

REGIONAL, NATIONAL, INTERNATIONAL REGULATIONS

AND

CLINICAL GUIDELINES

1. Existing regulations

- 1.1. WHO guidelines and recommendations
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1. Existing regulations

1.1. WHO guidelines and recommendations

The WHO guidelines and recommendations are the base of all national and regional decisions. National plans are related to the WHO guidelines. Therefore, the knowledge of the WHO guidelines and recommendations is key to navigate in the field of pandemic readiness.

A number of WHO documents have been reviewed to answer questions related to maintenance of health services in the field of acute and chronic cardiovascular disease.

The WHO has produced a number of documents to support national/regional health policies to cope with the COVID-19 pandemic (<u>https://www.who.int/emergencies/diseases/novel-coronavirus-</u>2019/technical-guidance-publications)

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9 November 2020 Fmergency Global Supply Chain System (COVID-19) of	ataloque

The WHO created a **universal classification of the pandemic phases**, and reported a recent table to summarise the main actions required for each phase of the pandemic.



WHO PANDEMIC PHASE DESCRIPTIONS AND MAIN ACTIONS BY PHASE

PHASE	DESCRIPTION	MAIN ACTIONS								
		PLANNING AND COORDINATION	SITUATION MONITORING AND ASSESMENT	COMMUNICATIONS	REDUCING THE SPREAD OF DISEASE	CONTINUITY OF HEALTH CARE PROVISION				
PHASE 1	No animal influenza virus circulating among animals have been reported to cause infection in humans.									
PHASE 2	An animal influenza virus circulating in domesticated or wild animals is known to have caused infection in humans and is therefore considered a specific potential pandemic threat.	Develop, exercise, and periodically revise national influenza pandemic preparedness and response plans.	Develop robust national surveillance systems in collaboration with national animal health authorities, and other relevant sectors.	Complete communications planning and initiate communications activities to communicate real and potential risks.	Promote beneficial behaviours in individuals for self protection. Plan for use of pharmaceuticals and vaccines.	Prepare the health system to scale up.				
PHASE 3	An animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disazes in people but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks.									
PHASE 4	Human to human transmission of an animal or human-animal influenza reassortant virus able to sustain community-level outbreaks has been verified.	Direct and coordinate rapid pandemic containment activities in collaboration with WHO to limit or delay the spread of infection.	Increase surveillance. Monitor containment operations. Share findings with WHO and the international community.	Promote and communicate recommended interventions to prevent and reduce population and individual risk.	Implement rapid pandemic containment operations and other activities; collaborate with WHO and the international community as necessary.	Activate contingency plans.				
PHASE 5	The same identified virus has caused sustained community level outbreaks in two or more countries in one WHO region.	Provide leadership and	Actively monitor and assess	Continue providine updates to general	Implement individual.	Implement				
PHASE 6	In addition to the criteria defined in Phase 5, the same virus has caused sustained community level outbreaks in at least one other country in another WHO region.	coordination to multisectoral resources to mitigate the societal and economic impacts.	the evolving pandemic and its impacts and mitigation measures.	public and all stakeholders on the state of pandemic and measures to mitigate risk.	societal, and pharmaceutical measures.	contingency plans for health systems at all levels.				
POST PEAK PERIOD	Levels of pandemic influenza in most countries with adequate surveillance have dropped below peak levels.	Plan and coordinate for additional resources and capacities during possible future waves.	Continue surveillance to detect subsequent waves.	Regularly update the public and other stakeholders on any changes to the status of the pandemic.	Evaluate the effectiveness of the measures used to update guidelines, protocols, and algorithms.	Rest, restock resources, revise plans, and rebuild essential services.				
POST PANDEMIC PERIOD	Levels of influenza activity have returned to the levels seen for seasonal influenza in most countries with adequate surveillance.	Review lessons learned and share experiences with the international community. Replenish resources.	Evaluate the pandemic characteristics and situation monitoring and assessment tools for the next pandemic and other public health emergencies.	Publicly acknowledge contributions of all communities and sectors and communicate the lessons learned; incorporate lessons learned into communications activities and planning for the next major public health crisis.	Conduct a thorough evaluation of all interventions implemented.	Evaluate the response of the health system to the pandemic and share the lessons learned.				

World Health

1.1.1 The root document is the **WHO Guidelines on Infection Prevention and Control of Epidemic-and Pandemic-Prone Acute Respiratory Infections in Health Care** (WHO Pandemic Prevention Regulations.pdf, published in 2014):



The WHO guidelines for infection prevention and control of epidemic - and pandemic - prone acute respiratory infections in health care provide recommendations, best practices and principles for non-pharmacological aspects of **infection prevention and control (IPC)** for acute respiratory infections (ARI) in health care, with special emphasis on ARI that can present as epidemics or pandemics. The guidelines are intended to help policy-makers, administrators and healthcare workers to prioritise effective IPC measures.

Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care



The most relevant chapters for We CARE are the following:

- 2.2 Recommendations for administrative control strategies for health care facilities
- 2.3 Recommendations for engineering and environmental control for acute respiratory infection
- 3 Health care facility preparedness planning for acute respiratory infection
- Annex D Sample health care worker influenza-like illness monitoring form for workers exposed to patients with ARIs of potential concern
- Annex H Surge capacity: personal protective equipment needs of healthcare facilities during epidemics or pandemics

The WHO guidelines are designed in order to deliver guidance for preventive actions and reactive measures in case of pandemics.

Among the most important recommendations, WHO suggest to **implement or strengthen infection prevention control committees at facility level and ensure that IPC are supplied**. This IPC committees are essential both for prevention and reaction to infection outbreaks. The guidelines also put particular emphasis on the need for the following reactions:

- Cohorting of patients and health care workers in case of pandemic active phase
- Occupational health program (vaccination of health workers (influenza and other ARI), monitoring of health workers measures in case of symptomatic health workers)
- Create MDT within the health care facilities to develop a preparedness plan simulations
- Establish liaison with other levels of health care system
- Plan for surge capacity
- Have a communication policy

For any acute respiratory infection (ARI), the WHO strongly suggest the concept of **cohorting**:

Consider the use of patient cohorting – that is, place patients infected or colonised with the same laboratory-confirmed pathogens in the same designated unit, zone or ward (with or without the same staff) – to reduce transmission of ARI pathogens to health care workers and other patients



(conditional recommendation, low to moderate quality of evidence) (51) (Annex K, Table K.4). This relates to the establishment of COVID wards and COVID hospitals.

For patient-care units that house patients with ARIs of potential concern, wherever possible, assign health care workers who are experienced with IPC for ARIs and outbreak settings. Also, if possible, these workers should not "float" or be assigned to other patient-care areas.

Encourage the use of medical masks by patients with ARI during transport or when care is necessary outside of the isolation room or area

To ensure protection of health care workers, as well as to prevent lack of services due to sickness leave of health care workers, the WHO suggest a strong implementation of health care worker vaccination and occupational health: vaccinate health care workers caring for patients who are at higher risk of severe or complicated influenza disease, and to keep a register of health care workers who have provided care for patients with ARIs of potential concern, for contact tracing (138). Consider developing methods to provide additional support to health care workers taking care of patients with ARIs of potential concern (e.g., emotional and family support), as necessary.

The WHO is also delivering guidance on how to manage infected health care workers:

Advise workers to take the following actions if they develop a fever > 38 °C or symptoms of ILI (93, 144): stop work immediately or do not report to work; limit interactions with others; exclude themselves from public areas; and notify management or the team dealing with IPC and occupational health that they are symptomatic and have had contact with patients with an ARI of potential concern.

To support health care worker prevention for influenza-like illness, the WHO proposed monitoring form for workers exposed to patients with ARIs of potential concern.

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ocation:		_	
of exposure (list all, use back	of page if necessa	rv): / /	1 1
f contact with patient with AR	of potential concer	n, with patient's e	nvironment, or with
	or potential control	in the particular	
e following personal protectiv	e equipment (PPE)	used:	
	Yes	No	Don't know
Gown			
Gloves			
Particulate respirator			
Medical mask			
Eve protection			
Other			- IT
(Please specify)			
(i lease specify)			
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r non-occupational exposures	(e.g. exposure to a	anyone with sever	e acute febrile resp
/ non-occupational exposures	s (e.g. exposure to a	anyone with sever	e acute febrile resp
v non-occupational exposures	s (e.g. exposure to a e a day, in the mom	anyone with sever ing (AM) and ever	e acute febrile resp ning (PM), for 10 d
r non-occupational exposures check your temperature twice a patient infected with an ac	s (e.g. exposure to a e a day, in the mom ute respiratory dise	ing (AM) and ever ase of potential co	ning (PM), for 10 d
v non-occupational exposures check your temperature twick r a patient infected with an ac re), and also monitor yoursel	s (e.g. exposure to a e a day, in the mom ute respiratory dise f for any of the follow	ing (AM) and even ase of potential co wing influenza-like	e acute febrile resp ning (PM), for 10 d oncern (including 1 e illness (ILI) sympt
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The WHO delivered recommendations for engineering an environmental control for acute respiratory infection.

- 1. Patient placement should be planned according to:
 - the presence of epidemiological and clinical clues of ARIs of potential concern;
 - the precautions undertaken, in addition to standard precautions, for the suspected or confirmed causative agents; and
 - the availability of facilities.
- 2. If possible, situate rooms used for isolation of ARIs of potential concern (i.e. single rooms) in an area that is clearly segregated from other patient-care areas

The WHO suggest the design of triage and waiting areas:

Ensure that triage and waiting areas are adequately ventilated (1-3). Organise the space and the processes to allow for spatial separation (at least 1m) between patients waiting to be seen (51), and undertake rapid triage of patients with infection prevention and control of epidemic - and pandemic - prone acute respiratory infections and acute febrile respiratory diseases. Screen patients for risk factors associated with ARIs of potential concern.

The WHO suggest the establishment of IPC committees in all health care facilities:

The SARS outbreak of the early 2000s, and the influenza pandemic (H1N1) in 2009, highlighted the importance of preparedness to reduce the spread of potentially epidemic or pandemic ARIs. Health care facilities should prepare for communicable disease emergencies by (185-188):

- organising permanent IPC activities, surveillance and training of dedicated personnel and clinical staff;
- creating a multidisciplinary group within the health care facility to develop a preparedness plan;
- developing a preparedness plan in the health care facility;
- performing an evaluation plan and monitoring exercise, and updating the plan as necessary; and
- strengthening liaison with other levels of the health care system and public health authorities.
- plan for surge capacity according to the estimated impact of a potential pandemic on health care (194-198). (Annex H provides information on how to do this)
- identify the supplies and infrastructures needed to implement IPC measures.
- outline the limits of the health care facility's surge capacity to provide care, and suggest thresholds at which alternative sites for provision of health care (i.e., off-site care facilities) should be implemented (194-198).

Communication: the WHO clearly suggest the development of a risk communication policy to cover communication (199).



The 2014 WHO document had unclear recommendations on PPE:

A recent systematic review explored resource use as well as the economic implications (e.g., total cost and cost–effectiveness ratios) associated with physical barriers (e.g., masks, gowns and gloves) to interrupt or reduce the spread of respiratory viruses (207). The researchers concluded that, while the use of physical interventions to interrupt or reduce the spread of respiratory viruses increases during epidemics and pandemics, PPEs appear to be an economically attractive option in reducing the burden of illness associated with respiratory viruses, due to the relatively low costs of these interventions. The economic benefits rise when transmission rates and fatality rates are high. However, few studies were available for review, and the overall quality of data was low.

Assumptions to be taken into consideration include those concerning the use of PPE, expected impact of an epidemic (e.g., proportion of the population diseased, seeking care or being hospitalised), organisation of health services (e.g. frequency of encounters between health care workers and patients), recommended IPC precautions and duration of the epidemic. The rest of this annex discusses considerations that health care facilities can use in making assumptions about supplies of PPE for surge capacity.

And therefore, suggested that:

Each health care facility should follow the national assumptions, and adapt to its local policies and rationale.

Several countries have developed planning assumptions (examples of national pandemic preparedness plans are available at http://www.euro.who.int/en/what-we-do/health-topics/communicable-diseases/influenza/country-work/national-plans).

1.1.2. To support health politics, the WHO published the document **Considerations for Public Health and Social Measures** (WHO-2019-nCoV-Adjusting_PH_measures-2020.2eng.pdf)

The key principles are the following:

- Measures with the highest level of acceptability and feasibility, proven effectiveness – and which minimise the negative consequences on health and well-being of all members of society and the economy – should be considered first.
- Delays in implementation of measures have been linked to increased mortality and the need for more stringent measures to regain control.

Considerations for implementing and adjusting public health and social measures in the context of COVID-19

Interim guidance 4 November 2020



Key points

- Public health and social measures (PHSM) have proven critical to limiting transmission of COVID-19 and reducing deaths.
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 The decision to introduce, adapt or lift PHSM should be based primarily on a situational assessment of the intensity of transmission and the capacity of the health system to respond, but must also be considered in light of the effects these measures may have on the general welfare of society and individuals.
- Indicators and suggested thresholds are provided to gauge both the intensity of transmission and the capacity of the health system to respond; taken together, these provide a basis for guiding the adjustment of PHSM. Measures are indicative and

must be weighed against the impacts these measures have on societies and individuals. Considerations include impact on the economy, security, mental health and psychosocial well-being, human rights, food security, socioeconomic disparities, continuity of health and public health porgammes, treatment and management of conditions other than COVID-19, genderbased violence, and public sentiment and adherence to PHSM. The overall health and wellbeing of communities should therefore be at the forefront of considerations when deciding on and implementing PHSM.

PHSM include personal protective measures (such as hand hygiene, respiratory etiquette, mask wearing); environmental measures (such as cleaning, disinfection, ventilation), surveillance and response measures (including contact tracing, isolation and quarantine); physical distancing measures (e.g. limiting the size of gatherings, maintaining distance in public or workplaces, domestic movement restrictions); and international travel-related measures.¹ PHSM act in concert,



- Protection of vulnerable populations (including those clinically at risk for severe disease [aged >60 years and/or with comorbidities that increase risk of serious COVID-19 disease]), should be central.
- The infodemic4 that has emerged from a COVID-19 information and disinformation overload should be managed at all stages of the response by providing the right information at the right time to the right people through trusted channels (e.g., community and faith leaders, family doctors and other influential members of society).

In particular, there is no mention in this document of the need to interrupt elective interventions during any phase of the pandemic.

	Response capacity			Situational Level	Considerations for implementation of PHSM by Situational Level*			
Transmission level	Adequate	Moderate	Limited	Situational Level 2: Low	At this level, measures should be applied to limit the number of social encounters in the community			
No cases	0	0	1	risk of community	may be required to control transmission.			
Imported/Sporadic cases	0	1	1	clusters. Additional measures may be required to	In addition to measures on emergency preparedness and response and surveillance, individual precautionary measures and risk communications, authorities may consider implementing the			
Clusters of cases	1	1	2	control transmission;	following measures: • Education and interference of the following and control (IPC) measures in place			
Community - CT1	1	2	2	social and economic	 Businesses remain open with safety measures in place, with teleworking encouraged as much as accelled. 			
Community - CT2	2	2	3	activites can sur se minea	 Individual should apply individual precautionary measures and behaviours such as hand hydrogeneous disputs a traving home if usually usering a mark where appropriate physical 			
Community - CT3	2	3	3		distancing and avoiding the '3C's' – closed spaces, crowded places and close-contact settings.			
Community - CT4	3	3	4		 If required, further emphasis may be needed on protecting the most clinically vulnerable, through strict application of PPE and IPC measures being the deutyaillance and managing 			
					visits in long term care and other residential facilities.			
				Situational Level 3: Community transmission with limited additional capacity to respond and a risk of health services	At this level, a strengthening of all PHSM is needed to avoid more stringent restrictions on movement and other related measures applied under level 4. All individuals should reduce their social contacts, and some activities may need to close while allowing for essential services and in particular schools to remain open.			
				larger combination of	In addition to measures on emergency preparedness and response and surveillance, individual precautionary measures and risk communications, authorities may consider implementing the			
				in clasures may need to be put in place to limit transmission, manage cases, and ensure epidemic control.	 Closure of non-essential businesses or remote working as much as possible. Individual should apply individual precautionary measures and behaviours such as hand hygiene, cough etiquette, staying home if unwell, wearing a mask where appropriate, physical distancing and avoiding the '3C's' – closed spaces, crowded places and close-contact settings. Consider limiting in-person university teaching, and institute e-learning. 			

A number of **national plans** are available online on the WHO website:

For plans prepared before 2009 pandemic: <u>https://www.euro.who.int/en/health-</u> topics/communicable-diseases/influenza/pandemic-influenza/pandemic-preparedness/nationalpreparedness-plans/publicly-available-plans-prepared-before-2009-pandemic

and surveillance measures in place as long as the local context allows. Continuity of education for children for their overall well-being, health and safety should be at the forefront of all

relevant considerations and decision

For plans prepared after 2009 pandemic: <u>https://www.euro.who.int/en/health-</u> <u>topics/communicable-diseases/influenza/pandemic-influenza/pandemic-preparedness/national-</u> <u>preparedness-plans/publicly-available-plans-prepared-after-2009-pandemic</u>

Most of the plans have not been updated.



Plans published before 2009	
Armenia 2006	Romania 2009
Austria 2009	Slovenia 2006
Azerbaijan 2008	Spain 2996
Belgium 2006	Commission of the European Communities 2004
Bulgaria 2006	WHO-ECDC 2009
Croatia 2005	
Estonia 2005	
Greece 2009	
Hungary 2009	
Ireland 2009	
Israel 2007	
Italy 2007	
Luxemburg 2006	
Montenegro 2005	
Poland 2009	
Portugal 2006	

1.1.3. Very relevant to the objectives of We CARE is the **Survey on Continuity of Essential Health Care Services during the Pandemic** (Survey done in May-June 2020, and published on 27.8.2020; file: WHO-2019-nCoV-EHS_continuity-survey-2020.1-eng)

The WHO conducted a key informant survey among ministry of health officials in five WHO regions between May and July 2020 to assess the impact of the COVID-19 pandemic on up to 25 essential health services in countries. Questionnaires were sent to 159 countries and 105 responses were received (66% response rate).

In general, **disruptions of essential health services** were reported by nearly all countries, and more so in lower-income than higher-income countries.

The causes of the disruptions were a **mix of demand and supply factors**. On the demand side, 76% of countries reported reductions in outpatient care attendance. Other factors, such as lockdowns hindering access and financial difficulties during lockdown were also mentioned. On the supply side, the most commonly reported factor was cancellation of elective services (66%).

While some services, such as dental care and rehabilitation, may have been deliberately suspended by government protocol (half or more countries reported that government policies had limited or suspended outpatient services, inpatient services and community-based care), the disruption of many of the other services will have a potentially harmful impact on population health in the short, medium and long term. For example, potentially life-saving emergency services were disrupted in



almost a quarter of countries. Further work is needed to quantify and understand better the potential impact of such disruptions.

The most commonly reported factor on the supply side was cancellation of elective services (66%). Other factors reported by countries included staff redeployment to provide COVID-19 relief (49%), insufficient personal protective equipment available for health care providers (44%), unavailability of services owing to closures of services or health facilities (33-41%), and interruptions in the supply of medical equipment and health products (30%).

Many countries have already started to implement WHO-recommended strategies to mitigate disruptions to services, such as triaging to identify priorities, shifting to online patient consultations, changes to prescribing practices and supply-chain strategies, and refocusing public health information communications. Only 14% of countries reported removal of user fees, which may negatively affect access to services during this period. Documentation and learning about which strategies work best in different settings and throughout different stages of the pandemic are urgently needed.

This survey also highlights the need to improve the understanding of the potential impact of disruptions on morbidity and mortality, and to weigh carefully the benefits and risks of pursuing different mitigation strategies.

Documentation and learning about what works in different settings in terms of mitigation strategies during the different phases of the pandemic are urgently required.

These are some of the outcomes of the survey:

 80% of countries had defined an essential health service package prior to the outbreak, and 66% of all countries had identified a core set of services to be maintained during the COVID-19 pandemic. Only 55% of the 105 countries had allocated additional government funding to assure essential health services. This response was more common in uppermiddle and higher-income countries.





Essential health services to be maintained during COVID-19 defined in national plan (%);

Additional government funding allocated for maintaining essential health services during COVID-19 (%)

National essential health services package defined prior to COVID-19 (%);



2. The services affected were mostly outpatient and community care.



Fig. 2. Government policies in relation to service delivery platforms (*n* = 105)

3. Disruption of essential care services was related to the income of the country

Fig. 3. Percentage of countries reporting at least partial disruption in at least









4. According to the WHO, non-communicable diseases were very affected by COVID



Fig. 5. Percentage of countries reporting disruptions across entire service

All services at least partially disrupted (%);

No services disrupted (%)

Interestingly, cardiovascular interventions are not an indicator in this report.



Fig. 6. Percentage of countries reporting disruptions in emergency and critical care services

Partial disruption (%);

Severe disruption (%)



5. According to the WHO, a mix of demand and supply side factors are responsible for disruption of services.

As regards with **demand**, the situation differs from state to state, with partial and no disruption, depending on the program/service and region:

- patients not presenting to outpatient care (76%)
- perceptions that government or public transport lockdowns were hindering access (48%)
- perceptions that financial difficulties during the outbreak were affecting attendance (33%).
- a number of countries also noted fear and mistrust as "other" understood reasons for changes in utilisation.

As regards with **supply**, the main reasons for the reduction of essential health care services:

- cancellation of elective care (66%)
- health workforce difficulties: clinical staff redeployment to provide COVID-19 relief (49%) or
- insufficient staff to provide services (29%)
- unavailability of services: closure of screening programmes (41%), closure of disease-specific
- outpatient consultation clinics (35%), closure of outpatient services per government directive (33%),
- in-patient beds not available (9%)
- lack of supplies: reduced stock of health products (30%) and
- insufficient personal protective equipment for health care providers (44%)
- changes in treatment policies (33%)



Fig. 10. Reasons for service disruptions (n = 97)



National and regional policy makers have tried to cope with these challenges with the following reactions:



But probably the strongest obstacle for prioritisation of CV disease services (both acute and chronic) is the **lack of recognition of the primary role of CV disease services** among the essential health care services list from the WHO.

CV prevention, diagnostic and interventions are very little represented in the WHO documents, and usually grouped with other non-communicable diseases. As an example, in the questionnaire sent to the national health authorities, the acute coronary syndromes are grouped with asthma... while



high attention has been put into other services like cancer, dental, or infectious disease (WHO branding).

			[] Suspended [] DK
Whio servi due	Which of the following services have been disrupted	Family planning and contraception	[] Completely disrupted [] Partially disrupted [] Not disrupted [] DK
	due to COVID-19?	Antenatal care	[] Completely disrupted [] Partially disrupted [] Not disrupted [] DK
		Facility based births	[] Completely disrupted [] Partially disrupted [] Not disrupted [] DK
		spraying (IRS)	
		Implementation of seasonal malaria chemoprevention campaigns (SMC)	[] Completely disrupted [] Partially disrupted [] Not disrupted [] DK
	NCD diagnosis and treatment (e.g. hypertension, diabetes, asthma, chronic obstructive pulmonary disease, coronary artery disease)	[] Completely disrupted [] Partially disrupted [] Not disrupted [] DK	
		Treatment for mental health disorders	[] Completely disrupted [] Partially disrupted [] Not disrupted [] DK
	Cancer diagnosis and treatment	[] Completely disrupted [] Partially disrupted [] Not disrupted [] DK	
		Dental services	[] Completely disrupted [] Partially disrupted [] Not disrupted [] DK

24-hour emergency room/unit	[] Completely disrupted [] Partially
services (e.g. myocardial	disrupted [] Not disrupted [] DK
infarction/arrythmia/stroke,	
diabetic ketoacidosis, asthma/	
chronic obstructive pulmonary	
disease, sepsis and serious injury)	

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1.1.4 Based on the results of the survey, the WHO delivered a **recommendation document to maintain essential health care services** (file WHO-2019-nCoV-essential_health_services-2020.2-eng).

Maintaining essential health services: operational guidance for the COVID-19 context



In the early phases of the COVID-19 outbreak, many health systems have been able to maintain routine service delivery in addition to managing a relatively limited COVID-19 case-load. As demands on systems have surged and health workers themselves have increasingly been affected by COVID-19 infection and the indirect consequences of the pandemic, strategic adaptations have become urgent to ensure that limited public and private sector resources provide the maximum benefit for populations. Countries are making difficult decisions to balance the demands of responding directly to the COVID-19 pandemic with the need to maintain the delivery of other essential health services. Establishing safe and effective patient flow (including screening for COVID-19, triage and targeted referral) remains critical at all levels. Many routine and elective services have been suspended, and existing delivery approaches are being adapted to the evolving pandemic context as the risk-benefit analysis for any given activity changes. When the delivery of essential health services comes under threat, effective governance and coordination mechanisms, and protocols for service prioritisation and adaptation, can mitigate the risk of outright system failure.

As the outbreak is brought under control and restrictive public health measures are gradually eased, some adaptations in service delivery may need to be reversed, others continued for a limited time, and yet others that are found to be effective, safe and beneficial can be incorporated into routine post-pandemic practice. The course of the outbreak is likely to wax and wane, and the strategic



response will need to be dynamic and calibrated. Decision-makers should anticipate the need to start, stop and restart adaptations. Decisions should be aligned with relevant national and subnational policies and should be re-evaluated at regular intervals.

Successful implementation of these strategic shifts will require the active engagement of communities and public and private stakeholders, specific measures to ensure access for socially vulnerable populations, transparency and frequent communication with the public and a high degree of cooperation from individuals.

The document is reporting that the national COVID-19 responses usually involve **establishing an incident management team (IMT)**. A designated focal point for essential health services should be a member of this IMT and act as a liaison with essential health service programmes.

This member of the IMT should be aware of the importance of CV disease in Europe (as compared to other health problems, more relevant in other areas of the world).

National COVID-19 responses usually involve establishing an incident management team (IMT). A designated focal point for essential health services should be a member of this IMT and act as a liaison with essential health service programmes. In the phases of the epidemic when the COVID-19 case-load can be managed without compromising routine services, this focal point can coordinate the repurposing of human, financial and material resources and mobilize additional resources. During these phases, the focal point works with programmes to optimize protocols for modifying and maintaining essential health services, while ensuring that infection prevention measures are strengthened to guarantee safe service delivery. When routine services are compromised, the designated focal point coordinates the activation of protocols for phased reprioritization and adaptation of services, as described in the sections below. Implementation should be coordinated with the relevant authorities at the national and subnational levels and with public and private service providers. As COVID-19 transmission is controlled and demand related to the outbreak declines, the focal point will coordinate the gradual, safe restoration of services are likely to repeat, with the need to start, stop and restart service adaptations.

The key actions to adjust governance and coordination mechanisms to support timely action are:

- Designate a focal point for essential health services as a member of the COVID-19 IMT.
- Establish channels of coordination and communication among the COVID-19 IMT, essential health service
- Programme managers in public and private sector service providers.
- Establish (or adapt) mechanisms and protocols to govern the delivery of essential health services in coordination with response protocols, including for strengthening infection prevention measures.
- Establish triggers or thresholds for phased reallocation of capacity from routine comprehensive services towards essential services, and for the re-expansion and transformation of services as the pandemic evolves.
- Establish mechanisms to monitor the ongoing delivery of essential health services and incorporate data into IMT decision-making (see Section 1.8).



• Establish or maintain coordination mechanisms between finance and health authorities to ensure financing for essential health services and facilitate responsive adaptation, restoration and transformation of services (see Section 1.9).

The WHO suggest to **prioritise essential health services** and adapt to changing contexts and needs.

To avert indirect morbidity and mortality and prevent acute exacerbations of chronic conditions when services are disrupted, countries should identify context-relevant essential health services that will be prioritised for continuation during the acute phase of the COVID-19 pandemic. High-priority categories include:

- essential prevention and treatment services for communicable diseases, including immunisations;
- services related to reproductive health, including during pregnancy and childbirth;
- core services for vulnerable populations, such as infants and older adults;

• provision of medications, supplies and support from health care workers for the ongoing management of chronic diseases, including mental health conditions;

• critical facility-based therapies;

• management of emergency health conditions and common acute presentations that require timesensitive intervention; and

• auxiliary services, such as basic diagnostic imaging, laboratory and blood bank services.

Interventional procedures are not covered by the document, but some **guidance can be derived from surgical services**:

The suspension of surgical services, for example, is likely to create substantial backlog in most systems, with some procedures that were initially deemed elective becoming progressively more urgent. Given the health workforce requirements, the necessity for close contact and the associated material resource needs (including operating theatres and extensive personal protective equipment [PPE]), restoration of operative services will require a coordinated and well-planned strategy. Planning should account for the possibility of prolonged periods of increased volume and urgency relative to baseline conditions.

The key actions to make such priorities:

- Generate a country-specific list of care essential health services based on the context and supported by WHO guidance and tools.
- Address the particular needs of marginalised populations, such as indigenous peoples, migrants and refugees, sex workers and the homeless, among others.
- Identify routine and elective services that can be suspended or relocated to less affected areas.
- Create a roadmap for progressive reduction and restoration of services as pressure on the health system surges
- And recedes (see Section 1.3).
- Anticipate restoring suspended services based on changing needs as public health measures are gradually eased and address any new barriers to access.



- Ensure the continuity of risk reduction and mitigation measures for COVID-19 transmission, strengthening IPC programmes to implement priority measures, in all health service delivery programmes.
- Ensure the development of associated systems components through the strategic actions described in the sections below.

At the health care facilities, the WHO suggest that:

The settings where specific services are delivered may need to be modified for many reasons, including:

• existing service locations may be unavailable because they have been designated for the exclusive care of people affected by COVID-19, or because they cannot safely provide routine services;

• travel to health facilities may be disrupted by movement restrictions, including disruptions of public transport;

• a need to limit facility-based encounters, including non-essential hospital admissions, for reasons of safety and capacity;

• a shift of the primary venue for acute care services to hospital emergency units to concentrate services in a setting suited to high-volume, high-acuity care that is available 24 hours per day.

Interestingly, the WHO document suggest the **implementation of networks of care** (similar to the recent position statement for centre of excellence for valve disease):

Health systems with existing models of integrated primary care that include linkages across levels of care and with homecare and long-term care facilities can use their existing system architecture to re-map referral pathways and ensure timely access to needed services. In all systems, adaptations made in the pandemic context may provide a foundation for the transformation and integration of primary care services.

In general, the key actions suggested by the WHO are:

- Conduct functional mapping of health facilities for acute, chronic and long-term care, including those in public, private (commercial and non-profit) and military systems. This is a shared action with pillar 7 of the COVID-19 strategic preparedness and response plan: operational planning guidelines to support country preparedness and response (4).
- Taking into account repurposed facilities, ensure that 24-hour acute care services are available at designated first-level hospital emergency units (or similar) and ensure public awareness of these changes.
- Reorient referral pathways and ensure changes are communicated to providers and the public. Coordinating primary care support, adjust hospital admission and discharge protocols as appropriate and safe.
- Limit duration of in-patient stays.
- Use available technologies and associated regulations to facilitate the shift of clinical encounters to digital platforms and to support self-care interventions wherever appropriate (see Section 1.12).



- Redesign chronic disease management strategies around limited or adapted provider encounters and increased self-management, while ensuring access to necessary medications and supplies.
- Integrate services across disease programmes at the point of service delivery where appropriate to limit the number of facility-based encounters.
- Adapt outreach delivery of services, including availability of medicines at pharmacies, where appropriate.
- Document adaptive responses (e.g., teleconsultation, integrated primary care, remapping of referral pathways) implemented during the pandemic phase that should be considered for longer-term integration into health system operations.

Another important action is to **establish safe and effective patient flow** at all levels (screening, triage, and targeted referral).

Because people present for care prior to having a diagnosis, people with and without COVID-19 will initially access the health system in the same way. To guarantee the safe delivery of services, the minimum requirements for IPC should be enforced throughout the health system, in particular at frontline care sites: primary care centres, clinics and hospital emergency units and ad hoc community settings that have been designated as care sites. Adherence to standard precautions for all patients at all times should be strengthened, particularly regarding distancing, hand hygiene, the appropriate use of PPE, and surface and environmental cleaning and disinfection.

Disseminate information to **inform the public and guide safe care-seeking behaviour** (see Section 1.10).

- Ensure that minimum requirements for IPC, including implementation of standard precautions, are in place in all facilities throughout the health system.
- Ensure adequate IPC supplies to guarantee the safe delivery of services.
- Establish screening of all patients for COVID-19 on arrival at all sites using the most up-todate guidance and case definitions (11).
- Establish mechanisms for isolating patients in all care sites using the most up-to-date COVID-19 guidance.
- Ensure acuity-based triage at all sites providing acute care.
- Schedule appointments, limit visitors and manage patient flows to ensure distancing, avoid crowding in waiting areas, and create unidirectional flow of patients and staff.
- Establish clear criteria and protocols for targeted referral and counter-referral pathways within the public system and among public and private providers.

As far as communication is concerned, effective communication and community engagement are essential to maintaining trust in public health authorities and ensuring appropriate care-seeking behaviours.

While provider encounters should be limited where appropriate, in keeping with physical distancing recommendations, people should not delay seeking care for time-sensitive conditions and should maintain ongoing therapies for chronic conditions to avoid complications and acute exacerbations. Clear messages about when and where to seek care, relevant policies about the suspension of user



fees, and reassurance about the safety of care are essential and should be mainstreamed as part of the outbreak response communication strategy.

Public messaging should identify sources for information and assistance with emerging issues of public health concern, such as violence and substance abuse, as well as information about activities to promote health. The effective use of digital platforms can rapidly expand the reach of health promotion messaging to target audiences

Finally, the document is focusing on **specific issues related to non-infectious diseases** (including CV), again with an unacceptable lack of focus on the unicity of CV disease in Europe.

Evidence (58) suggests that people with cardiovascular disease (CVD) or diabetes, as well as those with CVD risk factors, such as hypertension and obesity, are at increased risk of severe disease and death from COVID-19, and this poor prognosis seems to be heightened with advanced age. In this subgroup, early clinical evaluation is warranted for any suspect symptoms

The nature of COVID-19 may make some NCDs more difficult to recognize. For example, COVID-19 has been associated with cardiovascular complications that can make the accurate diagnosis of myocardial infarction more difficult.

Programme activities	Modifications for safe delivery of services	Transition towards restoration of activities*		
		March and a loss for some soul from		
Care for ACS and	Maintain emergency care systems and protocols for managing ACS and stroke.	Monitor delays in care-seeking		
STOKE	Modify ACS and stroke networks (hub and spoke + differentiated pathways), according to patient's COVID-19 status.	ambulance triage protocols as needed.		
	Maintain time-sensitive interventions (e.g. thrombolysis, thrombectomy).	At the facility or stroke-network		
	Develop safe options for rehabilitation during inpatient care.	level, monitor survival rates,		
	Recognize potential medicine interactions and cardiovascular toxicities of several off-label medicines used for COVID-19 treatment.	patients' functional recovery and variations in stroke services and interventions: adjust pathways		
	Prioritize follow-up consultations with stroke survivors because they are at higher	and improve care as needed.		
	risk of pneumonia.	Consider developing a contingency plan for upgrading facilities and ambulances with, for example, diagnostic tools, treatment kits and relevant protocols, and providing training to personnel to activate the protocol for ACS or stroke with at-distance support from the relevant clinical network.		
		Review regulations and protocols for communicating with the patient and family members and ensure they include, for example, phone calls, SMS text messaging and video calls.		



1.2. Selected national and regional political plans

Selected national and regional political plans have been collected and stored in the file repository, but most of these publications are in native language, therefore, no structured work has been further carried on in this regard. The collected regulations are the following (the other publications are not available in English): EU, UK, Italian, French, German, Switzerland,

According to the adherence of the regional systems to the global WHO recommendations, the 2019 Global Health Security Index, which ranks 195 countries on health security, created a map of global health security and preparedness. It reveals that, while there were top performers, health care systems around the world on average are fundamentally weak—and not prepared for new disease outbreaks.



Ranking Global Pandemic Preparedness

This pre-COVID-19 report found that no country was truly prepared to manage a pandemic

B 0 ž. + Ö The Global Health Security Index measures the state DETECTION AND REPORTING RAPID RESPONSE HEALTH SYSTEM COMPLIANCE WITH GLOBAL NORMS RISK ENVIRONMENT of health security around PREVENTION Early detection and reporting for epidemics of potential international concern Commitments to improving national capacity, financing plans, and adhering to global norms Overall risk environment and country vulnerability to biological threats Prevention of the emergence or release of pathogens Rapid response to and mitigation of the spread of an epidemic the world. The index is Robust health system to treat the sick and protect health workers composed of 6 categories: Here's how countries scored in terms of health security: Countries with a population of over 5 million Global Health 85 Security Index score The **U.S.** ranked first in the world in a number of indicators including: Epidemiology Workforce, Biosecurity, and Emergency Preparedness and Response Planning. U.S. 83.5 80 184 75 Italy ranked 126th in the 70 Emergency Response Oper-ation indicator, and 59th in Emergency Preparedness and Response Planning. 65. 65 France Prior to the COVID-19 outbreak, **China** had a plan in place to deal with communicable diseases with pandemic potential. 60 58.7 Singapore Arg 55 Peru 49.2 Italy 50 45 Average score 40 Nigeria 35 33. 30 31.5 Iran ranked 108th in Emergency Preparedness and Response Planning. 25 20 A cholera outbreak has infected over 2.2 million people in Yemen since 2016 15

> **73%** of the world's population lives in countries that scored below 50 in the Health Security Index.

Global Health

CAPITALIST

Security Index score

10

16.6 Somal

The report found that most countries lack foundational health systems capacities vital for epidemic and pandemic response.

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1.3. Executive summary

The WHO has produced a large number of documents to provide insights into:

- a) Preparedness, readiness and response action for COVID-19
- b) Country-level coordination, planning and monitoring
- c) Serology and early investigation protocols
- d) Risk communication and community engagement
- e) Naming the COVID-19
- f) Surveillance, rapid response teams and case investigation
- g) Clinical care
- h) Essential resource planning
- i) Virus origin/reducing animal-human transmission
- j) Humanitarian operations, camps, refuges/migrants...
- k) National laboratories
- I) Infection prevention and control
- m) Guidance for schools, workplaces and Institutions
- n) Travel, points of entry and border health
- o) Health workers
- p) Maintaining essential health services and systems



These are available at the following link: <u>https://www.who.int/emergencies/diseases/novel-</u> <u>coronavirus-2019/technical-guidance</u>

Most of the recommendations are related to the pandemic preparedness guidelines: <u>https://www.who.int/influenza/preparedness/pandemic/en/</u>

Our work has been focused on analysing the source documents, identifying the topics relevant to the cardiovascular domain, and we put particular interest in the documents related to the maintenance of essential health services.

The WHO guidelines and recommendations are the base of all national and regional decisions. National plans are related to the WHO guidelines. Therefore, the knowledge of the WHO guidelines and recommendations is key to navigate in the field of pandemic readiness.

The WHO created a universal classification of the pandemic phases, and reported a recent table to summarise the main actions required for each phase of the pandemic.

The WHO guidelines on infection prevention and control of epidemic-and pandemic-prone acute respiratory infections in health care provide recommendations, best practices and principles for non-pharmacological aspects of **infection prevention and control (IPC)** for acute respiratory infections (ARI) in health care, with special emphasis on ARI that can present as epidemics or pandemics. The guidelines are intended to help policy-makers, administrators and health-care workers to prioritise effective IPC measures.

The WHO suggest to **implement or strengthen infection prevention control committees at facility level and ensure that IPC** are supplied.

For any acute respiratory infection (ARI), the WHO strongly suggest the concept of **cohorting**.

The WHO suggest the **establishment of IPC committees** in all health care facilities.

The 2014 WHO document had **unclear recommendations on PPE** and therefore suggested that each health care facility should follow the national assumptions, and adapt to its local policies and rationale.

To support health politics, the WHO published the document 'Considerations for Public Health and Social Measures', in which there is **no mention of the need to interrupt elective interventions** during any phase of the pandemic.

The survey on continuity of essential health care services during the pandemic, run by the WHO in May, demonstrated that 80% of countries had defined an essential health services package prior to the outbreak, and 66% of all countries had identified a core set of services to be maintained during the COVID-19 pandemic. Only 55% of the 105 countries had allocated additional government funding to assure essential health services. Disruption of essential care services was related to the income of the country. Interestingly, cardiovascular interventions are not an indicator in this report.



According to the WHO, **a mix of demand and supply side factors** are responsible for disruption of services: patients not presenting to outpatient care, government or public transport lockdowns hindering access, financial difficulties, fear and mistrust, cancellation of elective care, insufficient staff to provide services, inpatient beds not available, reduced stock of health products, insufficient personal protective equipment, etc.

But probably the strongest obstacle for prioritisation of CV disease services (both acute and chronic) is the lack of recognition of the primary role of CV disease services among the essential health care services list from the WHO.

CV prevention, diagnostic and interventions are very little represented in the WHO documents, and usually grouped with other non-communicable diseases. As an example, in the questionnaire sent to the national health authorities, the acute coronary syndromes are grouped with asthma... while high attention has been put into other services like cancer, dental, or infectious disease (WHO branding).

Based on the results of the survey, the WHO delivered a recommendation document to **maintain** essential health care services.

National COVID-19 responses usually involve establishing an incident management team (IMT). A designated focal point for essential health services should be a member of this IMT and act as a liaison with essential health service programmes. In the phases of the epidemic when the COVID-19 case-load can be managed without compromising routine services, this focal point can coordinate the repurposing of human, financial and material resources and mobilize additional resources. During these phases, the focal point works with programmes to optimize protocols for modifying and maintaining essential health services, while ensuring that infection prevention measures are strengthened to guarantee safe service delivery. When routine services are compromised, the designated focal point coordinates the activation of protocols for phased reprioritisation and adaptation of services, as described in the sections below. Implementation should be coordinated with the relevant authorities at the national and subnational levels and with public and private service providers. As COVID-19 transmission is controlled and demand related to the outbreak declines, the focal point will coordinate the gradual, safe restoration of services are likely to repeat, with the need to start, stop and restart service adaptations.

Interventional procedures are not covered by the document, but some guidance can be derived from surgical services.

Planning should account for the possibility of prolonged periods of increased volume and urgency relative to baseline conditions.

The key action to make such priorities is to **generate a country-specific list of care essential health services** based on the context and supported by WHO guidance and tools.

At the health care facilities, the WHO suggest that the settings where specific services are delivered may need to be modified for many reasons, including:

• existing service locations may be unavailable because they have been designated for the exclusive care of people affected by COVID-19, or because they cannot safely provide routine services;

• travel to health facilities may be disrupted by movement restrictions, including disruptions of public transport;

• a need to limit facility-based encounters, including nonessential hospital admissions, for reasons of safety and capacity;

• a shift of the primary venue for acute care services to hospital emergency units to concentrate services in a setting suited to high-volume, high-acuity care that is available 24 hours per day.

Another important action is to establish safe and effective patient flow at all levels.

Interestingly, the WHO document suggest the implementation of networks of care (similar to the recent position statement for centre of excellence for valve disease) and of telemedicine services.

The WHO suggest the need to disseminate information to inform the public and guide safe careseeking behaviour. As far as communication is concerned, effective communication and community engagement are essential to maintain trust in public health authorities and ensure appropriate care-seeking behaviours.

Regarding national and regional adherence, we found a large variability of local response and preparedness to pandemic.



2. Scientific publications on society position statements and guidelines

2.1. Summary table

Study	Target	Pathologies	Emergent	STEMI	Non emergent	Lab tests	Cath lab / hospital
		classifications	procedures	management	procedures management		management
			management		/ Other strategies		
EAPCI	-ACS	-Emergent	-Should be	-PPCI if no delay>120'	-Low risk NSTEMI/UA	-Tn in Covid	-Dedicated cath lab
recommendations		-Urgent (within	considered as	(consider up to 60'	should be assessed with	patients should	for suspected or
¹ (EU)		days)	COVID +	extra due to	СТ	be considered	positive COVID, if
		-Lower priority	(dedicated cath-	pandemic), otherwise	-COVID19 patients with	only in	possible
		(<3 months)	lab and pathways)	thrombolysis	cardiogenic shock: VA	presence of	-Patients should wear
		-Elective	-High risk NSTEMI	-Ventriculography	ECMO or IABP if ECMO	symptoms/ECG	surgical masks
		(>3months)	should be tested	instead of echo to	not feasible	suggesting type	-Staff should wear
			before procedure	assess EF		1 MI	complete PPE
							-Dedicated pathway
							for CV emergencies,
							COVID19 and not
							COVID19 patients
Canadian	-STEMI	-STEMI at low	-	-PPCI	-20/36 hours discharge	-	-
protocol for		risk (clinical,			-telehealth 28h-7-30 days		
STEMI		procedural and					
(Canada) ²		post procedural					
		criteria)					
Canadian	-Coronary	-STEMI	-If minor	-PPCI	-All other patients should	-	-
association of	-Structural	-Cardiogenic	restriction of	-Thrombolysis if	be tested if invasive		
interventional		shock	regular services	inability to provide	procedure is required.		
cardiology		-Cardiac arrest	and low risk of	PCI in that centre.	-If type2 MI diagnosis		
(Canada)			COVID treat		with CT.		



3		-NSTEMI HIGH	patients as usual,		-CTO cases suspended in		
		RISK	otherwise as		any case.		
		-NSTEMI LOW	COVID+				
		RISK	-if major				
		-TYPE 2 MI	restriction of				
			regular services,				
		-TAVI	consider all as				
		-MITRACLIP	COVID+,				
		-BIOPSIES	- if inability to				
			provide invasive				
			procedure:				
			medical				
			management				
			-TAVI, MITRACLIP				
			and Biopsies only				
			in high-risk				
			patients at life-				
			threatening risk				
New-Zealand &	-Any	-Elective	-Invasive	-PPCI in low risk	-All elective cases	-	-Dedicated cath lab
Australia	procedure	-ACS: NSTEMI/UA	procedure if	COVID, otherwise	cancelled		with all possible
Guidelines ⁴		-ACS: STEMI	required.	only if strong	-If low risk of COVID or		devices is
		-Structural		indication.	negative test: invasive		recommended, if
				-Thrombolysis should	procedure		there is more than 1
				be reconsidered in all	-If high risk or positive		cath lab
				cases where PCI	COVID: invasive only if		-Dedicated hot room
				cannot be performed	strong indication		for pre cath lab
				or if delay is			assessment in CCU,
				expected, or if staff is	-For TAVI and Mitraclip		where all non-
				reduced	decision on urgency in		invasive exams



					accordance with Heart		should be done
					Team		before transfer to the
							cath lab (X-rays, echo,
					-Lower threshold to		etc)
					intubate if airway		
					management is required		
Chinese Society of	-Emergent CV	-Requiring	-Designated	-Thrombolysis if	-Medical therapy always	-	-Division in
Cardiology	diseases	medical tp	hospital if high	delay	if possible, even in		designated and non-
(China)⁵		(STEMI delayed,	suspicion or	-PPCI if unstable	designated covid		designated COVID
		high risk NSTEMI,	confirmed case		hospitals		hospitals:
		B dissection, EP,					
		HF, hypertensive					-If no designated
		crisis)					hospital, isolated
		-Requiring					room until covid test,
		interventions					if suspected or
		(unstable STEMI,					confirmed transfer to
		life threatening					designated hospital
		NSTEMI, A					-In designated
		dissection,					hospital suspected
		unstable EP,					case await in single
		bradyarrhythmia					rooms
		requiring PM					
		implant)					
USA STEMI	-STEMI	-Low risk STEMI	-	-PPCI	-	-	-
protocol (USA) ⁶				-Assessment of risk			
				with modified Zwolle			
				Risk score			
				-If low risk (< 4			
				points) safe early			
				discharge			

$\langle \mathcal{V} \rangle$

SCAI – ACC	-AMI	-STEMI	-All should	-PPCI should be the	-Low risk NSTEMI should	-	-Dedicated cath-lab
consensus (USA) ⁷		-NSTEMI	undergo first	standard of care if	undergo medical tp up to		with negative
		-Cardiac arrest	evaluation in ED	not delay or not	covid testing		pressure
			before moving in	capable hospital			
			the cath-lab	-In such cases	-Patients with respiratory		-All stable patients
			(STEMI and	thrombolysis should	compromise should be		should be admitted in
			NSTEMI high risk):	be considered	intubated before moving		regular ward, and
			no "ED-bypass"		in the cath-lab		discharged <48h
			very common in				
			USA				
			-Cardiac arrest				
			should not receive				
			invasive				
			assessment if not				
			presenting ST-				
			elevation or				
			unstable				
			conditions after				
			ROSC				
ACS during MERS-	-ACS	-STEMI	-All considered	-PPCI with PPE and	-All elective procedures	-Covid test if	-Dedicated hospitals
CoV (Saudi	-Elective	-NSTEMI	CoV +	LV angiogram instead	cancelled	NSTEMI low	to treat CoV +
Arabia) ⁸		high/low risk	-NSTEMI high risk	of echo (NSTEMI high	-Low risk NSTEMI should	risk	patients, leaving CoV
,		-UA	considered as	risk included)	be tested before		free the remaining as
			STEMI	,	undergoing invasive		much as possible
					procedure		
	<u> </u>		1		· ·		
TAVI	-TAVI	-Urgent < 2	-	-	-Perform TAVI in local	-Reduce pre	-Early discharge when
management		weeks (critical			anaesthesia and with	TAVI tests as	possible
consensus (Asia) ⁹		AVA <0.6 with			mild sedation if possible		



		symptoms OR			(if general anaesthesia is	much as	-Telemedicine follow
		severe AS with			required, perform	possible	up
		NYHA III-IV, labile			intubation before TAVI in	-Perform	
		symptoms, or			a dedicated negative	COVID test	
		non-responder to			pressure room)	before	
		medical			-Reduce staff as much as	procedure if	
		treatment,			possible (no fellow,	possible	
		cardiogenic			visitors)		
		shock)					
		-Semi-urgent < 1					
		month (AVA 0.6-					
		0.8 with NYHA II					
		or EF < 50%)					
		-Elective (all the					
		remaining) 1-3					
		months					
TAVI: ESC nursing	-TAVI	-Priority 1: rapid	-	-	-Accelerated TAVI	-To be done	-
programmes ¹⁰		deterioration, ≥2			pathway through	the day of the	
(EU)		ED admission, or			teleconsultation and	procedure	
		ongoing			triage + web-based		
		symptom			meeting (Heart team):		
		-Priority 2:			1) waiting list		
		progressive			management: clinical		
		deterioration,			status and triage to		
		self-limiting			assess priority		
		symptoms, ≥1 ED			2) procedure:		
		admission			minimalistic, admission		
		-Priority 3:			the same day, discharge		
		infrequent			the day after (list of		
		symptoms,			criteria to be met)		



		stability, NYHA II,			3) telemedicine FU, echo		
		no ED admission			at 30 days		
Management of	-TAVI and	-Mild symptoms:	-Unstable patients	-	-Mild category deferred	-Pre admission	-Prefer TAVI over
AS during COVID	AVR	stable and NYHA	should be urgently		after COVID pandemic	Covid test	SAVR for the shorter
(USA) ¹¹		П	treated		end		hospital stay and less
		-Moderate:			-Moderate category		use of resources
		stable but worse			assessed every 1-2 weeks		
		symptoms (NYHA			and treated urgently if		
		III) angina,			worsening		
		chronic HF			-Early discharge after		
		-Severe/unstable			TAVI (24-48h)		
					-Echo focused on AS and		
					EF if needed		
					-Avoid ED and direct		
					admission to cardiac		
					ward		
					-Virtual outpatients visits		
					and monitoring		
					-Dedicated CT pre tavi		
					including coronary		
					assessment.		
SCAI – ACC: Triage	-Structural	-TAVI: severe AS	-Treat severe	-	-Minimalistic approach	-	-Virtual outpatients
for structural	interventions	+ symptomatic	symptomatic and		for TAVI procedures		clinics should not
interventions		(NYHA III or IV or	minimally		(local anaesthesia with		reduce the rate of the
(USA) ¹²		syncope);	symptomatic but		mild sedation)		visits
		minimally	critical AVS with		-Postpone CAD		
			TAVI		treatment if not critical		



		symptomatic but		-Postponed after covid	
		critical echo,	-Treat MR or	asymptomatic TAVI	
		asymptomatic +	paravalvular leak	-Close virtual FU for	
		severe AS	only if	those postponed	
			determining	-Avoid TEE	
		-Mitraclip: pts	clinical instability		
		needing			
		treatment (any			
		critical/unstable			
		condition not			
		safely treatable			
		with OMT); any			
		other patient to			
		be deferred			
		-TMVR: defer			
		-Paravalvular			
		leak closure:			
		defer if not			
		clinically urgent			
Ainway	Δηγ	Any nathology		-It's important to change	
management	intonyontional			room air: the times of air	
Australia	nrecoduro	management		changes per hour is	
(Austidiid,	procedure	management		indirectly correlated to	
Singapore, USA) ²⁸				time needed to be	
				time needed to be	
				effective (50 times/nour,	
				8 min needed to get	



		99.9% efficacy, 35 min if	
		12 time/hour)	
		-Nasal O2 tp <5 ml/min	
		to avoid viral spread	
		-Use always a viral filter	
		between the mask of the	
		patient and the manual	
		circuit/ventilator	
		-Rapid sequence	
		ventilation is	
		recommended (use video	
		laringoscope +	
		antisialogoge)	
		-Estubation: antiemetic	
		and anti-cough strategies	
		-General anaesthesia is	
		recommended for any	
		procedure at risk of	
		droplets generation	



2.2. Executive summary

Available literature about COVID-19 pandemic impact on interventional cardiology has been screened through a **systematic review** approach from September 1st to October 31st 2020.

It mostly includes national or international consensus documents, from different continents, offering practical recommendations for the management of interventional procedures, either in the acute or elective setting, even suggesting indications for the staff and infrastructures administration.

The main weakness of such documents lies in the **lack of scientific data** supporting their indications, as published during or immediately after the first COVID wave, when specific information regarding the COVID impact on health services was not yet available.

Despite this, they provided useful suggestions to face the pandemic, optimise resources and improve patients' care.

Accordingly, given the different realities and COVID spread, it is hard to resume all the indications in a unique and generalisable document.

Hence, we have summarised the **most common and feasible indications**, reported by the majority of the analysed documents.

1) Procedure classification

- *Emergent*: STEMI, high-risk NSTEMI, cardiogenic shock, cardiac arrest, type A aortic dissection, severe bradyarrhythmia
- Urgent: sub-acute STEMI, low-risk NSTEMI, UA, clinically critical valvular disease leading to acute decompensation
- *Elective*: all the remaining procedures

2) Intervention timing

- *Emergent*: as soon as possible
- Urgent: within days (according to the hospital capability)
- *Elective*: indefinitely deferred

3) Intervention management

 Emergent: ALL patients (unless inpatients resulted negative at COVID screening) should be treated as COVID +, in a dedicated cath-lab, with dedicated PPE. They should remain in an isolated room or dedicated grey area after the procedure until COVID test result is available. The cath-lab should be cleaned as per hospital protocol after the procedure.

*STEMI management:

- in the particular case of STEMI, PPCI should be the first choice



- during the procedure the LV function assessment should be performed by means of ventriculography to avoid echo
- only if delay in providing PCI is expected, OR the patient is critically ill, medical treatment with thrombolysis should be considered. Afterwards, coronary angiogram and rescue PCI should be performed after COVID testing*.
- *Urgent*: ALL patients should be tested before undergoing invasive procedure. If not possible, they should be treated as well as emergent cases.
- *Elective*: ALL elective cases should be postponed after the acute pandemic phase. Close VIRTUAL follow up is strictly recommended to monitor patients' symptoms and eventually change the priority (in particular for severe aortic stenosis patients).

4) Hospital stays

CCU and general ward stay should be shortened as much as possible to save resources and avoid beds occupancy.

Some protocols can be implemented to assess the patient's eligibility for a fast discharge, both after STEMI and other pathologies.

Afterwards, a close follow-up thought virtual visits is recommended.

5) Hospital pathways

Emergency department should be organised with dedicated COVID area (suspected cases). Emergent cardiovascular cases (i.e., STEMI), should bypass the ED (when coming with ambulance) and be directly transferred to the dedicated cath-lab to avoid contacts and time wasting.

Isolated rooms with negative pressure should be used after the procedures while waiting for the COVID test result.

6) Miscellaneous

- In case of unknown COVID status, airways management should be performed by dedicated anaesthesiologic team wearing PPE, in a dedicated room.
- Any case with probable necessity of airway management during the procedure should be preventively intubated and performed under general anaesthesia to minimise the infective risk during urgent airway management.
- Any room should be cleaned with dedicated protocols after the procedure.
- Air change should be adequate in terms of duration and times per day.
- Staff training and periodical monitoring is mandatory to minimise the risk of infection among the health care workers.
- Dedicated teams with expertise in acute respiratory pathologies should treat COVID patients only.



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