
COVID-19 AND CO-MORBIDITIES

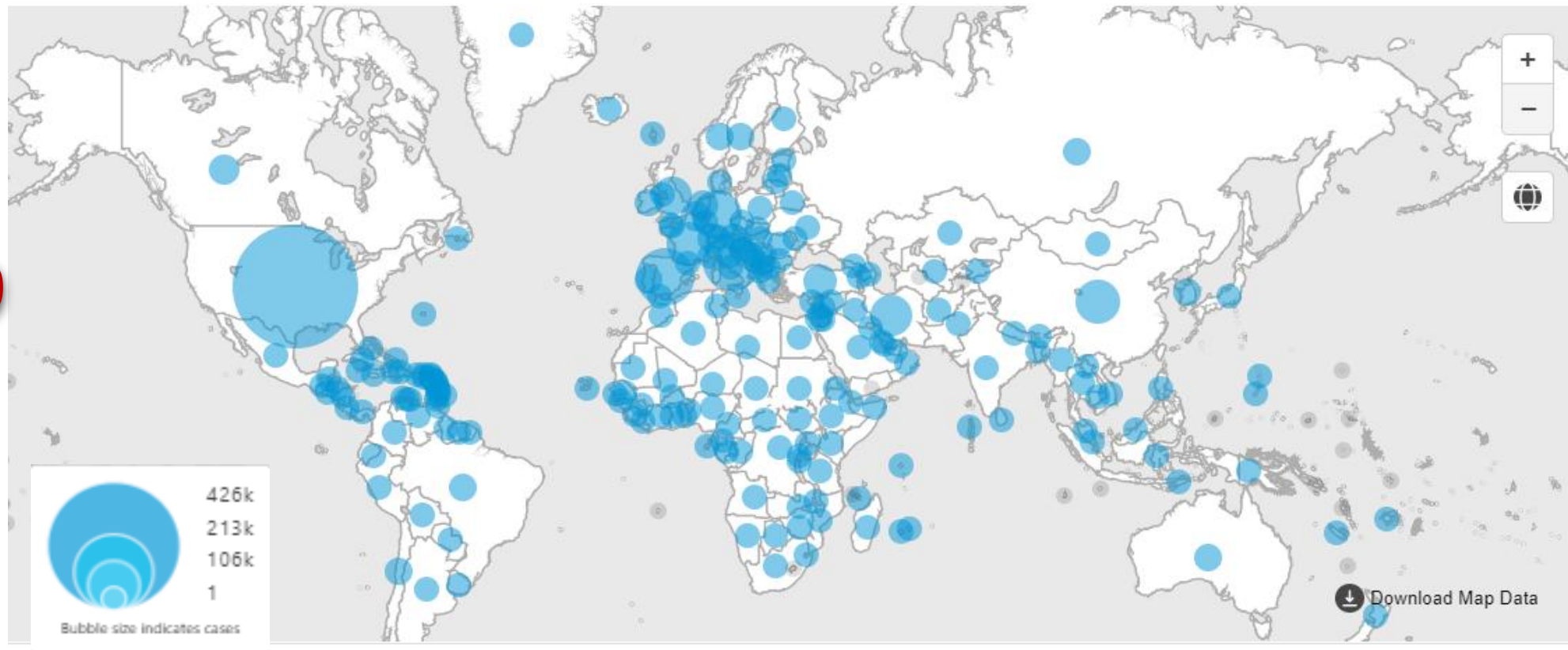


COVID-19 IMPACT TO DATE

≈ 212
Countries

≈ 15,00,000
Cases

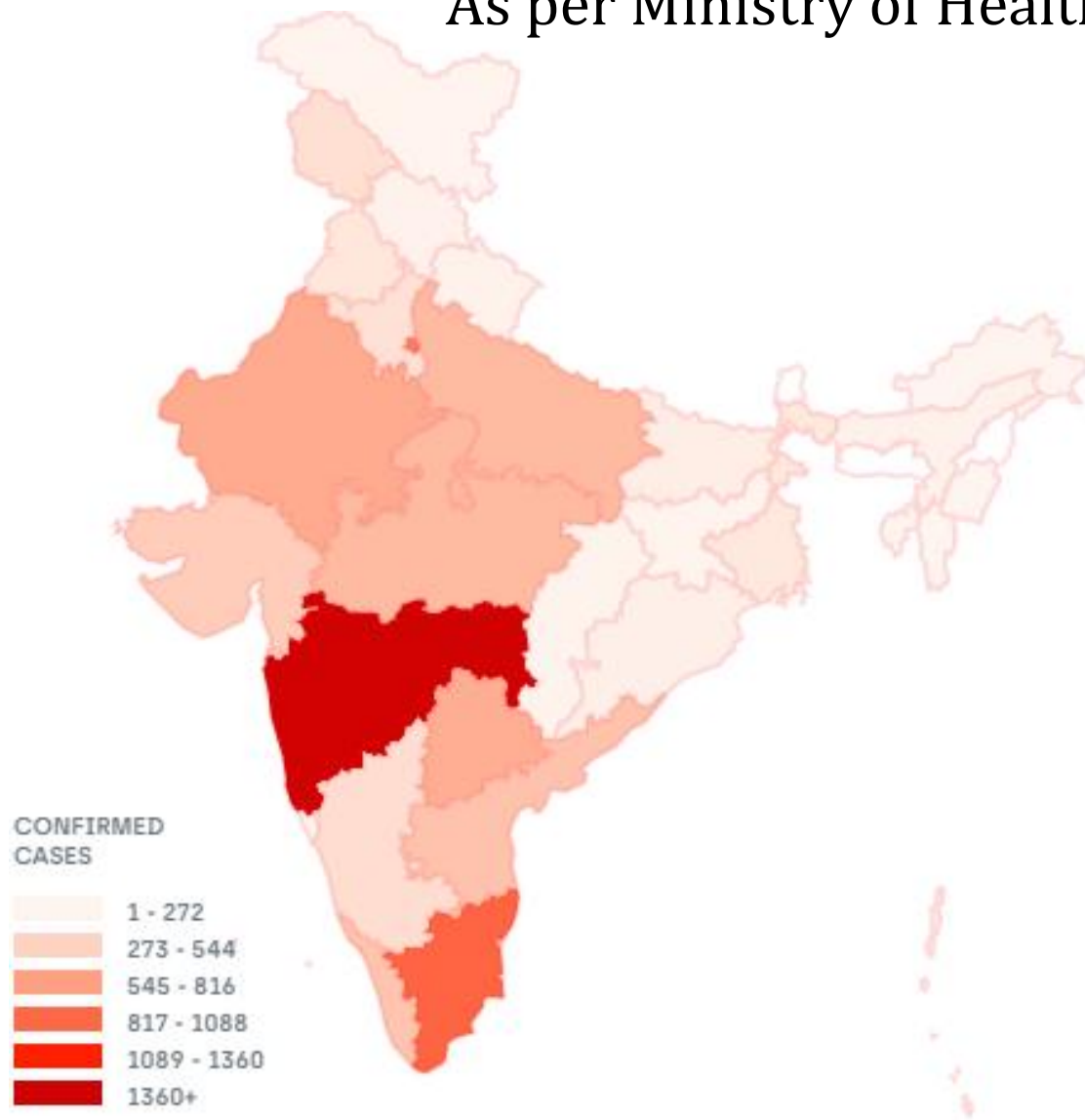
>90,000
Deaths





Prevalence- COVID-19

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



5709

Active
Cases

503

Cured/
Discharged

199

Death

CONFIRMED
09 APRIL
YESTERDAY
813 +248



RECOVERED
09 APRIL
YESTERDAY
70 -26



DECEASED
09 APRIL
YESTERDAY
46 +26



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**

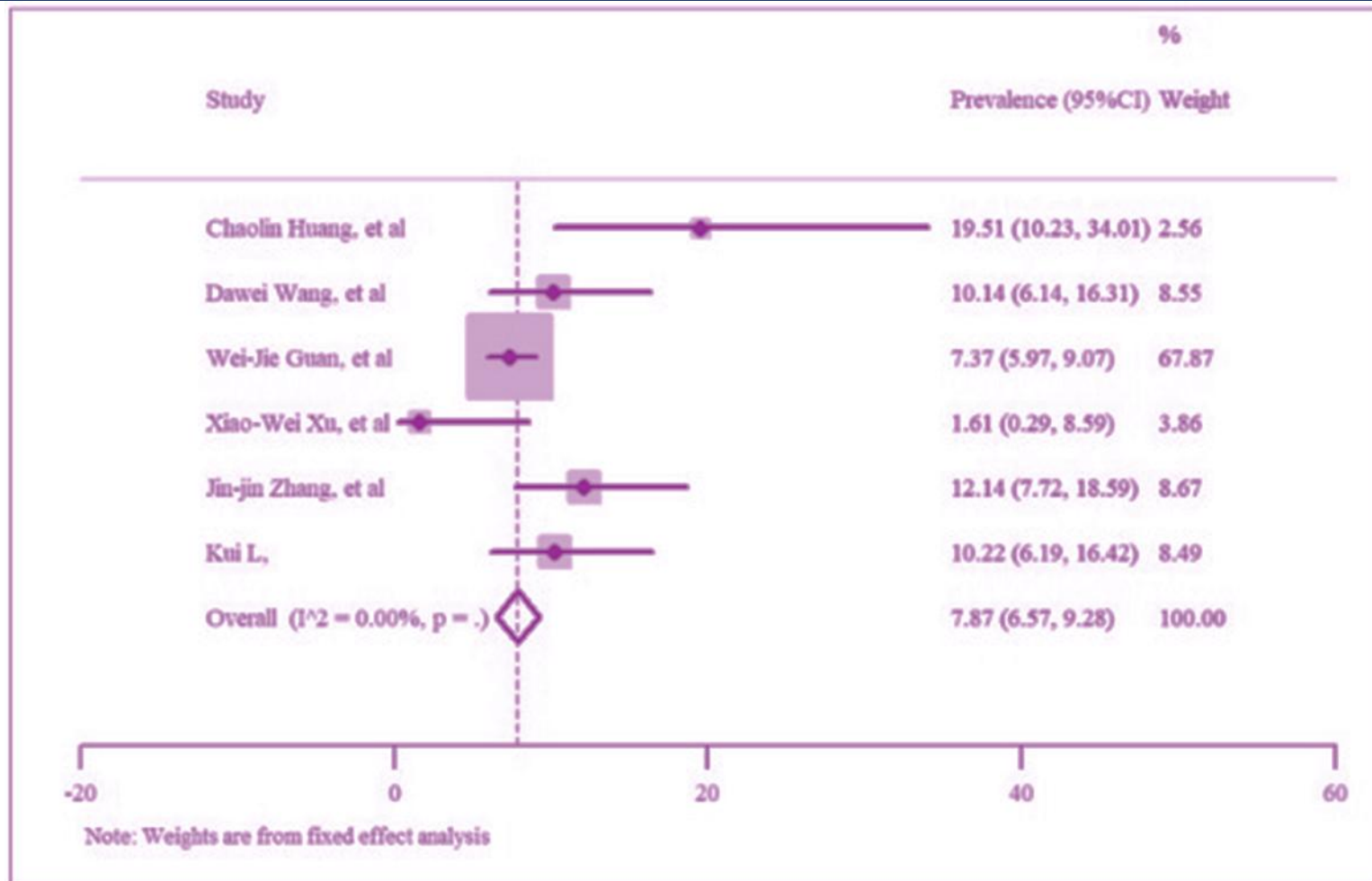
CLINICAL FEATURES

- 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, CKD etc. will have a worse prognosis with COVID-19

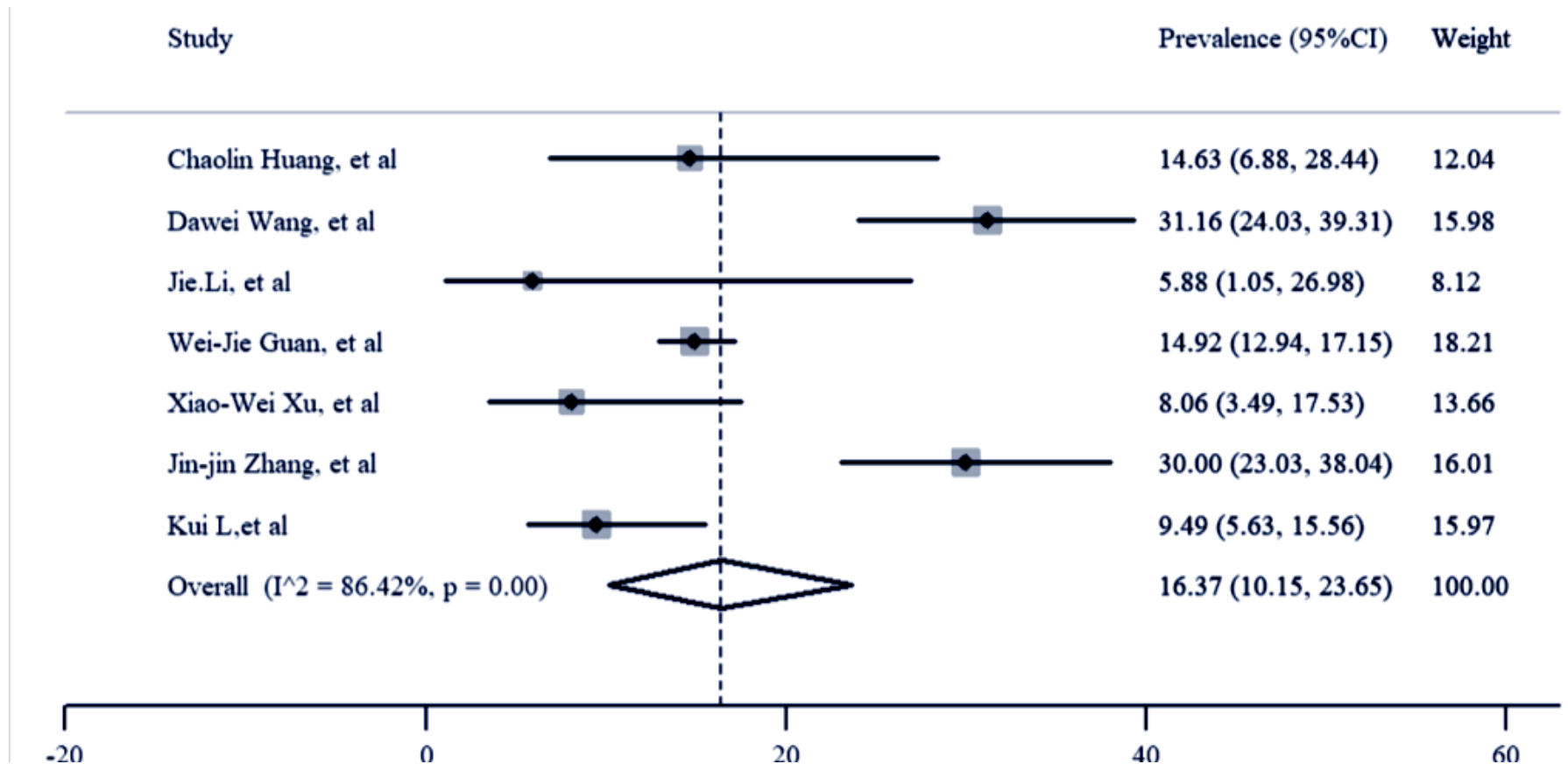
COVID-19 and NCDs

- People with pre-existing non-communicable diseases (NCDs) appear to be more vulnerable to becoming severely ill with COVID-19. These NCDs include:
 - Cardiovascular disease (e.g. hypertension, persons who have had, or are at risk for, a heart attack or stroke)
 - Chronic respiratory disease (e.g. COPD)
 - Diabetes
 - Cancer.
- For people living with or affected by non-communicable diseases:
 - People of all ages can be infected by the new coronavirus (COVID-19).
 - The risk of becoming severely ill with the virus appears to increase in people >60years.

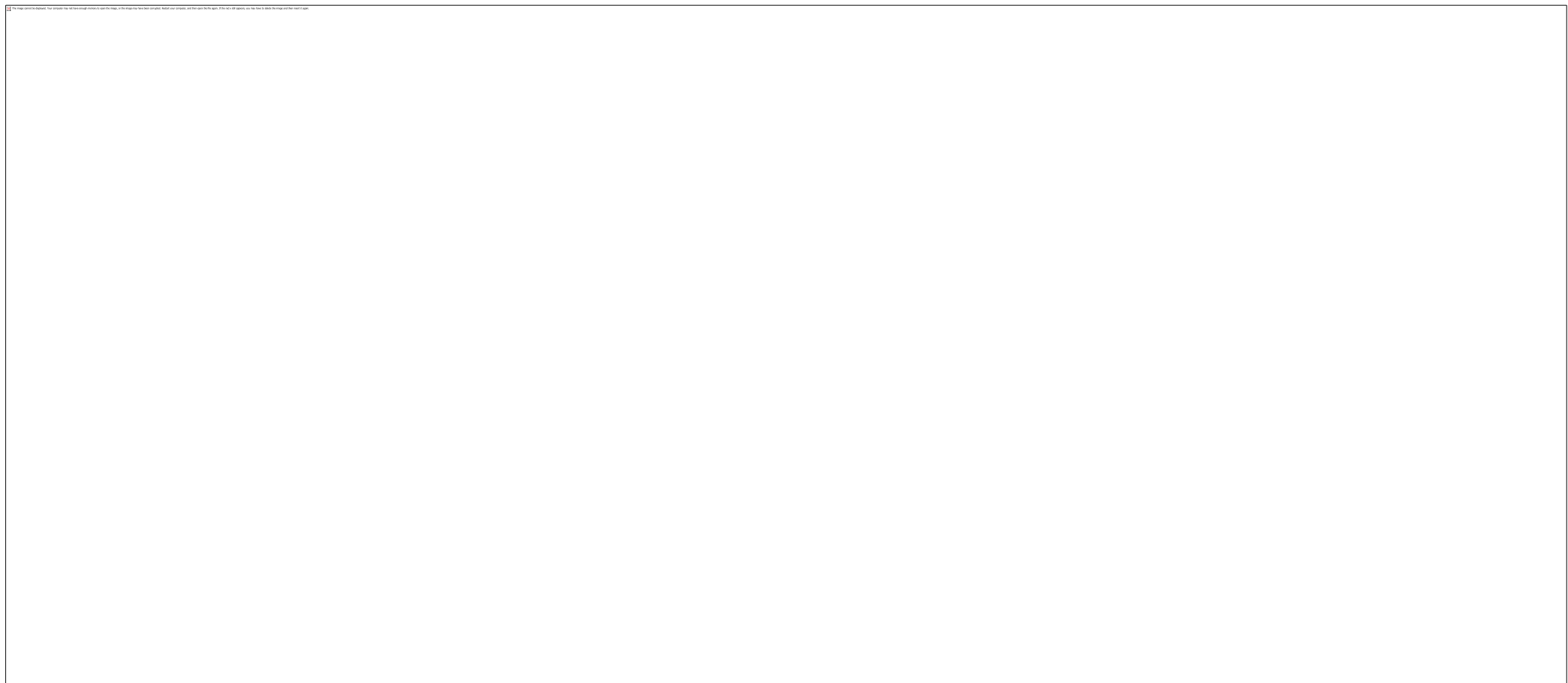
PREVALENCE OF DIABETES AMONG PATIENTS WITH COVID-19



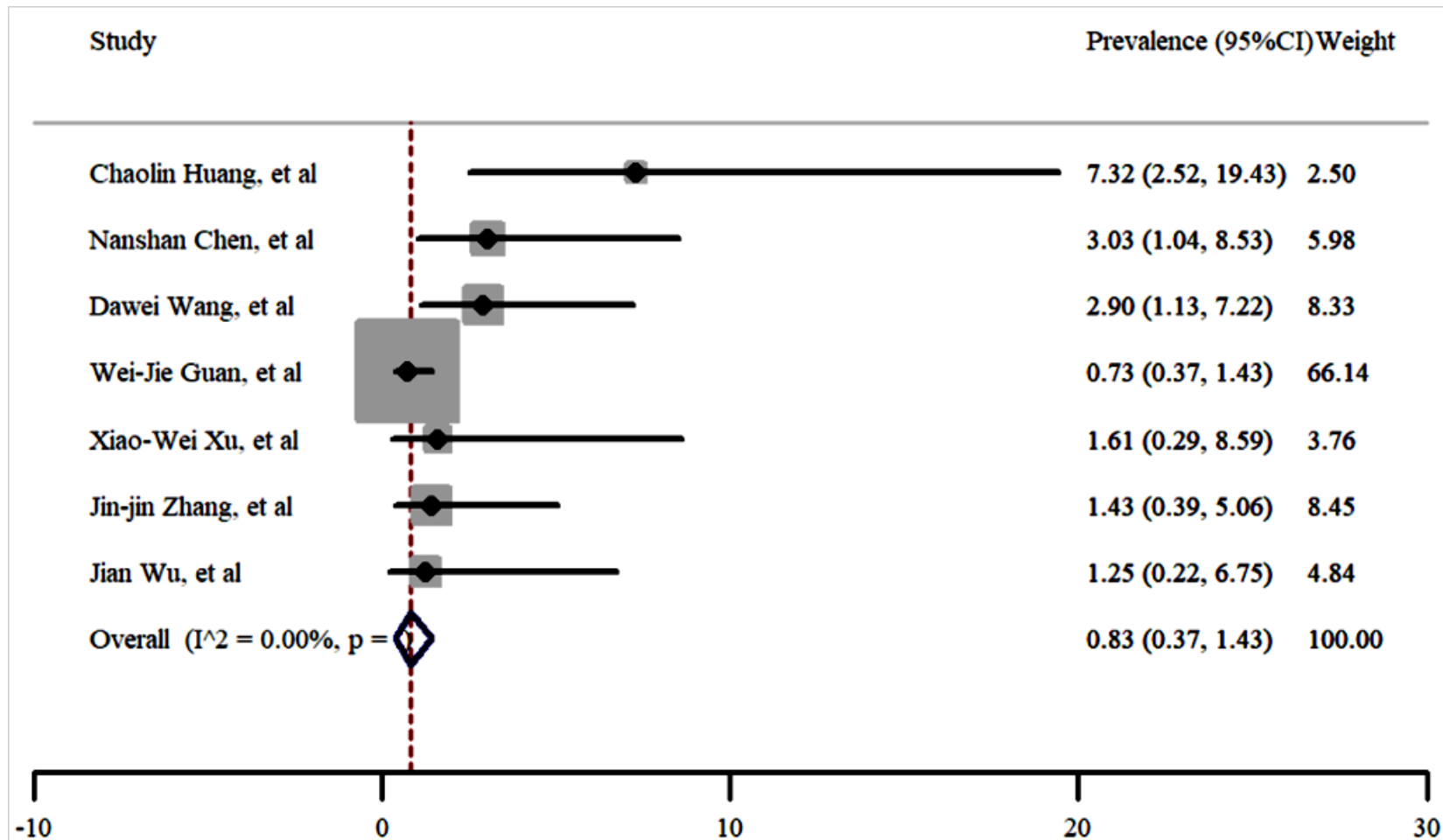
PREVALENCE OF HYPERTENSION AMONG PATIENTS HOSPITALIZED WITH COVID-19



PREVALENCE OF CVD AMONG PATIENTS WITH COVID-19



PREVALENCE OF KIDNEY DISEASE AMONG PATIENTS HOSPITALIZED WITH COVID-19





DIABETES AND COVID-19



SPECIFIC MEASURES IN PATIENTS WITH DIABETES

- It is important that people with diabetes maintain a good glycaemic control, as it might help in reducing the risk of infection and also the severity.
- More frequent monitoring of blood glucose levels (with use of self-monitoring blood glucose) is required.
- Good glycemic control may lessen chances of superadded infections
- Attention to nutrition and adequate protein intake is important.
- Any deficiencies of minerals and vitamins need to be taken care of.
- Exercise regularly.

MEASURES IN PATIENTS OF DIABETES WITH COVID-19

- In case a person with diabetes develops fever, cough, running nose or dyspnoea, the COVID-19 testing should be advised and appropriate health authority needs to be notified.
- Patients with type 1 diabetes should measure blood glucose and urinary ketones frequently if fever with hyperglycemia occurs.
- Frequent changes in dosage and correctional bolus may be required to maintain normoglycemia.
- Anti-hyperglycemic agents that can cause volume depletion or hypoglycemia should be avoided.

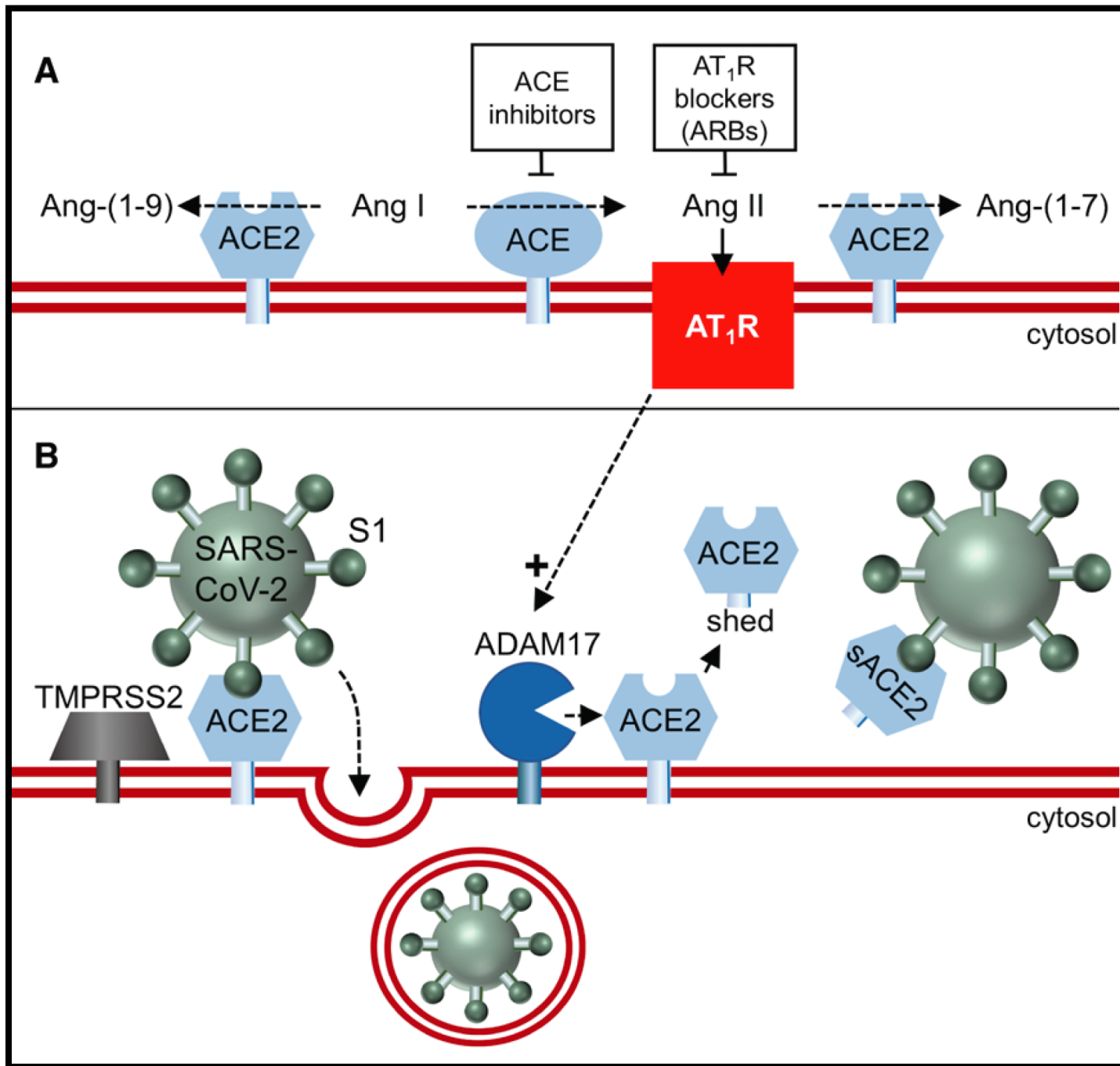
MEASURES IN PATIENTS OF DIABETES WITH COVID-19

- Dosage of oral anti-diabetic drugs may need to be reduced.
- Patients should follow sick day guidelines and may need more frequent monitoring of blood glucose and drug adjustment.
- Hospitalized patients with severe disease need frequent blood glucose monitoring.
- Oral agents especially metformin and sodium glucose cotransporter-2 inhibitors need to be stopped.
- Insulin is the preferred agent for control of hyperglycemia in hospitalised sick patients.



RAAS INHIBITORS IN PATIENTS WITH COVID-19





The carboxypeptidase ACE2 Converts Ang II (angiotensin II) to Ang-(1-7) and Ang I to Ang-(1-9)

(A), yet is not blocked by ACE inhibitors, which prevent the conversion of Ang I to Ang II. ACE2 also binds and internalizes SARSCov-2 (severe acute respiratory syndrome coronavirus-2);

B), after priming by the serine protease TMPRSS2 (transmembrane protease, serine 2). Shedding of membrane-bound ACE2 by a disintegrin and metalloprotease 17 (ADAM17) results in the occurrence of soluble (s) ACE2, which can no longer mediate SARSCov-2 entry and which might even prevent such entry by keeping the virus in solution.

AT₁R (Ang II, via its type 1 receptor) upregulates ADAM17, and AT₁R blockers (ARBs) would prevent this.

RAAS BLOCKERS AND 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.

INTERNATIONAL GUIDELINES ON USING RAAS ANTAGONISTS IN COVID-19

- There are no data supporting that ACE inhibitors or angiotensin II type 1 receptor blockers facilitate coronavirus entry by increasing ACE2 expression.
- *ESC Guidelines, ACC/AHA/HFSA Guidelines, ISH Guidelines recommend that Treatment with RAAS blockers should not be discontinued because of concerns with coronavirus infection.*



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

13 Mar 2020



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

Mar 17, 2020



A statement from the International Society of Hypertension on COVID-19

2020-03-16



ACUTE KIDNEY INJURY & COVID-19





COVID-19

AKI and #COVID19



Incidence of AKI
0.5-29%

Naicker S, et al. Kidney Int 2020; doi.org/10.1016/j.kint.2020.03.001
Yang X, et al. Lancet; doi.org/10.1016/S2213-2600(20) 30079-5

Need for CRRT
0.8-17%



Cheng Y, et al. Kidney Int 2020; doi.org/10.1016/j.kint.2020.03.005
Guan W, et al. NEJM 2020; doi:10.1056/NEJMoa2002032
Yang X, et al. Lancet; doi.org/10.1016/S2213-2600(20) 30079-5



**More common in
ICU setting**
8.3% vs 2.0%

Wang D, et al. JAMA 2020; 323 (11): 1061-69



Urinary abnormalities
Albuminuria 34%
Proteinuria 63%
Hematuria 26.7%
Both 44%



Naicker S, et al. Kidney Int 2020; doi.org/10.1016/j.kint.2020.03.001

Comorbidities

Arentz M, et al. JAMA 2020; doi:10.1001/jama.20204326
Chen H, et al. Lancet 2020; 395 (10226): 809-15
Cheng Y, et al. Kidney Int 2020; doi.org/10.1016/j.kint.2020.03.005
Guan W, et al. NEJM 2020; doi:10.1056/NEJMoa2002032
Huang C, et al. Lancet 2020; 395 (10223): 497-506



CVD
40%



CKD
0.7-48%



Diabetes
7.4-20%



Hypertension
15-33%



60 years
1960-2020

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Edgar V. Lerma, MD @edgarvlermamd



60 years
1960-2020
kidney
INTERNATIONAL

OFFICIAL JOURNAL OF THE INTERNATIONAL SOCIETY OF NEPHROLOGY

AKI in COVID-19 infections



AKI was an independent risk factor for patients' in-hospital mortality (Ref 13,14)



“Postulated” mechanisms

- Sepsis leading to cytokine storm syndrome
- Direct cellular injury due to the virus



Isolated SARS-CoV-2 from the urine sample of an infected patient suggests the kidney as a target of this novel coronavirus (Ref 19)



Treatment

- General and supportive management
- Kidney replacement therapy
- No effective antiviral therapy available at present

The impact of COVID-19 on CKD has not been reported



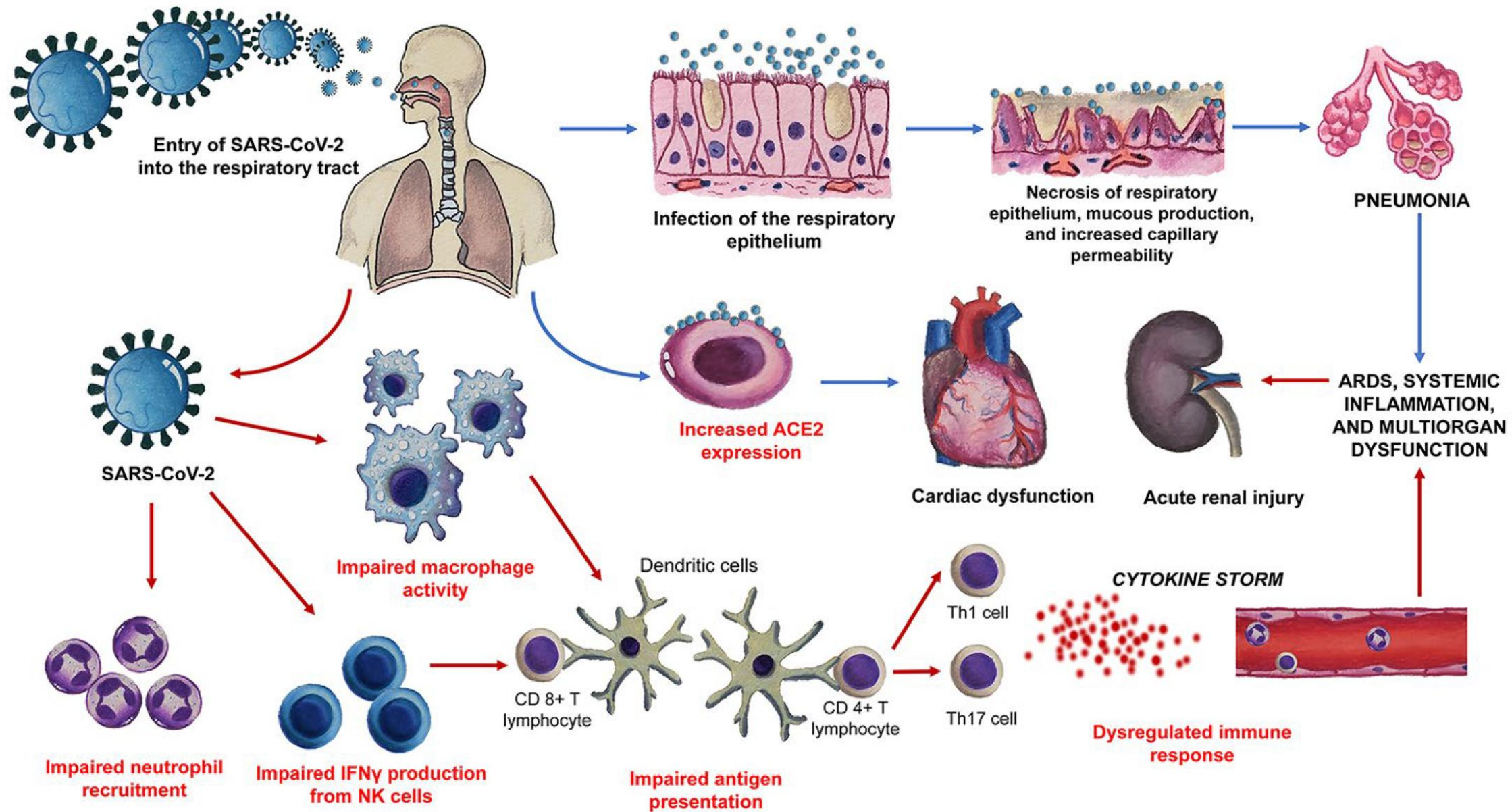
CARDIOVASCULAR COMPLICATIONS IN COVID-19



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.



**HOW TO IMPLEMENT IPC MEASURES FOR
PATIENTS WITH SUSPECTED OR CONFIRMED
COVID - 19 INFECTION?**

AT TRIAGE

- Give suspect patient a triple layer surgical mask and direct patient to separate area, an isolation room if available.
- Keep at least 1meter distance between suspected patients and other patients.
- Instruct all patients to cover nose and mouth during coughing or sneezing with tissue or flexed elbow for others.
- Perform hand hygiene after contact with respiratory secretions

APPLY DROPLET PRECAUTIONS

- Droplet precautions prevent large droplet transmission of respiratory viruses.
- Use a triple layer surgical mask if working within 1-2 metres of the patient.
- Place patients in single rooms, or group together those with same etiological diagnosis.
- If an etiological diagnosis is not possible, group patients with similar clinical diagnosis and based on epidemiological risk factors, with a spatial separation.
- When providing care in close contact with a patient with respiratory symptoms (e.g. coughing or sneezing), use eye protection (face-mask or goggles), because sprays of secretions may occur.
- Limit patient movement within the institution and ensure that patients wear triple layer surgical masks when outside their rooms

APPLY CONTACT PRECAUTIONS

Droplet and contact precautions prevent direct or indirect transmission from contact with contaminated surfaces or equipment (i.e. contact with contaminated oxygen tubing/interfaces).

- Use PPE (triple layer surgical mask, eye protection, gloves, gown) when entering room and remove PPE when leaving.
- If possible, use either disposable or dedicated equipment (e.g. stethoscopes, blood pressure cuffs, thermometers).
- If equipment needs to be shared among patients, clean and disinfect between each patient use.
- Ensure that health care workers refrain from touching their eyes, nose, and mouth with potentially contaminated gloved or ungloved hands.
- Avoid contaminating environmental surfaces that are not directly related to patient care (e.g. door handles and light switches).
- Ensure adequate room ventilation.
- Avoid movement of patients or transport.
- Perform hand hygiene.

APPLY AIRBORNE PRECAUTIONS WHEN PERFORMING AN AEROSOL GENERATING PROCEDURE

- Ensure that healthcare workers performing aerosol-generating procedures (i.e. open suctioning of respiratory tract, intubation, bronchoscopy, CPR)

Use PPE,

- including gloves,
- long-sleeved gowns,
- eye protection, and
- fit-tested particulate respirators (**N95**).

(The scheduled fit test should not be confused with user seal check before each use.)

APPLY AIRBORNE PRECAUTIONS WHEN PERFORMING AN AEROSOL GENERATING PROCEDURE

- Whenever possible, use adequately ventilated single rooms when performing aerosol-generating procedures,
 - meaning negative pressure rooms with minimum of 12 air changes per hour **or**
 - at least 160 litres/second/patient in facilities with natural ventilation.
- Avoid the presence of unnecessary individuals in the room.
- Care for the patient in the same type of room after mechanical ventilation commences

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/N-99 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

SUMMARY

- **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**
- **Clinicians caring for COVID-19 patients need to be fully aware of the potential CV side-effects of various therapies used.**

COVID-19 TECHNICAL GUIDANCE – W.H.O

- Patient management
 - Understand the patient's co-morbid condition(s) to tailor the management of critical illness and appreciate the prognosis
 - Communicate early with patient and family
- During intensive care management of COVID-19, determine which medications should be continued and which should be stopped temporarily.
- Communicate proactively with patients and families and provide support and prognostic information.
- Understand the patient's values and preferences regarding life-sustaining interventions.



Thank You