

CVD and COVID-19

COVID-19 Impact to Date

The global spread is accelerating with more reports of local transmission

>14 lakh

Reported confirmed cases

>75,000

Deaths

>200

Countries or territories with reported cases¹

>160

Countries or territories with evidence of local transmission²

>49

Countries or territories with more than 1000 reported cases¹

>0.2%

**CHINA share of new reported cases
April 1st week**

>38%

**USA share of new reported cases
April 1st week**

>52%

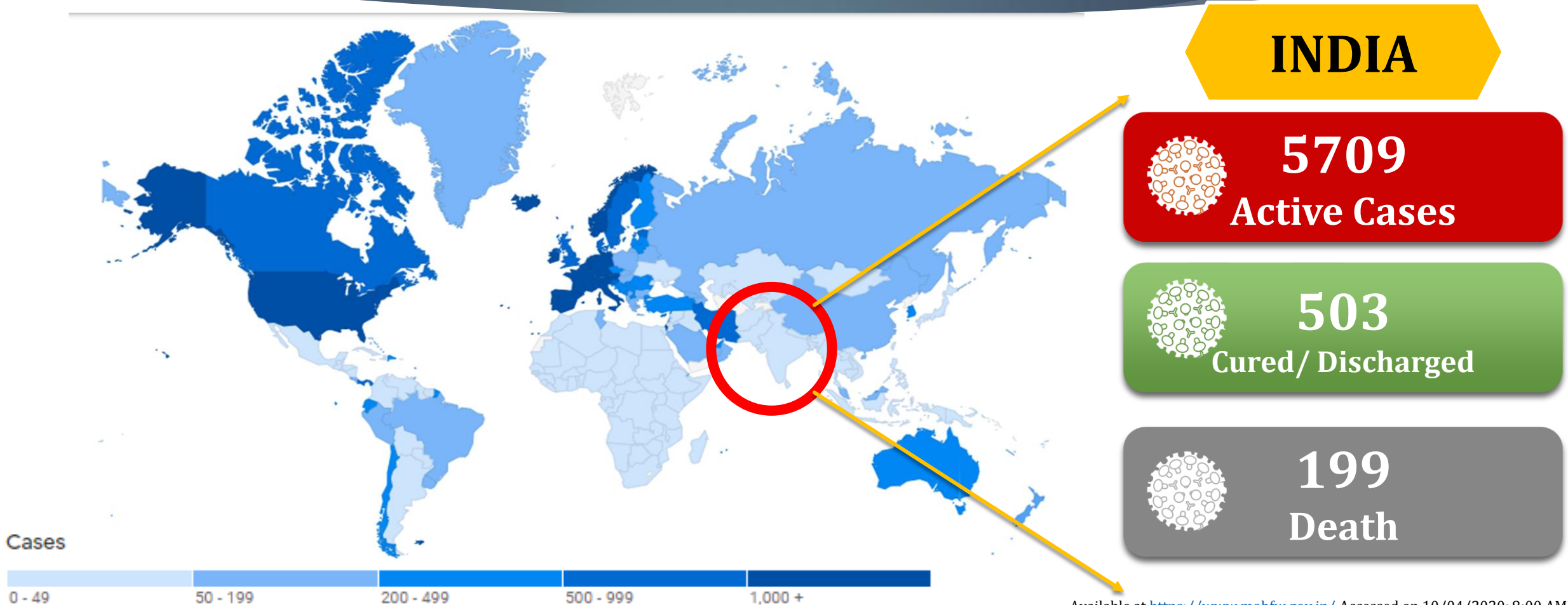
**EUROPE share of new reported cases
April 1st week**

6

Countries or territories with more than 1000 reported cases

Prevalence- COVID-19

As per Ministry of Health and Family Welfare, Govt. of India



Revised Definition

Govt. of India (31/03/2020)

- **When to suspect**
- All symptomatic individuals who have undertaken international travel in the last 14 days or
- All symptomatic contacts of laboratory confirmed cases **or**
- All symptomatic healthcare personnel (HCP) **or**
- All hospitalized patients with severe acute respiratory illness (SARI) (fever AND cough and/or shortness of breath) **or**
- Asymptomatic direct and high risk contacts of a confirmed case (should be tested once between day 5 and day 14 after contact)

Symptomatic refers to fever/cough/shortness of breath. Direct and high-risk contacts include those who live in the same household with a confirmed case and HCP who examined a confirmed case

Revised Definition

Govt. of India (31/03/2020)

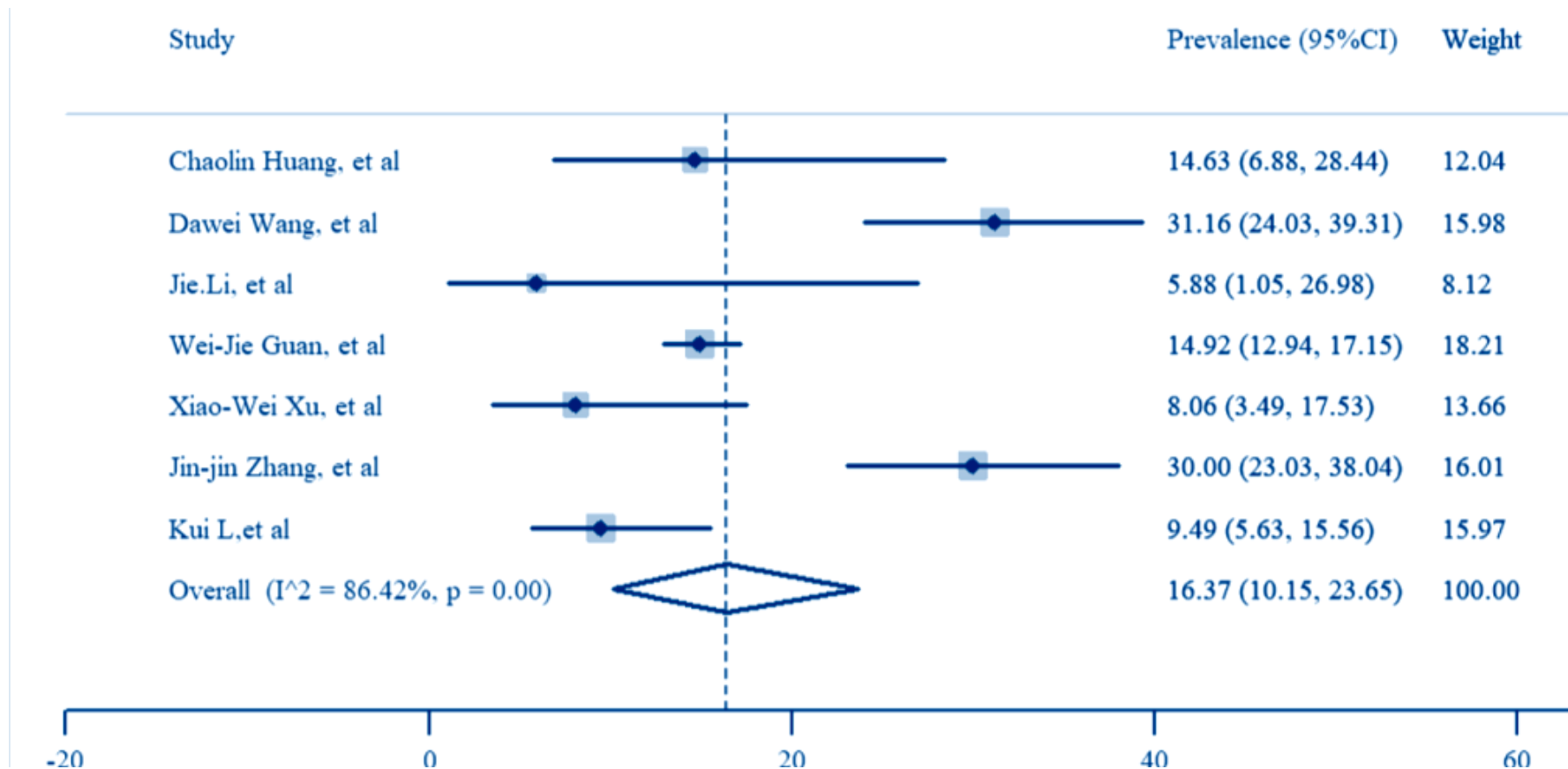
- CONFIRMED CASE

**A person with laboratory confirmation of COVID-19 infection,
irrespective of clinical signs and symptoms**

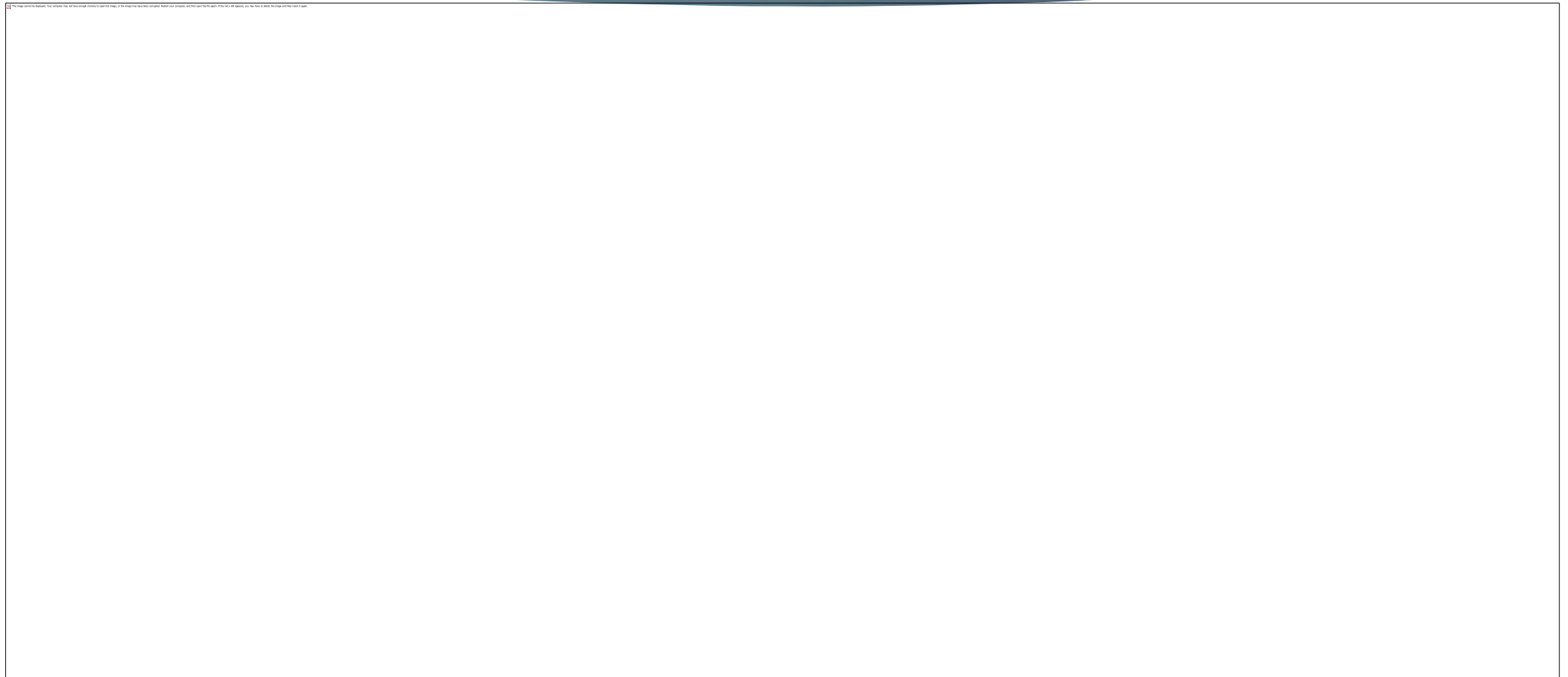
Clinical Features

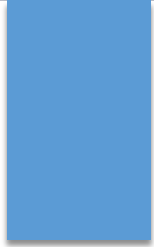
- COVID-19 may present with mild, moderate, or severe illness
- The latter includes severe pneumonia, ARDS, sepsis and septic shock.
- Early recognition of suspected patients allows for timely initiation of Infection prevention control (IPC)
- Early identification of severe manifestations allows for immediate optimized supportive care treatments and safe, rapid admission (or referral) to ICU
- Studies have reported that people with chronic medical conditions, viz., hypertension, CVD, diabetes etc. will have a worse prognosis with COVID-19

Prevalence of hypertension among patients hospitalized with COVID-19



Prevalence of CVD among patients with COVID-19



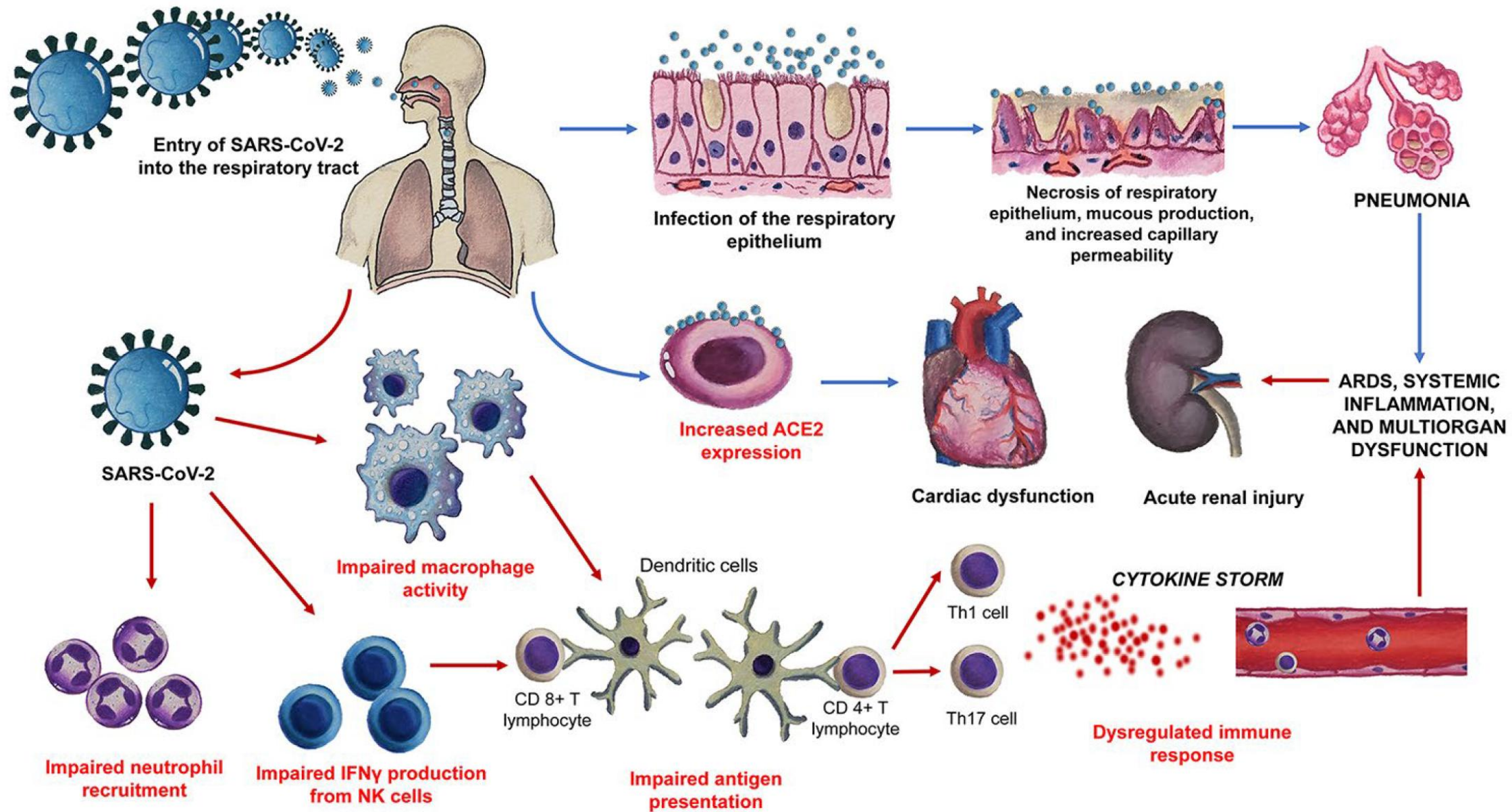


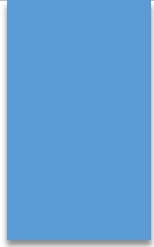
CARDIOVASCULAR COMPLICATIONS IN COVID-19

Cardiovascular Complications in COVID-19

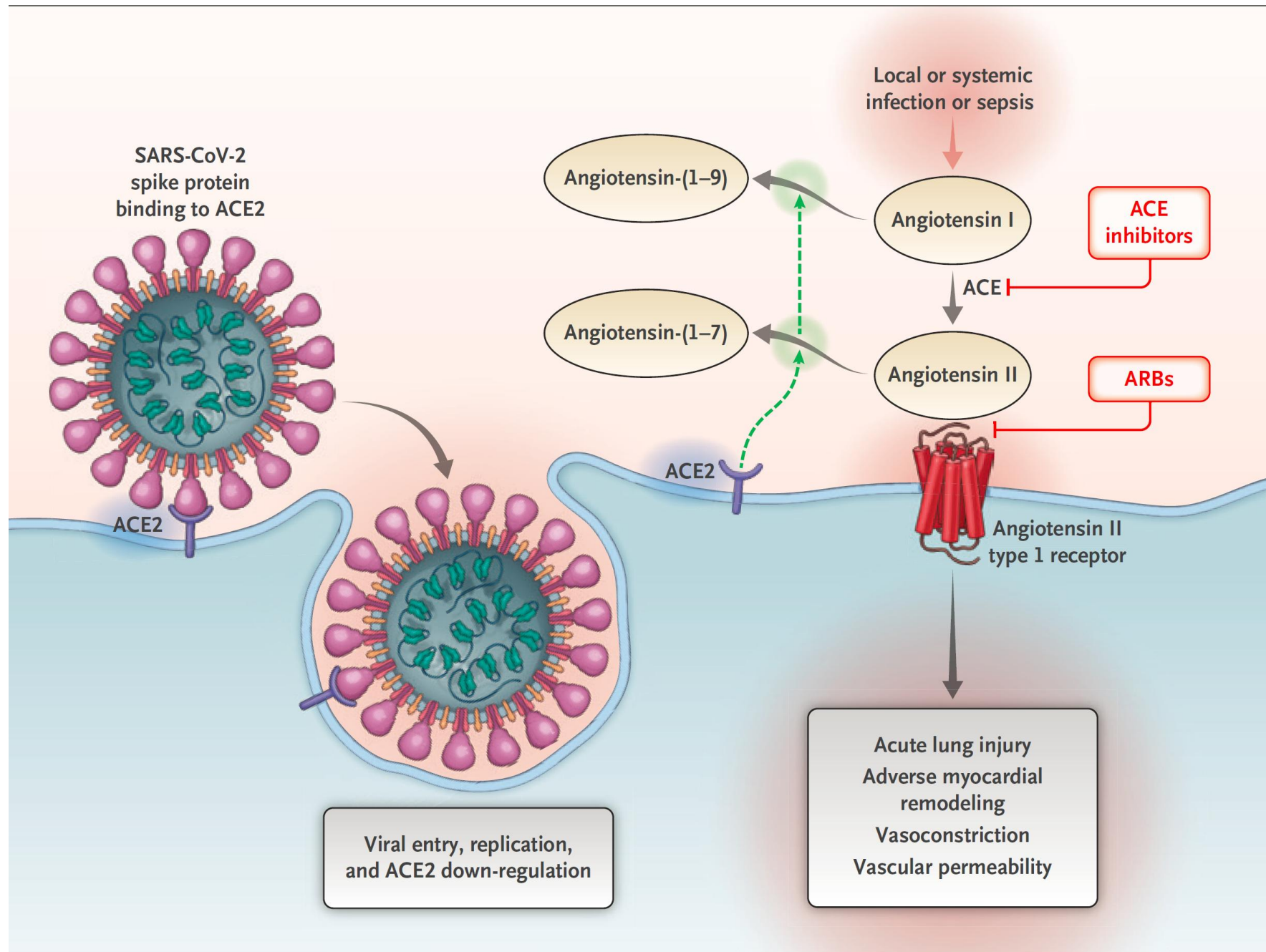
Manifestation	Incidence	Remarks
Acute cardiac injury* (most commonly defined as elevation of cardiac troponin I above 99th percentile upper reference limit)	8–12% on average [10]	• Most commonly reported cardiovascular abnormality • Can result from any of the following mechanisms- • Direct myocardial injury • Systemic inflammation • Myocardial oxygen demand supply mismatch • Acute coronary event • Iatrogenic • Strong adverse prognostic value
Acute coronary event	Not reported, but appears to be low	Potential mechanisms- • Plaque rupture due to inflammation/increased shear stress • Aggravation of pre-existing coronary artery disease
Left ventricular systolic dysfunction	Not reported	Any of the causes of myocardial dysfunction mentioned above can lead to acute left ventricular systolic dysfunction
Heart failure	Reported in one study- 52% in those who died, 12% in those who recovered and were discharged [5]	• Any of the causes of myocardial dysfunction mentioned above can lead to acute heart failure • Increased metabolic demand of a systemic disease can cause acute decompensation of pre-existing stable heart failure
Arrhythmia	16.7% overall; 44.4 in severe illness, 8.9% in mild cases [8]	Both tachyarrhythmia and bradyarrhythmia can occur but exact nature not described
Potential long-term consequences	Too early to assess	Too early to ascertain for coronavirus disease 2019. However, patients recovering from a similar earlier illness- Severe Acute Respiratory Syndrome- continued to have long-term abnormalities of lipid and glucose metabolism and of cardiovascular homeostasis [12]

* Acute cardiac injury is a non-specific term with significant overlap with other cardiovascular manifestations; however, it is listed here because of how reporting has been done in most of the studies on coronavirus disease 2019.





RENIN-ANGIOTENSIN- ALDOSTERONE SYSTEM INHIBITORS IN PATIENTS WITH COVID-19



Interaction between SARS-CoV-2 and the Renin-Angiotensin-Aldosterone System

Shown is the initial entry of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) into cells, primarily type II pneumocytes, after binding to its functional receptor, ACE2. After endocytosis of the viral complex, surface ACE2 is further down-regulated, resulting in unopposed angiotensin II accumulation. Local activation of the renin-angiotensin-aldosterone system may mediate lung injury responses to viral insults.

Renin-Angiotensin System Blockers and the COVID-19 Pandemic

- ACE2 (angiotensin-converting enzyme 2) is the receptor that allows coronavirus entry into cells.
- ACE2 in its full-length form is a membrane-bound enzyme, whereas its shorter (soluble) form circulates in blood at very low levels.
- ACE inhibitors do not inhibit ACE2 because ACE and ACE2 are entirely different enzymes
- Although angiotensin II type 1 receptor blockers have been suggested to upregulate ACE2, the evidence is not fully consistent and differs per angiotensin II type 1 receptor blocker and per organ.

Renin-Angiotensin System Blockers and the COVID-19 Pandemic

- There are no data supporting that ACE inhibitors or angiotensin II type 1 receptor blockers facilitate coronavirus entry by increasing ACE2 expression.
- Animal data support a potential protective pulmonary and cardiovascular effects of elevated ACE2 expression.
- Treatment with RAS blockers should not be discontinued because of concerns with coronavirus infection based on the currently available evidence.

ESC Guidelines on Using RAAS Antagonists in COVID-19



Position Statement of the ESC Council on Hypertension on ACE-Inhibitors and Angiotensin Receptor Blockers

13 Mar 2020

The Council on Hypertension strongly recommend that physicians and patients should continue treatment with their usual anti-hypertensive therapy because there is no clinical or scientific evidence to suggest that treatment with ACEi or ARBs should be discontinued because of the Covid-19 infection.

ACC/AHA Guidelines on Using RAAS Antagonists in COVID-19



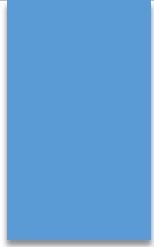
AMERICAN
COLLEGE of
CARDIOLOGY

HFSA/ACC/AHA Statement Addresses Concerns Re: Using RAAS Antagonists in COVID-19

Mar 17, 2020

The HFSA, ACC, and AHA recommend continuation of RAAS antagonists for those patients who are currently prescribed such agents for indications for which these agents are known to be beneficial, such as heart failure, hypertension, or ischemic heart disease.

In the event patients with cardiovascular disease are diagnosed with COVID-19, individualized treatment decisions should be made according to each patient's hemodynamic status and clinical presentation.



CVD MANAGEMENT IMPLICATIONS

Precaution types and PPE

	Hand Washing	Gloves/ Double Gloves	Isolation Gown	Surgical Mask	N-95 mask	Face Shield	PAPR System	Surgical Cap	Shoe Cover
Standard	X	X		X					
Special Droplet	X	X	X	X*	X*	X	X	X	X
Airborne**	X	X	X		X	X	X	X	X

*Surgical mask may be used for droplet precautions in order to conserve N-95 respirators

**Patient location may determine level of protection (e.g. airborne precautions employed for all patients in ICU setting)

This is a general guide based on current practice/recommendations at the present time and is subject to change

CVD Management Implications

- The overall management principles for patients presenting with COVID-19 who develop CV complications or who have pre-existing CVD are same as for any other patient without COVID-19.
- All healthcare personnel engaged in the care of COVID-19 patients must observe necessary precautions at all times.
- Should be trained in donning, usage, and doffing of the personal protective equipment in accordance with the existing practice guidelines

ACS & COVID-19

1. We must not forget the needs of patients with CVD



- Even during the current pandemic, more people will die of CVD than of COVID-19.
- Patients with CVD or CVD risk factors, such as hypertension, diabetes, and smokers, are more likely to die of COVID-19.
- Hospital admissions of patients with ACS have reduced drastically in the COVID-19 most affected areas.
- STEMI patients seek medical help much later (or not at all) - more of them are admitted in cardiogenic shock.
- **It needs to be clear that “don’t come to hospital” does not apply to patients with ACS or other acute syndromes.**

ACS & COVID-19

ACS in COVID-19: Treatment Considerations Take-home message



Make your hospital safe for ACS patients and for care providers

Raise awareness that patients with chest pain need to call the emergency number as soon as possible and come to the hospital

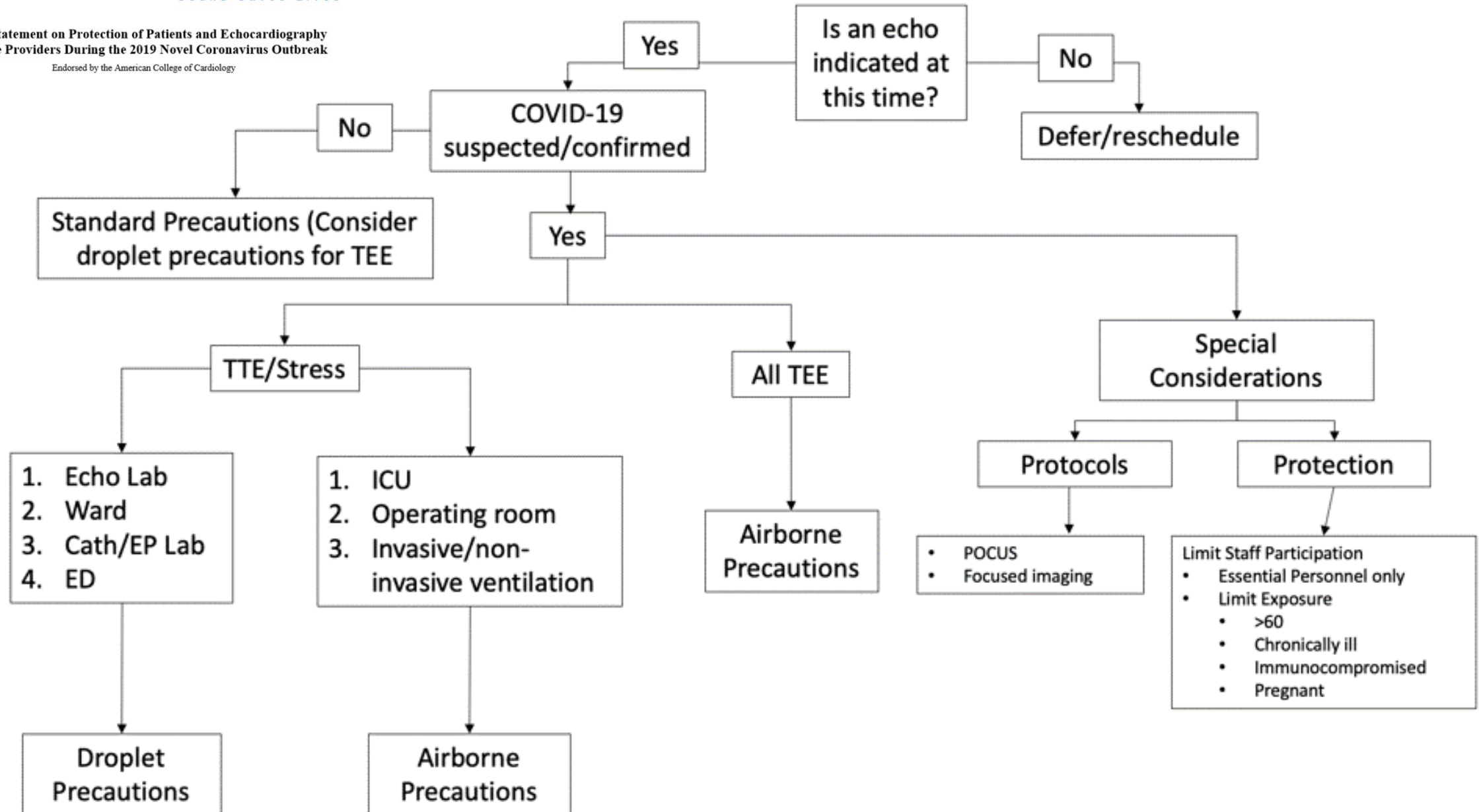
CVD Investigations

- Strong emphasis should be placed on avoiding unwarranted diagnostic tests (e.g. cardiac troponin, echocardiography, etc.) in these patients.
- The American College of Cardiology has released an advisory discouraging random measurement of cardiac biomarkers such as troponins and natriuretic peptides.
- The American Society of Echocardiography has also issued a similar advisory regarding the use of echocardiography in these patients

Suggested algorithm for determining indication and level of protection

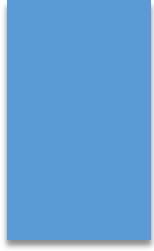
ASE Statement on Protection of Patients and Echocardiography
Service Providers During the 2019 Novel Coronavirus Outbreak

Endorsed by the American College of Cardiology



ASE Statement on Protection of Patients and Echocardiography
Service Providers During the 2019 Novel Coronavirus Outbreak

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Summary Recommendations for Policies/ Procedures during COVID-19

- **Defer/Reschedule Options**
 - Identify and defer all elective exams
 - Identify and perform only urgent/emergent exams
- **Assess patient COVID-19 status**
 - None
 - Suspected
 - Confirmed
- **Provide for appropriate levels of self-protection**
- **TEEs are high risk – defer whenever possible, perform in suspected / confirmed cases with airborne PPE precautions**
- **Institutional PPE conservation**
 - Defer non-urgent/emergent exams in suspected/confirmed cases
 - POCUS: Imaging by trained clinician already caring for a patient
- **Limiting exposure during exams**
 - Problem-focused, limited examinations
 - Guided by prior studies, other imaging (including POCUS findings)
- **Reading room methods to reduce transmission**
 - Facilitate remote report generation and echo consultation
 - Frequent disinfection of computer keyboard, mouse, surfaces, chairs, doorknobs
 - Discourage congregating in the echo lab reading room
- **Identify and appropriately re-assign special at-risk personnel (>60 yrs, immunosuppressed, chronic disease / cardiopulmonary conditions, pregnancy, etc.)**

CVD Management Implications

- Clinicians caring for COVID-19 patients need to be fully aware of the potential CV side-effects of various therapies used.
- Various anti-retroviral drugs have significant interactions with cardiac drugs, which need to be considered
- More recently, chloroquine/hydroxychloroquine and azathioprine have been proposed as potential therapeutic options, based on preliminary evidence

Resuscitation of adult COVID-19 patients in acute hospital settings

Recognize cardiac arrest. Look for the absence of signs of life and normal breathing. Feel for a carotid pulse if trained to do so. Do not listen or feel for breathing by placing your ear and cheek close to the patient's mouth.

If a defibrillator is readily available defibrillate shockable rhythms rapidly prior to starting chest compressions. The early restoration of circulation may prevent the need for further resuscitation measures.

Full Aerosal Generating Procedure (AGP) Personal Protective Equipment (PPE) must be worn by all members of the resuscitation/ emergency team before entering the room.

Sets of AGP PPE must be readily available where resuscitation equipment is being locally stored.

No chest compressions or airway procedures such as those detailed below should be undertaken without full AGP PPE.

Once suitably clothed, start compression-only CPR and monitor the patient's cardiac arrest rhythm as soon as possible.

Do not do mouth-to-mouth ventilation or use a pocket mask.

If the patient is already receiving supplemental oxygen therapy using a face mask, leave the mask on the patient's face during chest compressions as this may limit aerosol spread.

Airway interventions (e.g. supraglottic airway (SGA) insertion or tracheal intubation) must be carried out by experienced individuals.

Resuscitation of adult COVID-19 patients in acute hospital settings

Identify and treat any reversible causes (e.g. severe hypoxaemia) before considering stopping CPR.

Discussion should be maintained throughout the resuscitation event and early planning of the post resuscitation phase undertaken. Contact senior help and gain advice from critical care partners as part of the planning.

Dispose of, or clean, all equipment used during CPR following the manufacturer's recommendations and local guidelines.

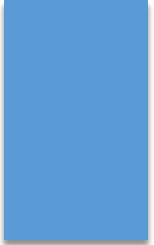
Any work surfaces used for airway/resuscitation equipment will also need to be cleaned according to local guidelines. Specifically, ensure equipment used in airway interventions (e.g. laryngoscopes, face masks) is not left lying on the patient's pillow, but is instead placed in a tray.

Do not leave the Yankauer sucker placed under the patient's pillow; instead, put the contaminated end of the Yankauer inside a disposable glove..

Remove PPE safely to avoid self-contamination and dispose of clinical waste bags as per local guidelines.

Hand hygiene has an important role in decreasing transmission. Thoroughly wash hands with soap and water; alternatively, alcohol hand rub is also effective.

Post resuscitation debrief is important and should be planned.



Thank You