

 Open access • Posted Content • DOI:10.22541/AU.160217176.66860225/V1

## **Risk factors for severe and critically ill COVID-19 patients: a review** — [Source link](#)

[Ya-dong Gao](#), [Mei Ding](#), [Mei Ding](#), [Xiang Dong](#) ...+17 more authors

**Institutions:** [Wuhan University](#), [Swiss Institute of Allergy and Asthma Research](#), [Huazhong University of Science and Technology](#), [University of Zurich](#)

**Published on:** 08 Oct 2020

**Topics:** [Acute kidney injury](#), [Cytokine storm](#), [Diabetes mellitus](#) and [Eosinopenia](#)

Related papers:

- [The cardiovascular complications in COVID-19: Focus on acute cardiac injury](#)
- [COVID-19 and kidney;a mini-review on current concepts and new data](#)
- [Clinical characteristics of COVID-19 with cardiac injury: a systematic review and meta-analysis.](#)
- [Cardiovascular diseases and complications in patients with COVID-19](#)
- [The Definition and Risks of Cytokine Release Syndrome in 11 COVID-19-Affected Critically Ill Patients with Pneumonia: Analysis of Disease Characteristics](#)

Share this paper:    

View more about this paper here: <https://typeset.io/papers/risk-factors-for-severe-and-critically-ill-covid-19-patients-173vhyjtop>

# Risk factors for severe and critically ill COVID-19 patients: a review

Ya-dong Gao<sup>1</sup>, Mei Ding<sup>2</sup>, Xiang Dong<sup>2</sup>, Jin-jin Zhang<sup>2</sup>, Ahmet Kursat AZKUR<sup>3</sup>, Dilek Azkur<sup>4</sup>, Hui Gan<sup>2</sup>, Yuan-li Sun<sup>2</sup>, Wei Fu<sup>2</sup>, Wei Li<sup>2</sup>, Hui-ling Liang<sup>2</sup>, Yi-yuan Cao<sup>5</sup>, Qi Yan<sup>6</sup>, Can Cao<sup>2</sup>, Hong-yu Gao<sup>6</sup>, Marie-Charlotte Brüggem<sup>7</sup>, Willem van de Veen<sup>8</sup>, Milena Sokolowska<sup>9</sup>, Mubeccel Akdis<sup>10</sup>, and Cezmi Akdis<sup>8</sup>

<sup>1</sup>Zhongnan Hospital of Wuhan University

<sup>2</sup>Wuhan University Zhongnan Hospital

<sup>3</sup>Kirikkale University Faculty of Veterinary Medicine

<sup>4</sup>Kirikkale Universitesi Tip Fakultesi

<sup>5</sup>Wuhan University Zhongnan Hospital Department of Radiology

<sup>6</sup>Tongji Hospital of Tongji Medical College of Huazhong University of Science and Technology

<sup>7</sup>University Hospital Zurich

<sup>8</sup>University of Zurich

<sup>9</sup>Swiss Institute of Allergy and Asthma Research, University of Zurich

<sup>10</sup>University of Zürich

October 8, 2020

## Abstract

The coronavirus disease 2019 pandemic (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has caused an unprecedented global social and economic impact, and numerous deaths. Many risk factors have been identified in the progression of COVID-19 into a severe and critical stage, including old age, male gender, underlying comorbidities such as hypertension, diabetes, obesity, chronic lung disease, heart, liver and kidney diseases, tumors, clinically apparent immunodeficiencies, local immunodeficiencies, such as early type-I interferon secretion capacity, and pregnancy. Possible complications include acute respiratory distress syndrome, shock, disseminated coagulopathy, acute kidney injury, pulmonary embolism, and secondary bacterial pneumonia. The development of lymphopenia and eosinopenia are laboratory indicators of COVID-19. Laboratory parameters to monitor disease progression include lactate dehydrogenase, procalcitonin, high-sensitivity C-reactive protein, proinflammatory cytokines such as interleukin (IL)-6, IL-1?, Krebs von den Lungen-6 (KL-6) and ferritin. The development of a cytokine storm and extensive chest computed tomography imaging patterns are indicators of a severe disease. In addition, socioeconomic status, diet, lifestyle, geographical differences, ethnicity, exposed viral load, day of initiation of treatment, and quality of health care have been reported to influence individual outcomes. In this review, we highlight the scientific evidence on the risk factors of COVID-19.

## Hosted file

Risk factors for severe and critically ill COVID - final.pdf available at <https://authorea.com/users/320601/articles/485583-risk-factors-for-severe-and-critically-ill-covid-19-patients-a-review>

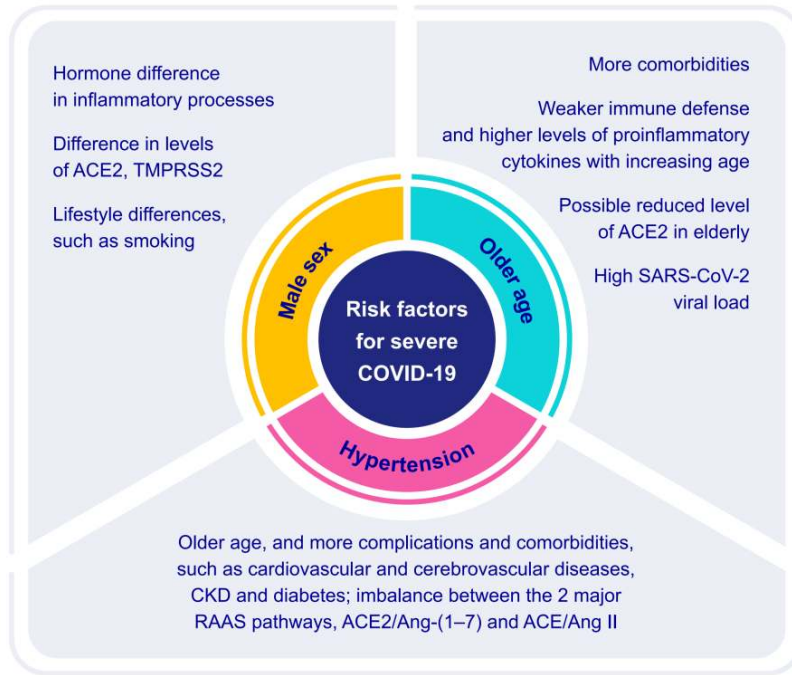


Figure 1\_Yadong et al.

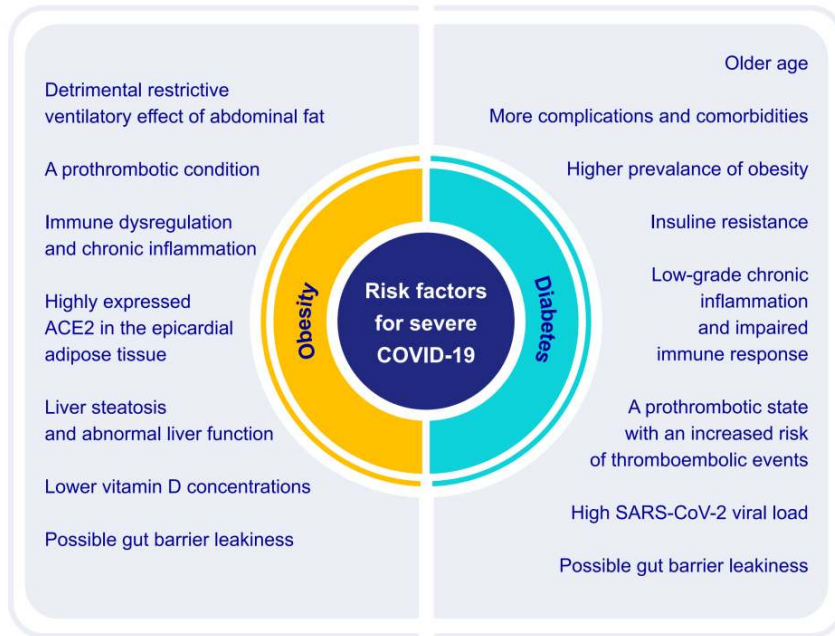


Figure 2\_Yadong et al.

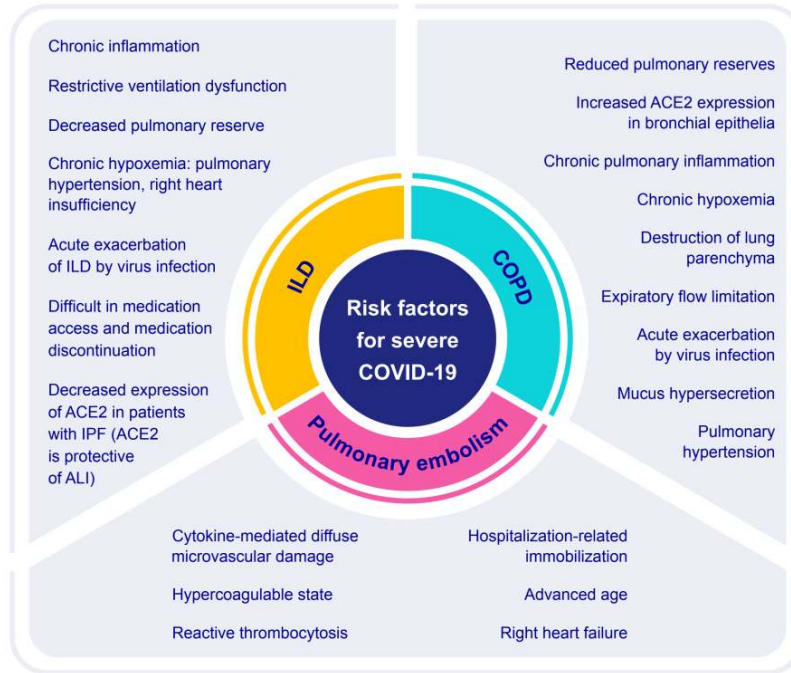


Figure 3\_Yadong et al.

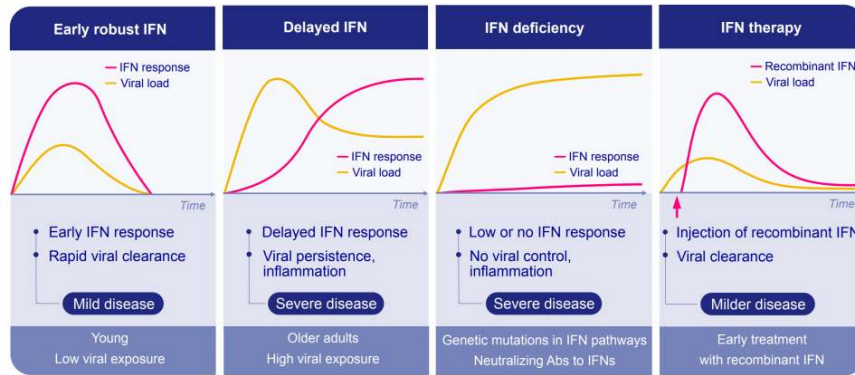


Figure 4\_Yadong et al.

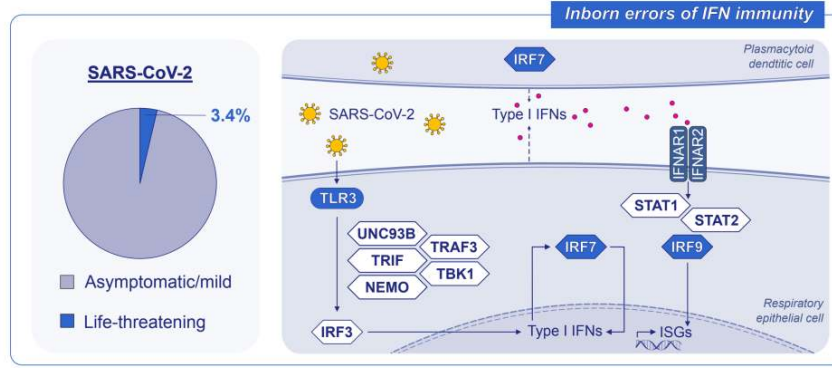


Figure 5\_Yadong et al.

**Laboratory indexes associated with severe and critical COVID**

Peripheral blood cell counts	Biochemical parameters	Coagulation indicators
Leucocytes ↑	LDH ↑	Platelet counts ↓
Lymphocytes ↓	CRP ↑	D-dimer ↓
Neutrophils ↑	PCT ↑	Fibrinogen ↑
Eosinophils ↓	AST/ALT ↑	PT ↑
NLR ↑	BUN/Scr ↑	APTT ↑
	cTnl ↑	
	IL-6 ↑	
	IL-1 $\beta$ ↑	
	KL-6 ↑	
	Ferritin ↑	

Figure 6\_Yadong et al.



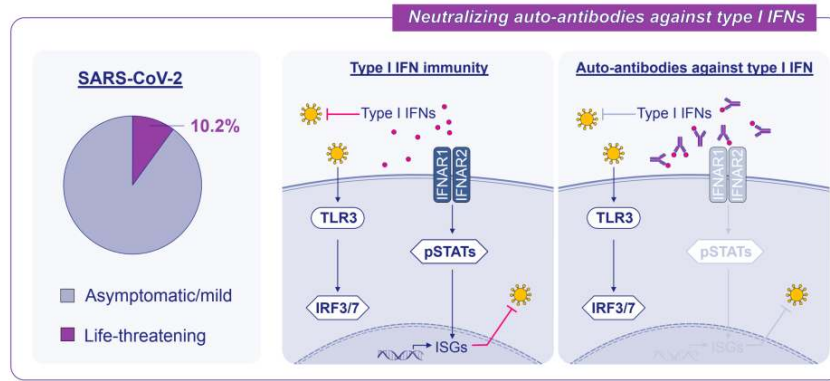


Figure 7\_Yadong et al.

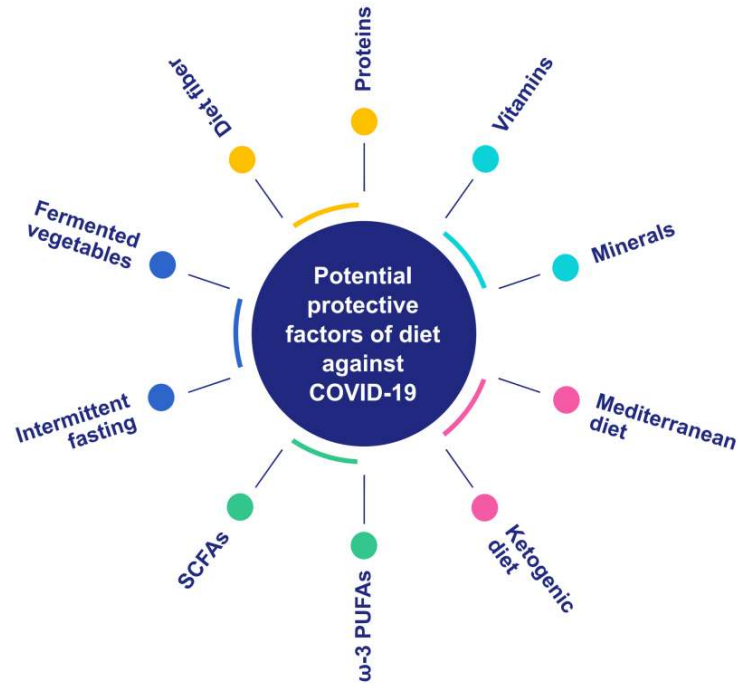


Figure 8\_Yadong et al.