**Key Findings**

- The median length of overall hospital stay varied widely and was often the only LoS estimate reported by included studies.
- The median length of stay in hospital was influenced by several factors including gender, age, presence of comorbidities and disease severity.
- The period of follow up was relatively short in studies to allow for determination of outcomes in the entire cohort. Many observations were censored at the study endpoint because patients were still hospitalized.

**Limitations**

- The majority of studies originated in China reflecting the earliest origin of COVID-19.
- Data is limited about estimates for some levels of care with most studies reporting overall length of stay in hospital.
• Length of stay was often not a primary outcome of interest in studies that reported it although an important parameter for models.
• Several studies included censored observations for patients still hospitalized at the study endpoint that has implications for interpretation of the LoS estimates.

GRADE of Evidence: B - Moderate  
A grade of "B" is assigned when further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate. The review may include one high quality study and/or several studies with some limitations.

For more information about how this rating was determined, visit https://www.essential evidenc eplus.com/product/ebm_loe.cfm?show=grade
Background/Context
Mathematical modelling is an important tool to inform planning health system response to COVID-19 infection in communities. With heightened community transmission, the infection can spread rapidly and quickly overwhelm existing health care resources such as intensive care beds. Models can simulate patient flow and help decision makers to understand demand and capacity under different scenarios. Any model is predicated on specific assumptions and requires inputs from multiple sources such as data on hospital beds, estimated infection rates, proportion of people hospitalized (general medicine and ICU), average lengths of stay (LOS), increased risk for people older than 65 and transmission rate.

Purpose
This rapid review support the local modelling efforts by researching estimates for the length of stay (LoS) in hospital for COVID-19 cases who do not require ICU care, those who require ICU care as well as LoS after ICU admission.

Review Question(s)
- What is the mean length of stay for COVID-19 patients in the ICU and general wards?

Method
The search strategy was developed and executed by a team of medical librarians in collaboration with the modeling team who requested the review. Bibliographic databases were searched including Medline, CINAHL, PubMed, PSYCInfo, TRIP and content specific resources such as LitCovid and medRxiv. The latter were expected to be important sources due to the current rapid development of this field; hence, the fully published literature might not cover all the available information. Additionally grey literature was searched including organizational websites that produce situation reports that may publish length of stay estimates. Reference lists were also reviewed for articles that may have been missed in the primary search.

The search combined concepts of COVID 19 (e.g. Coronavirus, SARS CoV2, COVID-19, severe acute respiratory syndrome) and terms related to duration of hospital stay (length of stay, admission duration, admission length, hospital*). The search terms for hospital stay length were broad to capture studies that report length of stay as a secondary outcome. The strategy can be found in supplementary appendix.

Studies were included if they were published after December 1, 2019 and reported length of stay in hospital for COVID-19 patients. Only articles in English were included.

Summary of Evidence
There were 35 studies identified in the literature that satisfied the eligibility criteria. The majority of studies examined COVID patients in China (n=20) followed by United States (n=6). As expected, most studies did not explore length of hospital stay as a primary outcome of interest. Among the studies, two pertained exclusively to children (Rees et al., 2020; Wu, Xing, Shi et al., 2020) and another two studies to pregnant women (Pierce-Williams et al., 2020; Wu, Sun, Chen et al., 2020). Most studies were retrospective observational studies except a study by Pierce-Williams and colleagues (2020) that also had a prospective component. Additionally, most study samples included a greater number of males than females.
Most studies (n=21) provided overall estimates of length of stay for COVID-19 patient admitted to hospital without disaggregation by duration in ICU and after discharge from ICU care (Bode et al., 2020; Bhatraju et al., 2020; Hong et al., 2020; Huang et al., 2020; Jiang et al., 2020; Lei et al., 2020; Lui et al., 2020; Pablo et al., 2020; Paranje et al., 2020; Phillip et al., 2020; Richardson et al., 2020; Wang, Ji, Liu et al., 2020; Wu et al., 2020; Wu, Chen, Cai et al., 2020; Wu, Sun, Cheng, et al., 2020; Wu, Xing, Shi et al., 2020; Xie et al., 2020; Yu et al., 2020). A few studies (n=4) focused only on COVID-19 patients who were admitted to ICU (Graselli et al., 2020; Pedersen et al., 2020; Lapidus et al., 2020; Valenti et al., 2020). The median length stay in hospital varied markedly across studies from a low of 4 days to 17 days. A review (Rees et al., 2020) found that length of stay varied according to whether the individual was managed within China or another country suggesting the influence of individual characteristics and/or local health care resources. In several studies, length of stay in ICU was significantly different for survivors and non-survivors (Bhatraju et al., 2020; Guan et al., 2020; Graselli et al., 2020; Liu et al., 2020; Rees et al., 2020; Richardson et al., 2020; Yang et al., 2020; Zhou et al., 2020). Other factors that affected median length of stay in hospital included sex (prolonged stay among males), age (older age associated with longer stay) and presence of comorbidities such as diabetes, hypertension and heart disease and disease severity (Auld et al., 2020; Bode et al., 2020; Graselli et al., 2020; Jiang et al., 2020; Paranje et al., 2020; Pierce-Williams et al., 2020; Richardson et al., 2020; Valente et al., 2020; Wang, Hu, Hu, et al., 2020; Wang, Ji, Liu, et al., 2020; Wu, Sun, Chen, et al., 2020; Xie et al., 2020; Zhou et al., 2020).

There were few studies of children and pregnant women hence it is difficult to determine whether the length of stay was similar to other general adult populations. However, it was noted that case fatality was low in these studies suggesting fewer patients with milder disease. Additional studies describing the clinical course of these populations are needed.

**Conclusions**

The studies identified have limited granularity about different levels of care provided within the patient pathway and mostly reported overall length of stay in hospital. There is heterogeneity in estimates across studies with overall median length of stay in hospital between 4 and 17 days. Several factors influence length of stay in hospital for COVID patients including age, sex, presence of comorbid conditions and disease severity. The majority of studies reflect the experience in China and include a substantial number of censored outcomes for patients who were still hospitalized.

**Glossary**

(Optional, but useful if there are clinical/statistical terms being referenced in the document.)
<table>
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<tr>
<th>Ref</th>
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<th>Primary outcome measure</th>
<th>Additional findings</th>
<th>Quality of study</th>
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| 1.  | Adult patients with laboratory-confirmed Covid-19 seen at 552 hospitals had data extracted for inclusion in the study through January 29, 2020 China Age: 47(IQR35-58) Sex: 640 (58.4%) | Retrospective study        | N=1099  
Overall LOS: 12(IQR10-14)  
ICU: No:55  
Median LOS: 12(IQR10-13)  
Non-ICU: N=1032  
LOS Non-ICU:12(IQR 10-13) |                                                                                                                                    | Peer reviewed |
| 2.  | Adult patients with confirmed COVID-19 pneumonia admitted to Wuhan Jinyintan Hospital in China between December 25, 2019, and January 26, 2020. The final date of follow-up was February 13, 2020. Age:51(IQR43-60) Sex: 128(63.7%) | Retrospective study        | N=201  
Overall median LOS:13(IQR10-16)  
ICU:53 died:44 CFR:83%  
Medial LOS for non survivors: The median time from admission to developing ARDS was 2 days (IQR, 1-4 days). All of the patients who died had developed ARDS and received mechanical ventilation. Most received empirical antibiotics and antiviral treatment (n=170). |                                                                                                                                    | Peer reviewed |
| 3.  | All consecutive patients with confirmed NCIP admitted to Zhongnan Hospital of Wuhan University from January 1 to January 28, 2020, were enrolled. 64 had comorbid conditions. Age:56(IQR42-62) Sex: 75(54.3%) | Retrospective study        | N=138  
deaths=6  
CFR:4.3%  
Median LOS:7(IQR4-8)  
ICU: No=36  
deaths=6  
CFR:16.7%  
Non-ICU:102  
Compared with patients who did not receive ICU care (n = 102), patients who required ICU care (n = 36) were significantly older (median age, 66 years [IQR, 57-78] vs 51 years [IQR, 37-62]; P < .001) and were more likely to have underlying comorbidities, including hypertension (21 [58.3%] vs 22 [21.6%]), diabetes (8 [22.2%] vs 6 [5.9%]), cardiovascular disease (9 [25.0%] vs 11 [10.8%]), and cerebrovascular disease (6 [16.7%] vs 1 [1.0%]). |                                                                                                                                    | Peer reviewed |
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<td>4</td>
<td>Patients referred for admission to 1 ICU of 72 hospitals in the network. All cases confirmed with RT-PCR by nasal or pharyngeal swabs. <em>Lombardi, Italy</em></td>
<td>Retrospective case series</td>
<td>N=1581 Died=405 CFR:25.6% Median LOS: 9days (6-13) ICU=920 Median LOS for non-survivors:7(IQR5-11) Post ICU: N=256 Median LOS:8(IQR5-12)</td>
<td>ICU mortality was significantly lower in younger patients (≤63 years) compared with older patients (≥64 years) (15% vs 36%; difference, −21% [95% CI, −26% to −17%]; P &lt; .001). Percentage of patients discharged from the ICU was significantly higher among younger patients compared with older patients (21% vs 11%; difference, 9% [95% CI, 6%-13%]; P &lt; .001).</td>
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<td>5</td>
<td>Consecutive lab confirmed patients admitted to dedicated ICU for COVID patients in from December 30 2019 to March 12, 2020 <em>Wuhan, China</em></td>
<td>Retrospective study</td>
<td>N=59 Died=21 CFR:36% All Av LOS: 30.6(95%CI 26.2-35.3) Median LOS:27(IQR16.5-39) ICU</td>
<td>Mean and median estimates for the duration of mechanical invasive ventilation was 21.6 days (95%CI 15.4-28.7) and 12 days (IQR 8.5-31 days), respectively. The corresponding estimates for non-invasive ventilation were 5.6 days (95% CI 3.9–7.8) and 3.5 [IQR 1.9–3.0], respectively.</td>
<td>Peer reviewed</td>
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<td>6</td>
<td>Studies reported LOS for individual patients who had confirmed SARS CoV infection. Includes 3 pediatric studies. Searched Jan 1, to Apr 12, 2020. Summary distributions created for general hospitalisation LoS and for ICU LoS. <em>Age: 59(SD9.6) Sex: 38(64%)</em></td>
<td>Systematic review and meta-analysis</td>
<td>Most studies only reported overall hospitalization stay; 8 studies reported LOS in ICU (4 China and 4 outside China All hospitalized Estimated to be 14 (10-19) for China and 5 (3-9) excluding China. ICU Estimated to be 14 (10-19) for China and 5 (3-9) excluding China.</td>
<td>Not always possible to accurately interpret the sample size of the population nor whether the LoS estimate included still hospitalised patients. Length of stay for those discharged alive (4-53 days) was longer than those who died (4 - 21 days)</td>
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<td>7</td>
<td>Lab confirmed COVID cases who were managed in a designated hospital for SARS pneumonia between Dec 24 and followed to Feb 9, 2020. Twenty 21 (40%) had chronic diseases Age: 59(SD13.3) Sex: 35(67%) Comorbidity: 91(48%)</td>
<td>Retrospective single center</td>
<td>N-52 Died _32 CFR:61.5% Median LOS(all): Median LOS non-survivors: Median LOS Survivors: ICU: 12 Died:39 CFR:78% Median LOS (ALL): 8(IQR4,12) Median LOS non-survivors: 8(IQR4,12) Median LOS survivors: 7(IQR 2,9)</td>
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<td>8</td>
<td>All lab confirmed adult cases admitted to two hospitals with a definite outcome of death or discharge by Jan 31, 2020 Wuhan, China</td>
<td>Retrospective multicenter study</td>
<td>N=191, Died=54 CFR:28.3% Median LOS: All: 11 days(IQR7 -14) Non-survivors:7.5(IQR5-11) Survivors: 12(IQR 9-15) ICU: N=50 Died:39 CFR:78% Median LOS (ALL ICU): 8(IQR4-12) Median LOS survivors:7(IQR 2-9)</td>
<td>Multivariable regression showed increasing odds of in-hospital death associated with older age (odds ratio 1·10, 95% CI 1·03–1·17, per year increase; p=0·0043), higher Sequential Organ Failure Assessment (SOFA) score (5·65, 2·61–12·23; p=0.0033) on admission.</td>
<td>Peer reviewed</td>
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<td>9</td>
<td>All patients hospitalised with laboratory-confirmed SARS-CoV-2 infection at Imperial College Healthcare NHS Trust (3 hospitals) between February 25 and April 5, 2020. The population served is 40% non-white ethnicity United Kingdom Age: 67(IQR 26) Sex:322 (62% men)</td>
<td>Retrospective cohort study</td>
<td>N=520 Died:144 Discharged:302 Completed outcomes:446 CFR: 32% Median LOS: 7(IQR 6-8) accounting for patients with pending outcomes ICU=80 Died=20</td>
<td>Whilst the crude OR of death of black compared to white patients was not significant (1·14, 95%CI 0·69-1·88, p=0.62), adjusting for age and comorbidity showed a trend towards significance (aOR 1·72, 95%CI 0·98-3·02, p=0.06) and further accounting for admission severity (Early Warning Score) showed a significant difference (aOR 1·83 95% CI 1·02-3·30, p=0.04)</td>
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| 10  | Adult patients from nine Seattle-area hospitals who were admitted to the intensive care unit (ICU) with lab confirmed infection with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). Followed up until Mar 23, 2020 (each had at least 14 days). Six patients admitted from skilled nursing facility and remainder from home. Age: 64 (IQR 18) Sex: 63% men | Retrospective case series                   | N=24 (All ICU) Died:12 (50%)  
Median LOS: All ICU: 12 (IQR 6-18)  
Median LOS non-survivors: 7.5 (IQR 3-10) |                                                                                                                                                                                                             | Peer reviewed          |
| 11  | Patients who were at least 18 years old, had a laboratory confirmed COVID-19 infection and were admitted to any of the 5 MSHS hospitals between February 27 and Apr 2, 2020 New York  
Age: 65 (IQR 54-76)  
Sex: 1293 (58.8%)                                                                                                                                       | Retrospective cohort study                  | N=2199, 1078 with outcomes  
Discharged: 768  
Median LOS (ALL) accounting for censoring: 7.7 days  
ICU: 385, Died: 121  
CFR: 31.4%                                                                                                                                     | Median age of non-survivors was older [75 IQR 64-85] than survivors [59 IQR 45-72]                                                                                                                               | Not peer reviewed     |
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<td>12</td>
<td>Patients all patients with COVID-19 admitted to six COVID-designated intensive care units (ICUs) at three Emory Healthcare acute-care hospitals in Atlanta, Georgia from March 6, 2020 through April 17, 2020 Age:64(IQR54-75) Sex: 193(IQR54.8%)</td>
<td>Retrospective cohort study</td>
<td>N=217 Died:52 (23.9%) 129 transferred out and 4 died on another ward Median LOS ICU: 12(IQR10-18)</td>
<td>Among patients who received invasive mechanical ventilation, ICU mortality is 28.5% (47/165) and hospital mortality is 29.7% (49/165)</td>
<td>Not peer reviewed</td>
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<td>13</td>
<td>Data for confirmed COVID-19 patients in Sichuan Province was obtained form the registry (NNDRS) for the period Jan -Mar 2020 Age: (53%) Sex:235 (53% men)</td>
<td>Cross sectional study</td>
<td>N=538, Died:3(&lt;1%), 171 not resolved at study endpoint Median LOS: 19(IQR14-23) The median LOS was 21 days (IQR: 14-24, range: 3-41) for those aged 45, 18 days (IQR:13-22, range 3-41) for people under 45 years old.</td>
<td>Adjusted multivariate analysis showed that longer hospital length of stay was associated with factors aged 45 and over (HR: 0.74, 95% CI: 0.60-0.91), those admitted to provincial hospital (HR: 0.73, 95% CI: 0.54-0.99), and those with serious illness (HR: 0.66, 95% CI: 0.48-0.90); living in areas with more than 5.5 healthcare workers per 1000 population (HR: 1.32, 95% CI: 1.05-1.65) was associated with shorter hospital length of stay. There was no gender difference.</td>
<td>Peer reviewed</td>
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<td>14</td>
<td>Lab confirmed COVID-19 cases were enrolled from Beijing YouAn Hospital who were seen during the period Jan 21 to Feb 8, 2020 Beijing, China Age:52(SD 20) Sex: 34(44.3%)</td>
<td>Retrospective cohort study</td>
<td>N=77, Died:5(6.5%), 8 still in hospital at study endpoint Median LoS (ALL): 13(IQR10-18) Median LoS (discharged): 13(IQR10-16.5)</td>
<td>Multivariable stepwise Cox regression model showed bilateral pneumonia on CT scan, shorter time from the illness onset to admission, severity of disease and lymphopenia were independently associated with longer hospitalized duration.</td>
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<td>15</td>
<td>Lab confirmed COVID cases who were admitted to ICU at Evergreen Hospital, Washington State between Feb 20 and Mar 5, 2020 Age:70(IQR43-92) Sex: 10(%2%)</td>
<td>Retrospective case series</td>
<td>N=21, Died:11(52%), 8 remained ill at end of study ICU N=17, Died=11(81%), 2 discharged Those who survived or remained critically ill: 7.5(5-10) Hospital duration prior to intubation: 1.5(0-12)</td>
<td>Mechanical ventilation was required in 15(71%). Acute respiratory distress syndrome (ARDS) was observed in 15 of 15 patients (100%) requiring mechanical ventilation and 8 of 15 (53%) developed severe ARDS by 72 hours.</td>
<td>Peer reviewed</td>
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<td>16</td>
<td>Consecutive patients with COVID-19 admitted to 12 hospitals in <em>New York City</em>, Long Island, and Westchester County, New York, within the Northwell Health system between March 1, 2020, and April 4, 2020, inclusive of these dates. Age:63(IQR52-75) Sex:3473(60.3% men)</td>
<td>Retrospective case series</td>
<td>N=5700, 2634 discharged, 3066 remained in hospital, Died: 553(20.9%) Median LoS (ALL): 4.1(IQR 2.3-6.8) ICU: 373, Discharged:82 Died:291(78%) Median LoS survivors:4.5(IQR2.3-7.4)</td>
<td>A total of 45 patients (2.2%) were readmitted during the study period. The median time to readmission was 3 days (IQR, 1.0-4.5) for readmitted patients. 320/373 received mechanical ventilation and 88.1% died.</td>
<td>Peer reviewed</td>
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<td>17</td>
<td>Medical records of confirmed COVID-19 cases for the period Jan to Feb 20, 2020 Zhejiang, China Age:46.3(SD13.3) Sex:41(55%)</td>
<td>Retrospective Case series</td>
<td>N=75, deaths=0</td>
<td>The ProLOS group (had h/o travel to Wuhan) showed significantly longer stay in hospital [16 (IQR, 15–17) vs. 7 (IQR, 4–11) days; P&lt;0.001]. Patients who received corticosteroids tended to have longer LOS in hospital (36% vs. 16%; P=0.097).</td>
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<td>18</td>
<td>Adult lab confirmed COVID-19 cases with and without diabetes hospitalized between Mar 1 to Apr 2020 in 8 US hospitals. 451(38.5%) had diabetes or uncontrolled hyperglycemia Age:65(IQR24-95) Sex: 624(55.6%)</td>
<td>Retrospective observational study</td>
<td>N=1122 (552 still in hospital at end) Died:77 (13.5% of those with outcome) Estimate available only for patients discharged alive. Longer median LOS for diabetics (5.2 vs 4.3 days) than non-diabetics.</td>
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<td>Peer reviewed</td>
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<td>19</td>
<td>Adult lab confirmed hospitalized patients admitted to 1 of 2 hospitals during the period Mar13 to Apr 11, 2020 Palo Alto, California Age:60.4(IQR43.3-70.6) Sex: 38(52.8%)</td>
<td>Retrospective chart review</td>
<td>N=72, Died:5(6.9%), discharged 63 Median LoS (All):7.5(IQR4-13) ICU ICU: N=21, Died: 3(14.3%) Median LoS (All ICU):17(IQR 11-30) Non-ICU Non-ICU: 51, Died: 2(3.9%) Median LoS:59(IQR3-9)</td>
<td></td>
<td>Peer reviewed</td>
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<tr>
<td>20</td>
<td>Adult lab-confirmed COVID-19 cases who were admitted to Georgia hospitals during March 2020 Age: 60(IQR46-69) Sex: 151(49.5%)</td>
<td>Retrospective chart review</td>
<td>N=305 (4 censored at study end) Died:48(17.1%), Discharged:233 Median LoS (All): 8.5(IQR 5-14) ICU: N=119, fatality estimated at 37-48% assuming all currently hospitalized lived or died Median LoS (ALL ICU): 8(IQR 5-12) Convenience sample that does not necessarily represent all patients in selected hospitals 80% of cohort patients were black compared with 47% of hospitalized patients overall during March 2020</td>
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<td>21</td>
<td>Adult lab-confirmed case of COVID who were hospitalized between Jan 17 to Feb 10, 2020 Hunan, China Age: 41(IQR31-51) Sex: 26(52%)</td>
<td>Retrospective multicentre cases series</td>
<td>N=54, Died=0(0%) Median LoS (All):9(IQR7-15)</td>
<td>Median LOS was longer for patients with severe disease [21 days(IQR20-24) vs 9 days (IQR7-12)]</td>
<td>Peer reviewed</td>
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<td>22</td>
<td>Adult lab confirmed cases of COVID 19 who were admitted to the Taizhou Enze Medical Center from Jan 31 to Feb 16, 2020 Age: 41(IQR 12-74) Sex:35(58.3%)</td>
<td>Retrospective observational study</td>
<td>N=60, Died: 0(0%) Median LoS (All):15(IQR 7-23)</td>
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<td>Peer reviewed</td>
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<td>23</td>
<td>Adults admitted to hospital with coronavirus infection between 2010 - 2016 [NOT COVID-19] Ontario, Canada Age:77(IQR 55-86) Sex: 102(45%)</td>
<td>Retrospective observational study</td>
<td>N=226, Died:16(7%) Median LoS (All): 4(IQR 2-10.5) ICU: N=39 (don’t know many deaths were in ICU) Median LoS: 11.8(1-354)</td>
<td>In a multivariate model, female gender and smoking were associated with increased likelihood of admission to ICU or death</td>
<td>Peer reviewed</td>
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<td>24</td>
<td>Adult confirmed COVID-19 cases admitted to designated hospital during Jan 20 to Feb 3, 2020 Chongquing, China Age:45(IQR 34-51) Sex: 32(62.5%)</td>
<td>Retrospective case series</td>
<td>N-51, Died:1(1.96%) Median LoS:12(IQR9-13)</td>
<td>Compared with non-severe patients (n = 44), severe patients (n = 7) were older (median age, 52 years vs 44 years), with a higher proportion of diabetes mellitus (4 [57.1%] vs 0 [0.0%])</td>
<td>Not peer reviewed</td>
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<td>25</td>
<td>Adult confirmed COVID cases admitted to non-ICU ward between Feb 2-23 Jin Yin Tian, China</td>
<td>Retrospective study</td>
<td>N=79 (All non-ICU) No deaths Median LoS:11.9(IQR not reported)</td>
<td>Liver injury occurred in 29 (36.7%). Males were more likely to have liver injury (72% of those with liver injury.)</td>
<td>Peer reviewed</td>
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<td>26</td>
<td>Consecutive adult lab confirmed COVID cases admitted to 2 designated hospitals between Dec 29 2019 to Jan 31, 2020 Wuhan, China</td>
<td>Retrospective study</td>
<td>N=191, Died: 54(28.2%) Median LoS (ALL):11(7-14) ICU: 50, Died:39(78%) Median LoS (ALL ICU): 8(IQR4—12)</td>
<td>Median duration of viral shedding was 20·0 days (IQR 17·0–24·0) in survivors, but SARS-CoV-2 was detectable until death in non-survivors.</td>
<td>Peer reviewed</td>
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<td>27</td>
<td>COVID-19 patients admitted to the ICU due to respiratory failure between 11 March 2020 and 01 April 2020</td>
<td>Retrospective descriptive study</td>
<td>N=16 (All ICU) Died: 7(43.8%) Median LoS ICU:14(SD 9)</td>
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<td>Peer reviewed</td>
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<td>28</td>
<td>First 100 adult confirmed COVID cases that were admitted to a children's hospital that was required to surge in place</td>
<td>Retrospective case series</td>
<td>N=100, Died: 6(6%) Discharged 74 and 20 were still in hospital at study endpoint Median LoS for discharged and deceased:4(IQR 2-7)</td>
<td>Obesity, which was present in 48% of patients. Almost one-half of the patients had ≥2 comorbidities. The study showed the advantage of using established teams and workflows, such as nursing structure, requesting consults, and escalating emergencies, allowed our efforts to focus on quickly adapting to care for adults, both logistically and clinically in the pediatric hospital.</td>
<td>Peer reviewed</td>
</tr>
<tr>
<td>Ref</td>
<td>Sample/population</td>
<td>Method</td>
<td>Primary outcome</td>
<td>Additional findings</td>
<td>Quality</td>
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<tr>
<td>29</td>
<td>Pregnant and postpartum lab confirmed COVID-19 patients who were hospitalized between Mar 5 to Apr 20, 2020 in 12 institutions Age in years:33.2(5.8) Sex: All women</td>
<td>Retrospective and prospective study</td>
<td>N=65 (13 censored at study endpoint) ; No deaths Severe=44 cases and critical =20 cases</td>
<td>Median LoS (All): 7(IQR 5-9)</td>
<td>Peer reviewed</td>
</tr>
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<td>Median LoS (severe cases): 7(5-9) Median LoS (critical): 7(IQR 5-10)</td>
<td>32 women delivered and there were no adverse perinatal outcomes</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Adult lab-confirmed COVID 19 cases who were released from quarantine in a region outside of Hubei, China Liaocheng, China Age:44.3(SD 1.67) Sex: 17(45.9% men)</td>
<td>Retrospective study</td>
<td>N=37, No deaths</td>
<td>Median LoS: 16±6.2 days</td>
<td>Not peer reviewed</td>
</tr>
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<td>The duration from onset to release from quarantine was related to age, the length of time from onset to admission, the presence or absence of symptoms, and was not related to mild or normal type</td>
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<tr>
<td>31</td>
<td>Consecutive patients with Lab confirmed COVID-19 who were admitted to a tier 1 private hospital in Mexico Age: 60.6(SD12.6) Sex: 23(69.7%) Comorbidity: 23 (69.7%) Obesity: 23 (69.7%)</td>
<td>Retrospective case series</td>
<td>N=33, No deaths Discharged:24 Medain LoS reported by disease severity Severe (n=25): 7.5(IQR 4.7-8.7)</td>
<td>Critical (n=8): 23(IQR 16-24.7)</td>
<td>Not peer reviewed</td>
</tr>
<tr>
<td>Ref</td>
<td>Sample/population</td>
<td>Method</td>
<td>Primary outcome</td>
<td>Additional findings</td>
<td>Quality</td>
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<td>32</td>
<td>Lab confirmed COVID cases admitted to hospital in <em>Fuyang</em> between Jan 20 and Feb 9, 2020 <em>Fuyang Anhui, China</em> Age: 38.7(SD13.8) Sex: 71(56.8% men)</td>
<td>Retrospective observational study</td>
<td>N=125, No deaths, 78 still in hospital at study endpoint, ICU=19 Median LoS (Discharged patients): 14 days(SD4.16)</td>
<td>Old age, chronic basal diseases and smoking history may be risk factors to a poor prognosis</td>
<td>Peer reviewed</td>
</tr>
<tr>
<td>33</td>
<td>Consecutive lab confirmed COVID19 cases who were admitted to a hospital in <em>Jiangsu, China</em> between Jan 22 and Feb 14, 2020 Age:46.1(30.7-61.5) Sex: 39(48.8%)</td>
<td>Retrospective observational study</td>
<td>N=80 (59 censored at study endpoint). No deaths, Discharged: 21 Median LoS (discharged patients): 8 days (IQR not reported)</td>
<td>28 (35%) patients were mild type, 49 (61.25%) patients were moderate type, 3 (3.75%) patients were severe type, and no patient was critically ill.</td>
<td>Peer reviewed</td>
</tr>
<tr>
<td>34</td>
<td>Consecutive lab confirmed cases who were admitted to a <em>maternal and children's hospital in Wuhan, China</em> Age:6 years(0.10-15.08) Sex: 44(59.5%)</td>
<td>Retrospective observational study</td>
<td>N=74, No deaths, All discharged Median LoS: 11 days(IQR 9-14)</td>
<td>20(27%) were asymptomatic.</td>
<td>Not peer reviewed</td>
</tr>
<tr>
<td>35</td>
<td>Lab confirmed COVID-19 pregnant patients who were admitted to Central Hospital between Dec 31, 2019 and Mar 7, 2020 <em>Wuhan, China</em> Age: 29(IQR 21-37) Sex: All women</td>
<td>Retrospective study</td>
<td>N=23, No deaths, Did not specify if any ICU admissions Median LoS (all): 17 days(13-25)</td>
<td>Length of hospitalization was significantly shorted in asymptomatic patients compared with symptomatic patients (14 vs 25.2 days, p&lt;0.001). 20 delivered with no adverse perinatal outcomes. # terminated pregnancy in first trimester.</td>
<td>Peer reviewed</td>
</tr>
</tbody>
</table>
References Included in Summary


33. Jian Wu, Jun Liu, Xinguo Zhao, Chengyuan Liu, Wei Wang, Dawei Wang, Wei Xu, Chunyu Zhang, Jiong Yu, Bin Jiang, Hongcui Cao, Lanjuan Li. Clinical Characteristics of Imported Cases of


Appendix: Evidence Search Details

Search Strategies

CINAHL
Run: May 11, 2020 15:50
S23  S20 OR S22  77
S22  S10 AND S21  42
S21  TX (((risk N1 (ratio? or prediction or assess* or factor* or stratif* or tool*)) or odds ratio? or prediction or prevalence or relative risk? or (risk N3 (regression or multivariate or multi-variate)) N3 (hospitalis* or hospitaliz* or hospital stay or intensive care unit* or ICU or critical* ill* or critical care or criticality or serious or severity or severe or deteriorat* or mortality or death or lethal* or poor prognosis or poor outcome*))) 57,848
S20  S10 AND S13 AND S16 AND S19  47
S19  S17 OR S18  941,476
S18  TI (hospitalis* or hospitaliz* or hospital stay or intensive care unit* or ICU or critical* ill* or critical care or criticality or serious or severity or severe or deteriorat* or mortality or death or lethal* or poor prognosis or poor outcome*) OR AB (hospitalis* or hospitaliz* or hospital stay or intensive care unit* or ICU or critical* ill* or critical care or criticality or serious or severity or severe or deteriorat* or mortality or death or lethal* or poor prognosis or poor outcome*) 788,666
S17  (MH "Hospitalization+") OR (MH "Intensive Care Units+") OR (MH "Critical Care Nursing+") OR (MH "Critical Care+") OR (MH "Critical Illness") OR (MH "Severity of Illness") OR (MH "Patient Classification") OR (MH "Clinical Deterioration") OR (MH "Mortality+") OR (MH "Death+") 352,188
S16  S14 OR S15  1,144,660
S15  TI ((risk N1 (ratio? or prediction or assess* or factor* or stratif* or tool*)) or odds ratio? or prediction or prevalence or relative risk? or case control or cohort or (risk N3 (regression or multivariate or multi-variate)) OR AB ((risk N1 (ratio? or prediction or assess* or factor* or stratif* or tool*)) or odds ratio? or prediction or prevalence or relative risk? or case control or cohort or (risk N3 (regression or multivariate or multi-variate))) 673,599
S14  (MH "Risk Assessment") OR (MH "Odds Ratio") OR (MH "Prevalence") OR (MH "Case Control Studies+") OR (MH "Prospective Studies+") 787,032
S13  S11 OR S12  1,976,498
S12  TI (risk factor* or comorbidity* or diabetes or cardiovascular disease* or heart disease* or hypertension or smoking or asthma* or chronic lung disease or chronic respiratory disease or chronic obstructive pulmonary disease or COPD or cancer or chemotherapy) OR AB (risk factor* or comorbidity* or diabetes or cardiovascular disease* or heart disease* or hypertension or smoking or asthma* or chronic lung disease or chronic respiratory disease or chronic obstructive pulmonary disease or COPD or cancer or chemotherapy) 968,176
S11  (MH "Risk Factors+") OR (MH "Age Factors") OR (MH "Geographic Factors") OR (MH "Sex Factors") OR (MH "Race Factors") OR (MH "Comorbidity") OR (MH "Diabetes Mellitus+") OR (MH "Cardiovascular Diseases+") OR (MH "Hypertension+") OR (MH "Smoking+") OR (MH "Lung Diseases, Obstructive+") OR (MH "Neoplasms+") OR (MH "Chemotherapy, Cancer+") OR (MH "Radiotherapy+") OR (MH "Cancer Patients") OR (MH "Cancer Care Facilities") 1,709,552
S10 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 Limiters - Published Date: 20191201-20201231;
English Language 2,588
S9 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 14,514
S8 TX ("severe acute respiratory syndrome**") 3,676
S7 TX ((outbreak* or wildlife* or pandemic* or epidemic*) N1 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)) 672
S6 TX ("seafood market***" or "food market***" or pneumonia*) N10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*) 454
S5 TX (respiratory* N2 (symptom* or disease* or illness* or condition*) N10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)) 1,247
S4 TX ("2019-nCoV" or 2019nCoV or nCoV2019 or "nCoV-2019" or "COVID-19" or COVID19 or "CORVID-19" or CORVID19 or "WN-CoV" or WNCoV or "HCoV-19" or HCoV19 or "2019 novel***" or Ncov or "n-cov" or "SARS-CoV-2" or "SARSCoV2" or "SARS-CoV2" or SARSCov19 or "SARS-CoV19" or "SARS-Cov-19" or "SARSCoV-19" or Ncovor or Ncoron* or NcovWuhan* or NcovHubei* or NcovChina* or NcovChinese* or SARS2 or "SARS-2" or SARScoronavirus2 or "SARS-coronavirus-2" or "SARScoronavirus 2" or "SARS coronavirus2" or SARScoronovirus2 or "SARS-coronovirus-2" or "SARScoronovirus 2" or "SARS coronavirus2") 2,246
S3 TX (coronavirus* or coronavirus* or coronavirinae* or CoV or HCoV*) 8,308
S2 TX ((corona* or corono*) N1 (virus* or viral* or virinae*)) 257
S1 (MH "Coronavirus Infections+") OR (MH "Coronavirus+") OR (MH "COVID-19") 4,737

Embase 1974 to 2020 May 08
Run: May 11, 2020 15:35
1 exp Coronavirinae/ or exp Coronavirus infection/ (21514)
2 (coronavirus disease 2019 or severe acute respiratory syndrome coronavirus 2).sh,dj. (3649)
3 ((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,kw. (710)
4 (coronavirus* or coronavirus* or coronavirinae* or CoV).ti,ab,kw. (19099)
5 ("2019-nCoV" or 2019nCoV or nCoV2019 or "nCoV-2019" or "COVID-19" or COVID19 or "CORVID-19" or CORVID19 or "WN-CoV" or WNCoV or "HCoV-19" or HCoV19 or "2019 novel***" or Ncov or "n-cov" or "SARS-CoV-2" or "SARSCoV2" or "SARS-CoV2" or SARSCov19 or "SARS-CoV19" or "SARS-Cov-19" or "SARSCoV-19" or Ncovor or Ncoron* or NcovWuhan* or NcovHubei* or NcovChina* or NcovChinese* or SARS2 or "SARS-2" or SARScoronavirus2 or "SARS-coronavirus-2" or "SARScoronavirus 2" or "SARS coronavirus2" or SARScoronovirus2 or "SARS-coronovirus-2" or "SARScoronovirus 2" or "SARS coronavirus2") (7908)
6 (respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*).ti,ab,kw. (542)
7 (("seafood market***" or "food market***" or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*).ti,ab,kw. (1317)
8 ((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw. (99)
9 "severe acute respiratory syndrome***".ti,ab,kw. (5894)
10 or/1-9 (34858)
11 10 and 20191201:20201231.(dc). (9620)
12 risk factor/ or age/ or comorbidity/ or race/ or sex factor/ or exp diabetes mellitus/ or exp cardiovascular disease/ or exp hypertension/ or exp smoking/ or exp asthma/ or chronic obstructive lung disease/ or exp malignant neoplasm/ or exp chemotherapy/ or exp radiotherapy/ (9259019)
13 (risk factor* or comorbidit* or diabetes or cardiovascular disease* or heart disease* or hypertension or smoking or asthma* or chronic lung disease or chronic respiratory disease or chronic obstructive pulmonary disease or COPD or cancer or chemotherapy).ti,ab. (5076382)
14 12 or 13 (10186079)
15 risk assessment/ or odds ratio/ or exp prevalence/ or exp case control study/ or cohort analysis/(1873935)
16 ((risk adj (ratio? or prediction or assess* or factor* or stratif* or tool*)) or odds ratio? or prediction or prevalence or relative risk? or case control or cohort or (risk adj3 (regression or multivariate or multivariate))).ti,ab. (2964396)
17 15 or 16 (3536815)
18 hospitalization/ or exp intensive care/ or exp intensive care unit/ or disease severity/ or critical illness/ or patient acuity/ or deterioration/ or terminal disease/ or exp mortality/ or exp death/(2983521)
19 (hospitalis* or hospitaliz* or hospital stay or intensive care unit* or ICU or critical* ill* or critical care or criticality or serious or severity or severe or deterioration* or mortality or death or lethal* or poor prognosis or poor outcome*).ti,ab. (4448056)
20 18 or 19 (5568249)
21 11 and 14 and 17 and 20 (290)
22 (((risk adj (ratio? or prediction or assess* or factor* or stratif* or tool*)) or odds ratio? or prediction or prevalence or relative risk? or (risk adj3 (regression or multivariate or multivariate))) adj3 (hospitalis* or hospitaliz* or hospital stay or intensive care unit* or ICU or critical* ill* or critical care or criticality or serious or severity or severe or deterioration* or mortality or death or lethal* or poor prognosis or poor outcome*)).af. (195338)
23 11 and 22 (142)
24 21 or 23 (335)
25 limit 24 to (english language and exclude medline journals) (31)

Ovid MEDLINE(R) ALL 1946 to May 08, 2020
Run: May 11, 2020 16:05
1 exp coronavirus/ or exp coronavirus infections/ (17219)
2 ((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,kw,kf. (952)
3 (coronavirus* or coronavirus* or coronavirinae* or CoV).ti,ab,kw,kf. (18672)
4 ("2019-nCoV" or 2019nCoV or nCoV2019 or "nCoV-2019" or "COVID-19" or COVID19 or "CORVID-19" or CORVID19 or "WN-CoV" or WNCoV or "HCoV-19" or HCoV19 or "2019 novel**" or Ncov or "n-cov" or "SARS-CoV-2" or "SARSCoV-2" or "SARS-CoV2" or SARSCoV2 or "SARS-Cov19" or "SARS-Cov-19" or "SARS-Cov-199" or Ncovor or Ncorona* or Ncoronavirus* or NcovWuhan* or NcovHubei* or NcovChina* or NcovChinese* or SARS2 or "SARS-2" or SARScoronavirus2 or "SARS-coronavirus-2" or "SARS-coronavirus2" or SARScoronavirus2 or "SARS-coronavirus2" or "SARS-coronavirus-2") .ti,ab,kw,kf. (10826)
5 (respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw,kf. (451)
6 ("seafood market***" or "food market***" or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*).ti,ab,kw,kf. (1221)
7 (outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei* or China* or Chinese* or Huanan*) .ti,ab,kw,kf. (233)
8 "severe acute respiratory syndrome***".ti,ab,kw,kf. (5854)
9 or/1-8 (33131)
10 9 and 20191201:20201231.(dt). (12364)
11 risk factors/ or exp age factors/ or exp comorbidity/ or race factors/ or sex factors/ or exp diabetes mellitus/ or exp cardiovascular diseases/ or hypertension/ or exp smoking/ or exp lung diseases, obstructive/ or exp neoplasms/ or exp antineoplastic protocols/ or radiotherapy/ (6949423)
12 (risk factor* or comorbidit* or diabetes or cardiovascular disease* or heart disease* or hypertension or smoking or asthma* or chronic lung disease or chronic respiratory disease or chronic obstructive pulmonary disease or COPD or cancer or chemotherapy).ti,ab. (3557733)
13 11 or 12 (7979166)
14 exp risk assessment/ or odds ratio/ or prevalence/ or exp case-control studies/ or exp cohort studies/ (2606613)
15 ( (risk adj (ratio? or prediction or assess* or factor* or stratif* or tool*)) or odds ratio? or prediction or prevalence or relative risk? or case control or cohort or (risk adj3 (regression or multivariate or multivariate))).ti,ab. (2035955)
16 14 or 15 (3746974)
17 exp hospitalization/ or exp intensive care units/ or exp critical care/ or critical illness/ or mortality/ or exp patient acuity/ or clinical deterioration/ or exp death/ (771597)
18 (hospitaliz* or hospitaliz* or hospital stay or intensive care unit* or ICU or critical* ill* or critical care or criticality or serious or severity or severe or deteriorat* or mortality or death or lethal* or poor prognosis or poor outcome*).ti,ab. (3120270)
19 17 or 18 (3457542)
20 10 and 13 and 16 and 19 (273)
21 (((risk adj (ratio? or prediction or assess* or factor* or stratif* or tool*)) or odds ratio? or prediction or prevalence or relative risk? or (risk adj3 (regression or multivariate or multi-variate))) adj3 (hospitalis* or hospitaliz* or hospital stay or intensive care unit* or ICU or critical* ill* or critical care or criticality or serious or severity or severe or deteriorat* or mortality or death or lethal* or poor prognosis or poor outcome*)).af. (721115)
22 10 and 21 (103)
23 20 or 22 (295)
24 limit 23 to english language (276)

Sources
- Grey literature was included in this search
- Refer to the evidence search report for extensive sources.

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