Definition of severe pneumonia cases in Chinese Expert Consensus on Clinical Practice for Emergency Severe Pneumonia

According to the Chinese Expert Consensus on Clinical Practice for Emergency Severe Pneumonia, criteria for defining the severe pneumonia cases, who should also be accordingly transferred to ICU for close observation and active treatment, were as follows:

Meet one of the main criteria or more than (or equal to) 3 minor criteria.

Main criteria: ① Admitted to invasive ventilation; ② Septic shock, in need of vasoactive agents after fluid resuscitation.

Minor criteria: ① Increased respiratory rate (≥30 breaths/min); ② Arterial oxygen tension (PaO_2)/fraction of inspired oxygen (FiO_2) ≤250 mmHg (1 mmHg=0.133 kPa); ③ Pulmonary Imaging shows multiple lobes infiltration; ④ Consciousness disturbance and/or disorientation; ⑤ Blood urea nitrogen ≥7 mmol/L; ⑥ Hypotension, in need of fluid resuscitation.

Reasons for the gradual improvement of diagnosis time-efficiency in China

This study set out to mainly assess the importance of diagnosis time-efficiency in COVID-19 prognosis. Another of the aims of this study was to sum up the status and ways of improving diagnosis time-efficiency over time in China. In the early beginning, China had adopted the basic strategy for controlling the epidemic, including early detection, early isolation, early diagnosis, and early treatment (39,40). *Figure S4* shows that there has been a steep increase in time-efficacy from symptom onset to diagnosis confirmation, especially during 10th to 20th January.

In addition, we particularly examined the duration from symptom onset to first visit and from first visit to confirmation, because diagnosis time-efficiency was predominantly determined by hospitals' capacity, as well as patients' vigilance and awareness to COVID-19, while the latter is more important. The graph also shows that there has been a sharp fall in the duration from first medical visit to diagnosis confirmation during 16th to 23rd January, and a marked, gradually centralizing decrease in the duration from symptom onset to first medical visit during 5th to 20th January.

Several factors are known to contribute to the time-efficiency improvement in China. In early January, Chinese government established a series of policies, including the four-early policy: Early Detection, Early Diagnosis, Early Isolation, and Early Treatment, concentrating experts and resources on treating COVID-19. On 10th January, the Chinese Center for Disease Control and Prevention (CDC) and other professional institutions initially developed the 2019-nCoV test kit. Then, medical institutions at all levels and of all kinds in all provinces have comprehensively deployed pre-examination triage and fever clinics, and standardized the monitoring, screening, diagnosis, treatment, and disposal of COVID-19 suspicious cases. On 16th January, PCR diagnostic reagents were optimized, and Wuhan City conducted active tests for all patients in fever clinics and emergency admissions from 69 hospitals. From 20th to 26th January, the provincial and municipal health commissions gradually published the lists of local fever clinics and designated hospitals for COVID-19, to facilitate the public's access to medical care. At the same time, in addition to improving the operation of pre-examination triage and fever clinics in all types of medical institutions continually, medical institutions have further increased the examination of suspected cases of COVID-19 in accordance with the newly revised diagnosis and treatment protocol, while further improving the testing protocol, optimizing the testing process, to accelerate the testing speed. Besides, Media tracking of progress and dissemination of scientific knowledge has been intensified since the beginning of the outbreak, making the public better aware of the symptoms and preventive measures of COVID-19 (41). All these policies may have played a vital role in bringing about higher diagnosis time-efficiency.

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Table S1 Demographics and clinical characteristics of patients stratified by different severe level

Variables	Total, n=1,590	Non-severe Level, n=1,353	Severe Level, n=237	P value
Age	n=1403	n=1,185 (84.46)	n=218 (15.54)	
	49.0(36.00- 62.00)	47.0 (36.00–59.00)	62.5 (50.00–69.00)	<0.01
Temperature on admission (℃)	n=1459	n=1226 (84.03)	n=233 (15.97)	
	37.2(36.70-38.00)	37.2 (36.70 - 38.00)	37.1 (36.50–38.00)	0.12
Gender	1578	1341 (84.98)	237 (15.02)	<0.01
Male	904 (57.29)	748 (55.78)	156 (65.82)	
Female	674 (42.71)	593 (44.22)	81 (34.18)	
Smoking status	1590	1353 (85.09)	237 (14.91)	0.04
Never/unknown	1479 (93.02)	1266 (93.57)	213 (89.87)	
Former/current	111 (6.98)	87 (6.43)	24 (10.13)	
Symptoms				
Dry cough	1052 (70.23)	877 (69.16)	175 (76.09)	0.04
Pharyngodynia	194 (14.73)	164 (14.71)	30 (14.85)	0.96
Conjunctival congestion	10 (0.74)	9 (0.79)	1 (0.48)	0.63
Nasal congestion	73 (5.62)	55 (5.01)	18 (8.96)	0.03
Headache	205 (15.44)	169 (14.98)	36 (18.00)	0.28
Productive cough	513 (36.03)	426 (35.38)	87 (39.55)	0.24
Fatigue	584 (42.78)	499 (43.17)	85 (40.67)	0.50
Hemoptysis	16 (1.22)	10 (0.90)	6 (2.91)	0.02
Shortness of breath	331 (20.82)	216 (15.96)	115 (48.52)	<0.01
Nausea/vomiting	80 (5.84)	63 (5.43)	17 (8.10)	0.13
Diarrhea	57 (4.19)	45 (3.91)	12 (5.80)	0.21
Myalgia/arthralgia	234 (17.49)	196 (17.22)	38 (19.00)	0.54
Chill	163 (12.23)	139 (12.26)	24 (12.06)	0.94
Chronic comorbidities	399 (25.09)	277 (20.47)	122 (51.48)	<0.01
COPD	24 (1.51)	10 (0.74)	14 (5.91)	<0.01
Diabetes	130 (8.18)	90 (6.65)	40 (16.88)	<0.01
Hypertension	269 (16.92)	185 (13.67)	84 (35.44)	<0.01
Coronary heart disease	59 (3.71)	40 (2.96)	19 (8.02)	<0.01
Cerebrovascular disease	30 (1.89)	15 (1.11)	15 (6.33)	<0.01
Hepatitis B	28 (1.76)	20 (1.48)	8 (3.38)	0.04
Malignancy	18 (1.13)	9 (0.67)	9 (3.80)	<0.01
Chronic renal diseases	21 (1.32)	13 (0.96)	8 (3.38)	<0.01
Immunodeficiency	3 (0.19)	2 (0.15)	1 (0.42)	0.37
Imaging abnormalities	1216 (85.03)	1003 (83.65)	213 (92.21)	<0.01
Having chest x-ray	383 (29.64)	264 (24.47)	119 (55.87)	<0.01
Having chest CT	1320 (90.78)	1114 (90.94)	206 (89.96)	0.64
Ground-glass opacities	789 (55.17)	658 (54.88)	131 (56.71)	0.61
Local pulmonary infiltrates	617 (43.15)	507 (42.29)	110 (47.62)	0.13
Pulmonary infiltrates	769 (53.78)	587 (48.96)	182 (78.79)	<0.01
Lnterstitial disorders	224 (15.66)	163 (13.59)	61 (26.41)	<0.01
Durations				
From symptom onset to diagnosis confirmation	882	733 (83.11)	149 (16.89)	
	2.0 (1.00–5.00)	2.0 (1.00–5.00)	4.0 (2.00–9.00)	<0.01
From symptom onset to first medical visit	1385	1176 (84.91)	209 (15.09)	
	3.0 (0.00–6.00)	3.0 (0.00–5.00)	4.0 (1.00–6.00)	<0.01
From first medical visit to diagnosis confirmation	905	753 (83.20)	152 (16.80)	
	6.0 (3.00–9.00)	6.0 (3.00–9.00)	8.0 (6.00–12.00)	<0.01
From admission to reaching sever level	1240	1039 (83.79)	201 (16.21)	
	8.0(7.00–11.00)	9.0 (7.00–11.00)	3.0 (1.00– 6.00)	<0.01

Data are mean ± standard deviation, or median with range, n (%), where n is the sample number of patients and % is the proportion with available data. COPD=chronic obstructive pulmonary disease.

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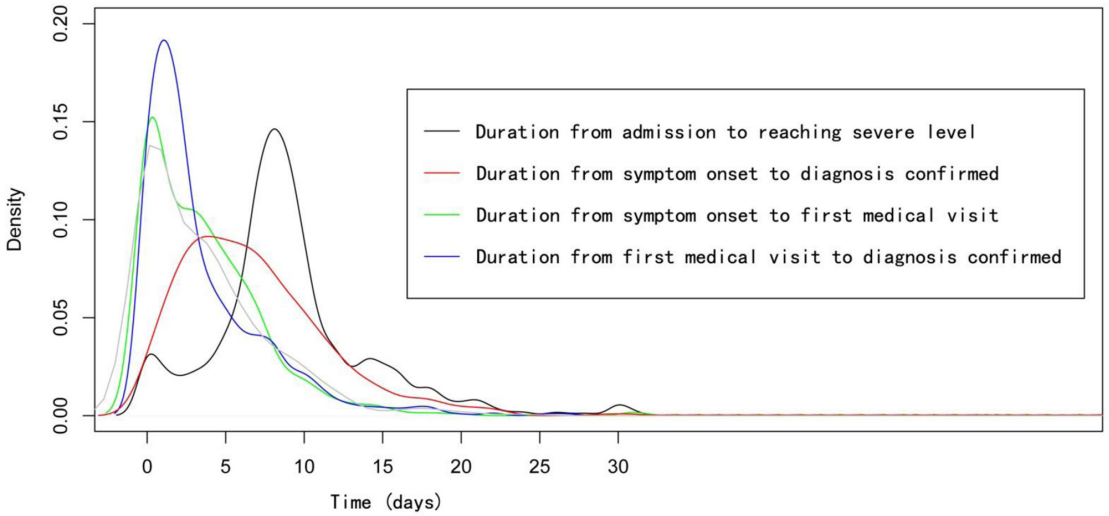

Figure S1 Frequency density of durations of diagnosis related time-efficiency and outcome.

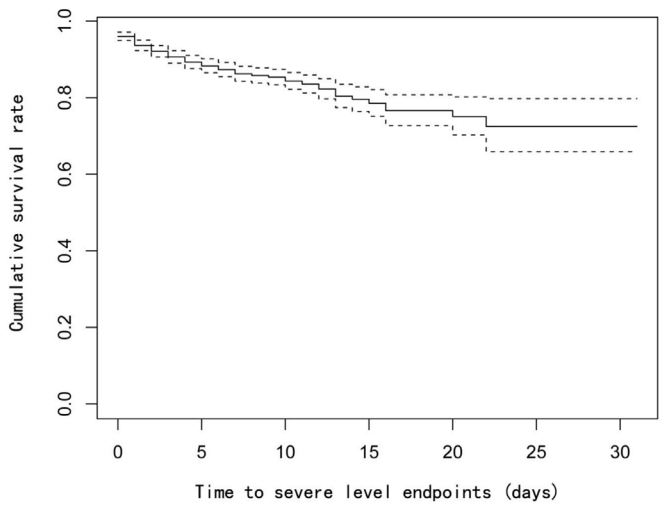

Figure S2 Overall survival curve within 31 days.

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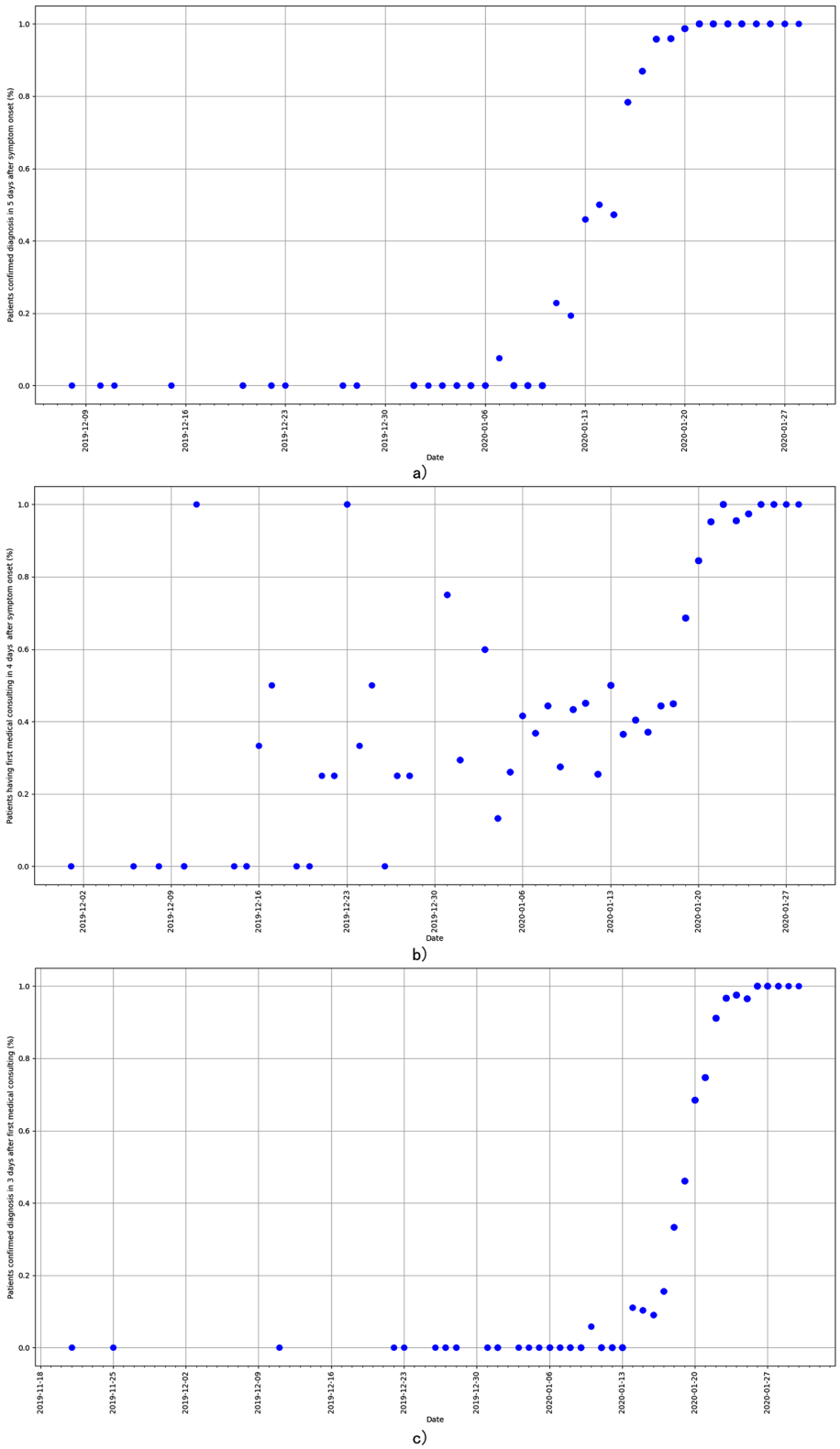

Figure S3 Gradual improvement of diagnosis time-efficiency in China.

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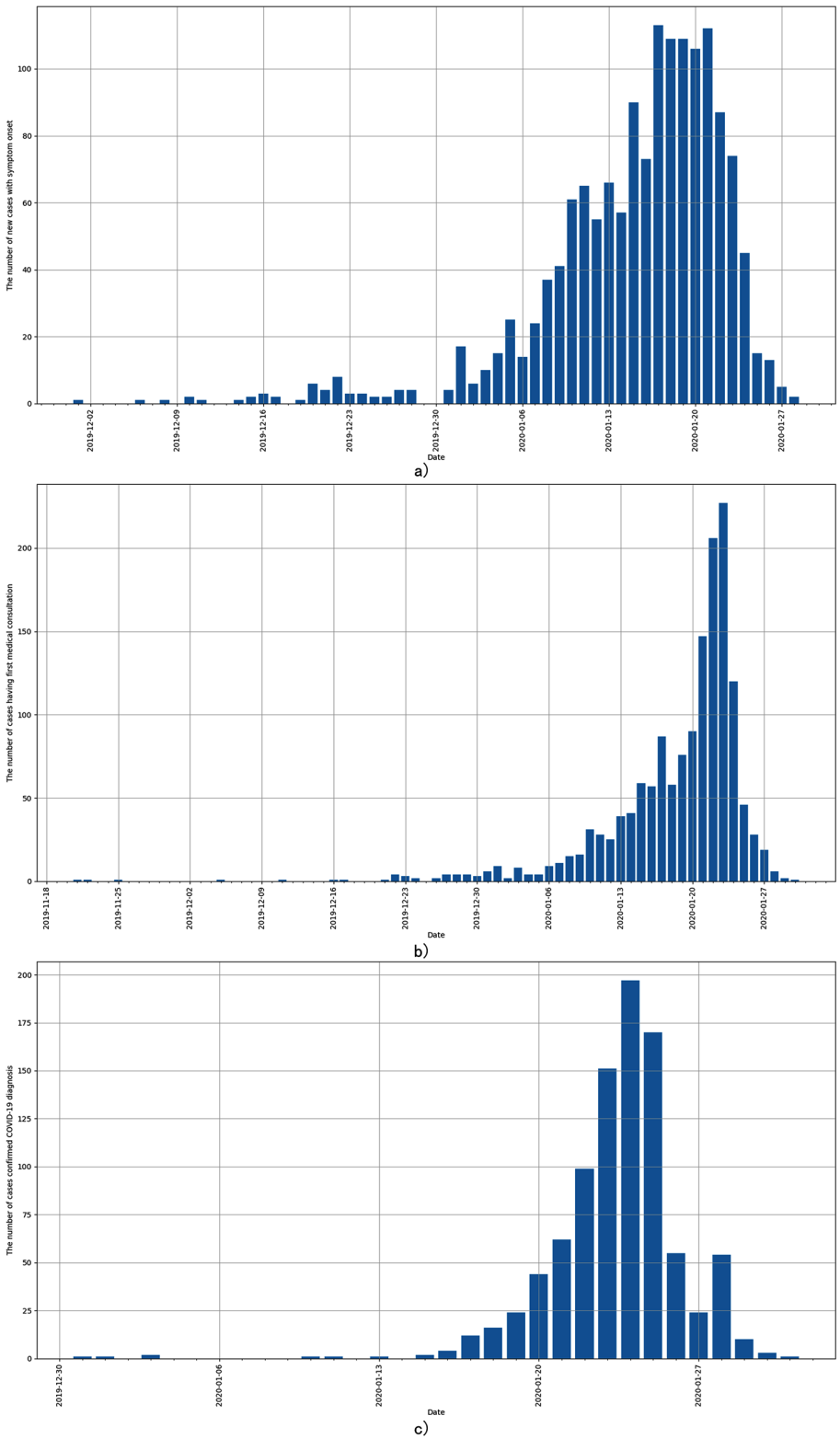

Figure S4 Daily new cases in this cohort.

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