may inappropriately respond to disease outbreaks, particularly in their capacity to care for large numbers of patients (7,8).

Standard operating procedures and guidelines are necessary to remind clinicians of the need for medical evaluations and to incorporate certain aspects of treatment (9). Governance, especially from the health ministry, plays an important role in hospital management through external collaboration, government policies, the national health care system and government financial incentives (10).

The COVID-19 epidemic is unique because of its extensive scale, the high rate at which it spread globally, the lack of pre-existing scientific information and the importance of media coverage (10). It forced hospitals to face significant new challenges associated with this epidemic (11). Hospitals will face an increasing number of COVID-19 patients and have to forecast the consequences,

including the need for an increase in the number of beds, trained health care workers and ventilators (12).

Specific hospitals should be prepared for the admission of COVID-19 patients, and these hospitals should ensure their staff are trained and equipped with personal protective equipment (PPE). The spread of COVID-19 within the health care facility should be prevented; patients with possible COVID-19 should be identified; care for a limited number of patients with confirmed or suspected COVID-19 should be performed routinely; all health care personnel should be monitored and managed due to the possibility of exposure to COVID-19; and effective communication within the facility should be conducted. Planning for proper external communication related to COVID-19 should also be incorporated (13).

Hospitals should be evaluated regarding their preparation for the pandemic and for admitting patients. This requires the proper tools for evaluation of preparedness functions and subsequently resolving weakness and improvement of strengths. Therefore, the aim of this study was to develop a checklist for the evaluation of hospital preparedness for COVID-19. Our checklist will assess the status of hospitals and can be used by hospital managers, directors and authorities and the health system. The output and results of this report may help to promote hospital preparedness for an appropriate response to the COVID-19 pandemic.

## Methods

### Review of literature and guidelines

To determine the nature and format of the core information to be contained in a hospital preparedness checklist for COVID-19 patients, we searched for and reviewed available evidence, including the literature and guidelines presented by related organizations. We searched Web of Science, PubMed and Google Scholar for relevant articles from January 2019 to April 2020. We also searched specialized databases and websites such as the Federal Emergency Management Agency (FEMA), the WHO, the Pan American Health Organization (PAHO) and the Centers for Disease Control and Prevention (CDC). Combinations of the following Medical Subject Headings (MeSH) key words were used: “COVID-19”, “hospital”, “emergency room”, “preparedness”, “preparation”, “management”, “response”, “epidemic”, “pandemic”, “outbreak”, “infectious disease” and “biological event”. Then the bibliographies of all relevant articles were reviewed to identify additional studies. We conducted a focused study of selected available resources (Open Research Dataset, BioRxiv and Medrxiv, PubMed – LitCovid, Cochrane Library, GIDEON, CDC and Jove) related to COVID-19 that had been published after 2019.

### Consultation with experts by interview

This study was conducted from 10 January to 18 July 2020. Due to the restrictions implemented during the COVID-19 outbreak, face-to-face interviews were not possible and

we used telephone and video connections, mobile applications and email for unstructured interviews. Participants included experts from multiple disciplines, including hospitalists, hospital administrators, hospital managers, disaster committee managers, matrons, nurses, researchers, emergency physicians, infection physicians, academics, and hospital administrators who had had direct experience in hospital management and infectious diseases. The composition of the panel is shown in Table 1.

The main focus of the topics discussed included effective measures for hospital management in the COVID-19 outbreak and the strengths and weaknesses of the hospital in the face of the outbreak. The draft checklist was then shared with the panel members to seek their input.

This checklist has been developed to improve hospital management during the COVID-19 outbreak. The elements described in the list may not be applicable to all hospitals and may need to be adapted to the specific characteristics of the hospital, the individual national health system, and the legislation and community norms where the hospital is located.

### Checklist development

The results of the literature review were further supplemented with expert opinion and practical advice. As a first step, the panel of experts reviewed existing toolkits and evidence-based recommendations around best hospital preparedness practices (details of the make-up of the expert panel are shown in Table 1). During meetings via video connection or mobile applications, panel members were assigned to 3 groups and instructed to review summarized toolkits and literature using context-specific aspects (infection control, patient management, surge capacity) (Figure 1). Following the meeting, each group was tasked to generate a list of evidence-based items necessary for COVID-19 hospital preparedness within the context of the group’s assigned aspect. Every subgroup reached consensus on items specific to its context. An initial draft checklist was generated based on input from all subgroups. The checklist was created using recommended PAHO, WHO and CDC concepts. The next meeting provided the opportunity for individual comments and feedback on the initial draft checklist. Three cycles of checklist revision were conducted followed by comments and feedback through exchanges via email and mobile applications. A final meeting resulted in consensus of the expert panel on every element of the hospital preparedness for COVID-19 checklist. During this final meeting, approval of the checklist was completed.

### Ethical approval

This study was completed in accordance with the ethical principles of, and was approved by, the research ethics committee of Iran University of Medical Sciences, Tehran (IR.IUMS.REC.1397.1379).

**Table 1** Characterization of the expert panel

Affiliation	Academic degree	Technical expertise
Head of disaster risk reduction department	MD-MPH	Physician
Hospital laboratory expert (2 people)	MSc, PhD	Laboratory science
Head of environmental health department of hospital (2 people)	MSc	Environmental health
Pre-hospital centre management	MSc	Nursing
Head nurse of emergency department	MSc	Nursing
Medical education deputy in medical university	PhD	Medical education
Head of emergency department	Medical specialty	Emergency medicine
Head of centre for disease control and prevention	MD-MPH	Physician
Head of infectious diseases department (2 people)	Medical specialty	Infectious diseases
Head of virology department (2 people)	PhD	Virology
Head of passive defence committee	MD-MPH	Physician
Head of drug hospital store	PhD	Clinical pharmacy
Head of environmental health and safety department of hospital	MSc	Environmental health
Head of hospital (2 people)	Medical specialty	Emergency medicine
Hospital director	MD-MPH	Physician
Health sector of military system	PhD	Biological defence
Passive defence deputy of university of medical sciences	PhD	Environmental health
Treatment deputy of hospital	MD-PhD	Health in disasters
Treatment deputy of university of medical sciences	Medical specialty	Emergency medicine
Head of hospital nursing office (matron) (2 people)	PhD	Nursing
Education deputy of hospital	Fellowship	Clinical toxicology
National centre for disease control and prevention (2 people)	Medical specialty, MD-MPH	Infectious diseases
Head of hospital occupational medicine department	Medical specialty	Occupational medicine
Head of university medical emergencies management centre	MD, PhD	health in disasters
Head of emergency operation centre	MSc	Health care management
Hospital supervisor (2 people)	MSc	Nursing
Bacteriology laboratory expert	PhD	Medical bacteriology
Head of hospital disaster management committee	MSc	Occupational health
Supervisor of hospital infection control committee	PhD	Nursing
Head of reference laboratory	PhD	Medical biotechnology
Hospital research centre	MSc	Epidemiology
Head of pulmonary diseases department	Medical specialty	Pulmonary diseases

## Results

After applying the opinions of the experts, the final checklist had 2 main domains: measures at national level and measures at hospital level. Preparedness at national level was categorized into 3 aspects: coordination, referrals hospitals and legal subgroups; these measures are performed by the ministry of health. Preparedness at the hospital level was categorized in subgroups: planning, surveillance system, prioritization and triage, external cooperation and interaction of hospitals, hospital incident command system, surge capacity, COVID-19 patient management, non-COVID-19 patient management, intensive care unit, drug and medical equipment management, management of volunteers, management of companions of patients, hospital personnel management, security, nutrition and food health, research and documentation, communications, quarantine, exercises and

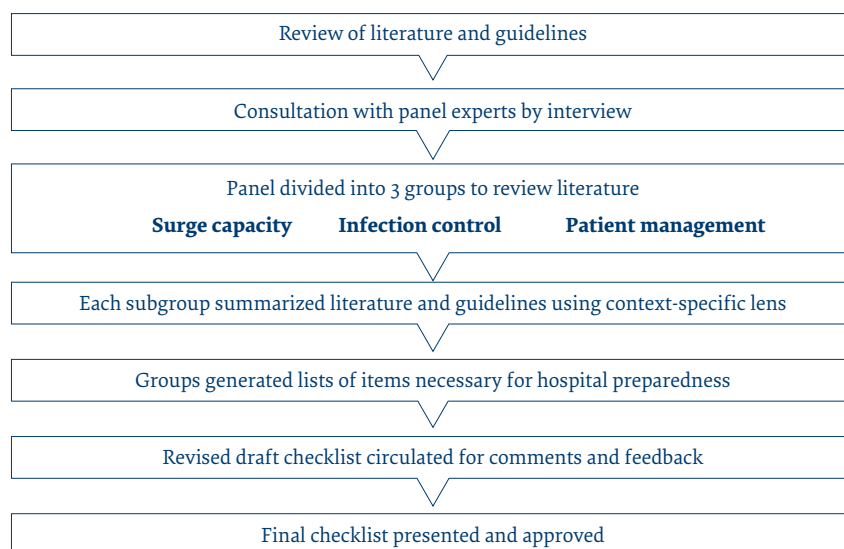
training, laboratory, PPE, environmental health, hospital infection prevention and control, and dead body management. Each subgroup encompasses related indicators and is classified according to whether it is “Completed”, “In progress” or “Not started” (Table 2). Items classed as in progress will be followed up for completion. Then, attempts will be made to initiate those items that have not been started.

Because of variability between outbreaks and the characteristics of individual hospitals (such as patient population, size of hospital/community and scope of service), each hospital will need to adapt this checklist to meet its unique needs and situation.

## Discussion

Hospital preparedness for disasters such as epidemics is critical. This checklist was designed to prepare hospitals

Figure 1 Checklist development process



for effective management of COVID-19 patients; it was designed and developed at a time when all countries already had many COVID-19 patients and hospitals were dealing with them. Nevertheless, the checklist is extremely useful: it can help hospitals to best assess their situation and make necessary improvements for COVID-19 management. We used a consensus process among stakeholders to develop the checklist for the assessment of hospital preparedness for COVID-19 that needs to be completed for every hospital admitting COVID-19 patients. The hospital response to epidemic and pandemic situations (with high numbers of patients and visits) demands a proper evaluation tool. We believe that preparedness planning starts before the event. The components of the assessment checklist should include all aspects of hospital management to ensure proper response and care of patients.

Some tools and checklists have been developed for hospital assessment by PAHO (14), CDC (15), and the European Centre for Disease Prevention and Control (ECDC) (16). One study was conducted with the aim of developing an assessment tool for the evaluation of hospital preparedness in chemical, biological, radiological and nuclear emergencies through the cross-sectional Delphi technique (17). Assessment items were categorized into 7 sections: planning and organization, safety and security, standard operation process, communication, resources, medical management and decontamination. In comparison, our checklist focused on the biological event and COVID-19 disease. In 2004, Hopkins et al. developed a SARS preparedness checklist for state and local health officials covering 6 issues: legal authority and policy issues, surge capacity, communication, laboratory, surveillance, and preparedness in other agencies (18). Another report was published by Adini et al. in 2014 on the development of an evaluation tool for assessing the preparedness of medical facilities for epidemics and

pandemics. Five categories (evaluation dimensions) were described: policy and planning, medical management, personnel, communication and infrastructure (19).

We categorized measures based on the tasks of the ministry of health at the national level and on hospital activities. Our expert panel was multidisciplinary and had broad representation from physicians, managers, policy-makers and nurses, incorporating all possible aspects of hospital preparedness (Table 1). Our tool extends beyond a checklist of tasks to be conducted: rather it serves as a platform and model to facilitate inter-professional collaboration through joint meetings with the participation and collaboration of various experts. In addition, our tool follows an explicit and defined consensus process. Finally, our proposed checklist better follows a recommended checklist format. It prompts hospital providers to perform the steps necessary for successful COVID-19 patient management while allowing for other hospital services and other (non-COVID-19) inpatients to continue. We suggest using the checklist during the first and recovery phases and before facing a large number of patients to ensure proper management of suspected and confirmed patients.

Several limitations of this study should be considered. First, the current literature on COVID-19 is limited. Second, the checklist has not yet been tested. The next step of this research is to assess the checklist in a pilot study. We plan to collect baseline, process and outcome measures before and after the implementation of the checklist in a hospital.

## Conclusion

Standardization of preparedness measures is critical to the response of hospitals regarding the admission and management of COVID-19 patients. Our preparedness assessment checklist is an expanded tool that provides clear

**Table 2 Hospital preparedness assessment checklist for COVID-19**

Measure	Completed	In Progress	Not Started
<b>National level</b>			
<b>Coordination</b>			
Using the experiences of other countries			
Coordinate with insurance organizations to provide services to COVID-19 patients			
Provide legal mechanisms for the use of volunteers and insurance of volunteers			
Establishment of a network for the supply and management of drugs and medical equipment between hospitals			
<b>Referrals hospitals</b>			
Hospital rankings for providing services to COVID-19 patients: identify specific hospitals for infectious patients			
Appointment of referral hospitals for admission of COVID-19 patients			
Definition of reference system for COVID-19 patients to hospitals			
Equipping referrals hospitals with diagnostic and treatment facilities such as laboratory, radiology			
<b>Legal</b>			
Supplementary insurance of staff for treatment of COVID-19			
Insurance of hospital equipment and facilities			
<b>Hospital level</b>			
<b>Planning</b>			
Designing and implementation of hospital emergency operational response plan			
Evaluate and determine hospital capacity for future planning			
Continuous development and updating of Corona contingency plan based on guidelines according to hospital conditions			
Determining hospital management processes and guidelines when dealing with COVID-19 outbreak			
Preparing a list of hospital requirements: personnel, medical equipment, drugs and support items			
<b>Pre-hospital measures</b>			
Ambulance guidance by dispatch for transportation of COVID-19 patient to referral hospital			
Education of emergency medical services and dispatch staff on symptoms of COVID-19			
Ambulance notification after diagnosis of suspected and confirmed cases transported to hospital			
Hospital warning for admission of the transferred COVID-19 patients			
<b>Surveillance system</b>			
Rapid identification, early warning and reporting of suspected cases to hospital			
Monitoring and reporting of suspected health events by health centres			
Establishing communication channels and procedures between hospitals and health centres			
Appoint epidemiologist in hospital for activities related to early warning and surveillance			
<b>Prioritization and triage</b>			
Identify and screen for suspected and confirmed cases of COVID-19 based on the new guidelines			
Screening for patients with suspected COVID-19 at a separate hospital entrance			
Training of personnel responsible for triage based on new guidelines			
Control of acute respiratory symptoms, thermometry and other suspected symptoms of Corona infection from all clients at the entrance to the clinic or hospital			
Using telephone triage system for prioritizing patients			
<b>External cooperation and interaction of hospitals</b>			
Concluding a memorandum of understanding with military/neighbouring/private hospitals to use equipment and facilities and transferring patients if capacity is complete			

**Table 2 Hospital preparedness assessment checklist for COVID-19** (continued)

Measure	Completed	In Progress	Not Started
Preparation of coordination process with reference laboratories			
Preparation of coordination process with health centres			
Establish a channel of communication with hospitals involved with COVID-19 through video conferencing			
<b>Hospital incident command system</b>			
Development of hospital command centre into a secure and well-equipped place			
Holding continuous meetings of members of the command team in hospital command centre			
Appoint a specialist consultant in the system (infectious disease specialist, virologist, epidemiologist)			
Presence of other related organizations in the hospital command centre			
Communicate job descriptions to employees based on existing framework			
Continuous monitoring of the hospital situation and communication with the emergency operations centre			
Appoint a public officer to interact with the media as a spokesperson			
Determining the liaison officer and coordinating to communicate with out-of-hospital organizations			
<b>Surge capacity (physical space, staff, supplies and processes)</b>			
Field hospital set up in the yard or environs of the hospital for COVID-19 patients			
Set up a special emergency support unit for COVID-19 patients			
Clearance of elective patients in need of elective services			
Increase the number of special care and radiology beds as much as possible			
Rapid transfer of patients from the emergency room to other wards or hospitals			
Preparing and allocating other hospital wards to COVID-19 patients			
Adequate storage of water and food in the hospital based on the number of beds and staff			
Provide vital hospital equipment, including oxygen, water, electricity, food, Internet, telephone			
<b>COVID-19 patient management</b>			
Provide patient care following national and international guidelines			
Presence of counsellor and psychologist to strengthen morale of COVID-19 patients			
Provide continuous monitoring of vital signs (e.g. temperature, blood pressure, pulse, respiratory rate, level of consciousness, clinical signs of dehydration, shock) and oxygen saturation (pulse oximetry or blood gas analyses)			
Treatment and care of mild cases at home remotely			
Decontamination of COVID-19 patients' secretions			
Appropriate coverage of hospitalized COVID-19 patients to prevent transmission of infection			
Use of disposable personal items for COVID-19 patients such as sheets, pillows, glasses, food containers			
Perform medical interventions with safety precautions			
Perform final tests to ensure complete recovery			
Self-care training and patient follow-up after discharge from the hospital			
Determining the person responsible for answering the questions and concerns of the patient's companions			
Ability to communicate remotely with COVID-19 inpatients from the hospital			
<b>Non-COVID-19 patient management</b>			
Provide care and treatment services to other hospitalized patients			
Special facilities for vulnerable groups such as pregnant mothers and children and people with chronic diseases (haemodialysis and infusion services, chemotherapy)			
Complete separation of COVID-19 department			
Meeting restrictions on non-COVID-19 patients			

**Table 2 Hospital preparedness assessment checklist for COVID-19** (continued)

Measure	Completed	In Progress	Not Started
<b>Intensive care unit (ICU)</b>			
Continuous replacement and updating of equipment in ICU			
Ventilation system optimization based on standards of infectious patients' admission			
Availability of decontamination facilities for personnel			
Restrictions on movement in ICU			
<b>Drug and medical equipment management</b>			
Provide appropriate funding for the provision of drugs and medical equipment needed by COVID-19 patients			
Memorandum of understanding with pharmaceutical and medical equipment companies			
Controlling the quantities and expiration date of drugs and medical equipment consistently			
Continuous monitoring of drug reserves and medical equipment consumed and residual items			
Proper stockpiling and safe storage of drugs and medical equipment			
<b>Management of volunteers</b>			
Identify and use the capacity of volunteers and charities			
Organize volunteers and prevent hospital disruption			
Prevent the involvement of charities and volunteers in specialized activities			
Identifying and concluding a memorandum of understanding with associations and nongovernmental organizations			
Observance of safety protocols for employing non-specialist forces in the hospital			
Complete training of volunteer forces before starting work			
<b>Hospital personnel management</b>			
Practical measures for stress management of staff to reduce panic			
Supporting the families of hospital staff			
Supply of additional expert staff from outside the hospital (other hospitals, volunteers, retired staff)			
Reduce hospital administrative staff as much as possible when dealing with COVID-19			
Use the capacity of medical science students if needed			
Do not use personnel with chronic diseases			
Use occupational health mechanisms that ensure the well-being and safety of personnel during the response, including monitoring of exposed personnel			
Allocation of special benefits and privileges of personnel involved with COVID-19			
Treatment and care of staff with COVID-19 by the hospital until complete recovery			
Assign shifts and rest periods to personnel for recovery			
Determining a suitable place for the recovery of staff (hotel, guest house, etc.) if it is not possible to return home			
Providing psychosocial support services for the families of staff and patients			
<b>Security</b>			
Securing hospital staff and facilities			
Protecting patients' confidential documents and information			
Provide security for hospitalized patients			
Management of crowds and gatherings around the hospital			
<b>Nutrition and food health</b>			
Distribution of food in disposable containers			
Determining the person in charge of food distribution for COVID-19 patients			
Use the appropriate diet for COVID-19 patients			
Supervision of hospital kitchen hygiene			
Disinfection of food distribution equipment			

**Table 2 Hospital preparedness assessment checklist for COVID-19 (continued)**

Measure	Completed	In Progress	Not Started
<b>Research and documentation</b>			
Cooperation of the hospital to carry out research projects on COVID-19			
Hospital cooperation/consultation with basic science groups in medical universities, such as virology, health care management, health in disaster, epidemiology			
Collaborate in the implementation of clinical trial test research			
Documentation and registration of lessons learnt from exercises and exercise documentation to provide corrective programmes			
<b>Communication</b>			
Prevent rumours from the hospital			
Reassuring people to go to hospital if they have acute symptoms			
Define a dedicated COVID-19 code to alert the hospital			
<b>Quarantine</b>			
Establishment of places around the hospital to quarantine patients			
Coordinate with the established facilities of other institutions and organizations for quarantine			
Identify the proper place for quarantine such as a hotel, stadium, mosque, hall			
Plan to create an area to separate patients with respiratory symptoms			
<b>Exercises and education</b>			
Training of all department and staff in hospital on COVID-19			
Performing exercise with other organization involved to COVID-19 patients management			
Specific training of COVID-19 department staff (vitalizing measures, communication skill, soothing skills)			
Training of family staff about home quarantine and self-care			
Education and responding to people's questions through telephone and online systems			
Using telemedicine, media and cyberspace for education and sharing information			
Develop a comprehensive programme for continuous training of hospital staff			
Training of sampling methods and transportation of COVID-19 samples			
<b>Laboratory</b>			
Warning to laboratory before sending suspected COVID-19 specimens			
Non-involvement of the main laboratory of the hospital with COVID-19 samples			
Proper and safe transfer of suspected samples from the hospital to the laboratory following biosafety measures			
Training of biosafety and biosecurity principles for laboratory personnel			
Appoint a safety officer in each laboratory			
Continuous availability of basic laboratory testing (e.g. complete blood count, biochemistry profile, electrolytes, blood gas analysis, blood culture, sputum examination).			
<b>Personal protective equipment (PPE)</b>			
Provide quality and quantity of PPE (medical/surgical masks, N95/FFP2 respirators, gloves, gowns, eye protection)			
Assistant present when donning PPE			
Physical health of individuals to use PPE			
Funding for the provision and maintenance of PPE			
Control and testing of PPE before use			
Provide quality PPE in various sizes			
<b>Environmental health</b>			
Frequent control of hospital water quality			
Correct and regular chlorination of the hospital water tank			
Treatment of infectious hospital waste water			
Medical and infectious waste management			



**Table 2 Hospital preparedness assessment checklist for COVID-19 (concluded)**

Measure	Completed	In Progress	Not Started
Proper collection of sewage from ambulance washing			
Decontamination and disposal of waste from COVID-19 inpatients			
Availability of bins and regular discharge from the hospital			
Collection and separation of contaminated PPE			
Disinfection of hospital surfaces with appropriate disinfectants according to scientific principles			
Distribution of patient's food in disposable containers			
Disinfection of ambulance after transportation of COVID-19 patient			
<b>Prevention and control of hospital infection</b>			
Hold infection control team meetings regularly during COVID-19			
Identifying source of infection and high-risk points in the hospital in terms of transmission of pathogens to break the chain of infection			
Applying standard precautions measures by personnel for COVID-19 patients in all inpatient departments			
Performing proper hand hygiene procedures and hand washing by personnel, patients and visitors regularly			
Training in standard precautions and health principles to personnel, patients and visitors via posters, video clips, brochures, workshops			
Use of disposable medical and other devices during COVID-19 (e.g. stethoscopes, blood pressure cuffs, thermometers, food trays)			
Availability of handwashing facilities (alcohol-based hand sanitizer, water, soap, paper towels, alcohol-hand rub) in hospital			
Establishment of decontamination facilities in departments with COVID-19 patients			
Appropriate distance between hospital beds of COVID-19 patients			
Complete separation and isolation of COVID-19 department			
<b>Dead body management</b>			
Proper disinfection of corpses of COVID-19 victims			
Separation of corpse of COVID-19 victims from other corpses			
Use special covers for corpses COVID-19 victims			
Cultural and social considerations in the management of corpses			
Observance of health requirements during the transfer of corpses to prevent contamination			

and practical guidance for each hospital, it can be adapted for any hospital admitting COVID-19 patients and will aid interdisciplinary efforts towards successful hospital management. We suggest future studies be carried out to assess hospital preparedness using this the checklist

to improve the strengths and minimize the weaknesses of the hospital.

**Funding:** None.

**Competing interests:** None declared.

## Établissement d'une liste de contrôle sur la préparation des hôpitaux pour évaluer leur capacité à riposter à la pandémie de COVID-19

### Résumé

**Contexte :** Pendant une épidémie ou une pandémie, les systèmes de santé, et en particulier les hôpitaux, font face à de nombreuses difficultés dans la prise en charge des patients et la gestion du personnel. Les mesures de préparation des hôpitaux sont essentielles pour leur permettre de réagir efficacement à l'admission et à la prise en charge des patients atteints de COVID-19. La politique du ministère de la santé en matière de pandémies doit couvrir la capacité des hôpitaux à riposter face à la COVID-19.

**Objectifs :** Le but de la présente étude était d'élaborer une liste de contrôle pour évaluer l'état de préparation des hôpitaux en vue de riposter à la pandémie de COVID-19.

**Méthodes :** Nous avons recherché et examiné les données disponibles, y compris la littérature et les lignes directrices présentées par les organisations concernées. En raison de l'épidémie de COVID-19, les entretiens en présentiel n'ont pas

été possibles ; nous avons donc eu recours à des connexions téléphoniques et vidéo, des applications mobiles et au courrier électronique afin de mener des entretiens non structurés. L'établissement de la liste de contrôle a été réalisé par un groupe d'experts multidisciplinaire.

**Résultats :** Après avoir appliqué les avis des experts, la liste de contrôle finale comportait deux domaines principaux : des mesures au niveau national et hospitalier. La préparation au niveau national a été classée en trois aspects qui sont mis en œuvre par le ministère de la santé. La préparation au niveau hospitalier a été répartie en 24 sous-groupes.

**Conclusion :** La préparation des hôpitaux à l'admission et la prise en charge des patients atteints de COVID-19 est essentielle. Une liste de contrôle pour l'évaluation de la préparation des hôpitaux à la prise en charge de ces patients et la gestion hospitalière a été mise au point et appliquée. Notre liste de contrôle pour l'évaluation de la préparation est un outil élargi qui fournit des indications claires et pratiques pouvant être adaptées à tout hôpital qui admet des patients atteints de COVID-19.

## إعداد قائمة مرجعية لتأهب المستشفى لتقييم قدرته على الاستجابة لجائحة كوفيد-19

حسام سيدين، شانديز مصلحي، فاضله سخائي، محسن دولتي

### الخلاصة

الخلفية: تواجه النظم الصحية ولا سيما المستشفيات، خلال الأوبئة والجوائح، العديد من التحديات في معالجة المرضى وإدارة الموظفين. وتكتسي تدابير تأهب المستشفى أهمية بالغة في استجابة المستشفيات بفعالية لإدخال مرضى كوفيد-19 إلى المستشفيات وعلاجهم. ويجب أن تغطي سياسة وزارة الصحة للجوائح قدرة المستشفيات على الاستجابة لمرض كوفيد-19.

الأهداف: هدفت هذه الدراسة إلى إعداد قائمة مرجعية لتقييم تأهب المستشفيات للاستجابة لجائحة كوفيد-19.

طرق البحث: بحثنا عن الأدلة المتاحة وراجعناها، واشتمل ذلك على المؤلفات والمبادئ التوجيهية المقدمة من المنظمات المعنية. ونظرًا لتفشي كوفيد-19، لم يمكن إجراء المقابلات وجهاً لوجه، لذا استعملنا اتصالات الهاتف والفيديو وتطبيقات الهاتف المحمول والبريد الإلكتروني لإجراء مقابلات غير منظمة. وأعدت مجموعة خبراء متعددة التخصصات القائمة المرجعية.

النتائج: اشتملت القائمة النهائية، بناءً على آراء الخبراء، على مجالين رئيسيين: التدابير على الصعيد الوطني، والتدابير على صعيد المستشفى. وصنّف التأهب على الصعيد الوطني إلى ثلاثة مجالات تنفذها وزارة الصحة. وصنّف التأهب على صعيد المستشفى إلى 24 مجموعة فرعية.

الاستنتاجات: لا غنى عن تأهب المستشفى لإدخال مرضى كوفيد-19 إلى المستشفى وعلاجهم. وقد صُممت وأعدت قائمة مرجعية لتقييم تأهب المستشفى لمعالجة مريض كوفيد-19 وإدارة المستشفى. والقائمة المرجعية لتقييم التأهب هي أداة موسعة توفر إرشادات واضحة وعملية يمكن تكيفها مع أي مستشفى يقبل مرضى كوفيد-19.

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