Management of the critically ill patient with confirmed or suspected COVID-19
Virus: SARS-CoV-2
Disease: COVID-19
https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6?utm_source=vancouver%20is%20awesome&utm_campaign=vancouver%20is%20awesome&utm_medium=referral

Sat 14th March
CLINICAL CHARACTERISTICS
Characteristics of and Important Lessons From Coronavirus Disease 2019 (COVID-19) Outbreak in China

Summary of a Report of 72,314 Cases From the Chinese Center for Disease Control and Prevention

The Chinese Center for Disease Control and Prevention recently published the largest case series to date of coronavirus disease 2019 (COVID-19) in mainland China (72,314 cases, updated through February 11, 2020). This viewpoint summarizes key findings from this report and discusses emerging understanding of and lessons from the COVID-19 epidemic.
<table>
<thead>
<tr>
<th>Signs and symptoms</th>
<th>All patients (n=41)</th>
<th>ICU care (n=13)</th>
<th>No ICU care (n=28)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>40 (98%)</td>
<td>13 (100%)</td>
<td>27 (96%)</td>
<td>0.68</td>
</tr>
<tr>
<td>Highest temperature, °C</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.037</td>
</tr>
<tr>
<td>&lt;37.3</td>
<td>1 (2%)</td>
<td>0</td>
<td>1 (4%)</td>
<td>-</td>
</tr>
<tr>
<td>37.3–38.0</td>
<td>8 (20%)</td>
<td>3 (23%)</td>
<td>5 (18%)</td>
<td>-</td>
</tr>
<tr>
<td>38.1–39.0</td>
<td>18 (44%)</td>
<td>7 (54%)</td>
<td>11 (39%)</td>
<td>-</td>
</tr>
<tr>
<td>&gt;39.0</td>
<td>14 (34%)</td>
<td>3 (23%)</td>
<td>11 (39%)</td>
<td>-</td>
</tr>
<tr>
<td>Cough</td>
<td>31 (76%)</td>
<td>11 (85%)</td>
<td>20 (71%)</td>
<td>0.35</td>
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<tr>
<td>Myalgia or fatigue</td>
<td>18 (44%)</td>
<td>7 (54%)</td>
<td>11 (39%)</td>
<td>0.38</td>
</tr>
<tr>
<td>Sputum production</td>
<td>11/39 (28%)</td>
<td>5 (38%)</td>
<td>6/26 (23%)</td>
<td>0.32</td>
</tr>
<tr>
<td>Headache</td>
<td>3/38 (8%)</td>
<td>0</td>
<td>3/25 (12%)</td>
<td>0.10</td>
</tr>
<tr>
<td>Haemoptysis</td>
<td>2/39 (5%)</td>
<td>1 (8%)</td>
<td>1/26 (4%)</td>
<td>0.46</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>1/38 (3%)</td>
<td>0</td>
<td>1/25 (4%)</td>
<td>0.66</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>22/40 (55%)</td>
<td>12 (92%)</td>
<td>10/27 (37%)</td>
<td>0.0010</td>
</tr>
<tr>
<td>Days from illness onset</td>
<td>8.0 (5.0–13.0)</td>
<td>8.0 (6.0–17.0)</td>
<td>6.5 (2.0–10.0)</td>
<td>0.22</td>
</tr>
<tr>
<td>to dyspnoea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days from first admission</td>
<td>5.0 (1.0–8.0)</td>
<td>8.0 (5.0–14.0)</td>
<td>1.0 (1.0–6.5)</td>
<td>0.0023</td>
</tr>
<tr>
<td>to transfer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic pressure, mm Hg</td>
<td>125.0 (119.0–135.0)</td>
<td>145.0 (123.0–167.0)</td>
<td>122.0 (118.5–129.5)</td>
<td>0.018</td>
</tr>
<tr>
<td>Respiratory rate (&gt;24</td>
<td>12 (29%)</td>
<td>8 (62%)</td>
<td>4 (14%)</td>
<td>0.0023</td>
</tr>
<tr>
<td>breaths per min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data are median (IQR), n (%), or n/N (%), where N is the total number of patients with available data. p values comparing ICU care and no ICU care are from χ² test, Fisher’s exact test, or Mann-Whitney U test. 2019-nCoV=2019 novel coronavirus. ICU=intensive care unit.

Table 1: Demographics and baseline characteristics of patients infected with 2019-nCoV
Case definition HPSC

https://www.hpsc.ie/az/respiratory/coronavirus/novelcoronavirus/casedefinitions/

• Case Definitions
• This interim case definition for COVID-19 for possible cases is based on the current information available on the outbreak and may be subject to revision as new data become available.
Of 1099, 975 patients had CT scan on admission
- 86.2% were abnormal
- ground-glass opacity 56.4%.

No radiographic or CT abnormality
- 17.9% with non-severe disease
- 2.9% with severe disease.
Clinical Course

- Severe Acute Respiratory Infection (SARI)
- Type I respiratory failure (often hypocapnic)
- ARDS
- Near normal compliance lungs
- Severe shunt
- Secondary Complications
  - Septic Shock
  - Acute Renal Failure
  - Myocarditis
  - Glucose abnormalities and ketoacidosis
- 7-10 days IPPV required
Laboratory testing for COVID-19

- 3 Viral swabs available in a pre-prepared pack
  - 1 nasopharyngeal swab and
  - 2 throat swabs in viral transport medium

- Further samples may be indicated - e.g. Nasopharyngeal aspirate (NPA) or Sputum or a lower respiratory tract sample (BAL) – please discuss with on-call clinical microbiologist if necessary

- Microbiologist-on-call should be contacted if COVID-19 testing to take place.

- A single negative test result, particularly if this is from an upper respiratory tract specimen, does not exclude COVID-19

- Repeat sampling and testing, lower respiratory specimen is strongly recommended in severe or progressive disease.

- A positive alternate pathogen does not necessarily rule out COVID-19 as little is yet known about the role of co-infections.
PREVENTION OF SPREAD
Transmission

• Direct contact (hand to mucus membrane)
• Droplet (contact within 1m of infected patient)
• Aerosols: Smaller airborne particles which can travel around a room
FFP3 or surgical mask (over NP)
Mask or Non-rebreather for Transfer
PROTECTING HCW
**Transmission within hospitals**

- In one study, 41% of patients were presumed to be related to transmission within the hospital,
  - 12% patients hospitalized for other reasons
  - 29% healthcare workers

- Health care personnel infected
  - 3.8% (1716 of 44 672)
  - 14.8% cases classified as severe or critical (247 of 1668)
  - 5 deaths

*Wang JAMA 2020*

*Zunyou Wu et al JAMA 2020*
Personal Protective Equipment

- FFP3 Filter Mask
- Visor or Goggles (glasses not sufficient)
- Long sleeved water resistant gown
- Gloves
- Hat
Technique for Donning and Doffing of PPE

**Donning**

1. **Perform Hand hygiene**

2. **Put on Gown and hat**

3. **Put on FFP3 mask**
   - **Fit Check Mask**
     - Place mask over nose, mouth and chin
     - Fit flexible nose piece over nose bridge
     - Secure on head with elastic
     - Adjust to fit
   - **Inhale - mask should collapse**
   - **Exhale - check for leakage around face**
   - **4. Put on Eye Protection – goggles or face shield**

4. **Put on gloves**

**Doffing**

**In the patients’ room**

1. **Remove Gloves**

2. **Perform Hand hygiene**

3. **Remove Goggles – avoid touching the front**

4. **Remove Gown – avoid touching the front of the apron/gown**

5. **Perform Hand hygiene**

**In ante room or directly outside patients’ room - Ensure door is closed**

1. **Remove Mask**
   - Grasp and lift ties from behind your head and pull off respirator away from your face.
   - Avoid touching the front of the respirator and use ties to discard.

2. **Perform Hand hygiene**

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https://www.youtube.com/watch?v=Gy4StHAHMU4

https://www.youtube.com/watch?v=pNirkWLjMX0
Aerosol generating procedures

• Procedures that produce aerosols of respiratory secretions carry an increased risk of transmission:
  – NIV/CPAP/HFNC
  – bronchoscopy
  – induced sputum
  – positive-pressure ventilation via a face mask
  – intubation and extubation
  – airway suctioning
  – CPR
Critical Care Equipment

- Protect respiratory equipment with a high efficiency filter (eg BS EN 13328-1).
- Use disposable respiratory equipment where possible.
- Decontaminate re-usable equipment in accordance with the manufacturer’s instructions.
- Use closed suctioning systems.
- Ventilator circuits should not be broken unless necessary.
- Place ventilators on standby when carrying out bagging.
- Wear PPE at all times.
- Consider a HME filter rather than water humidification.
Operating theatre

- Decisions regarding the need for surgery during the period of infectivity should be made by senior clinicians.
- Patient should be anaesthetised and recovered in the operating room
- Staff should wear appropriate PPE
- Disposable anaesthetic equipment should be used where possible
- The anaesthetic machine should be protected by a filter with **viral efficiency of 99.99%**
- Reusable anaesthetic equipment should be decontaminated as per manufacturer’s instructions
- Operation room should be cleaned and disinfected after use
- **Operating room should not be used for 15 minutes after patient leaves** (based on a conventional ventilation system with 20 air changes per hour)
TREATMENT
Clinical evidence does not support corticosteroid treatment for 2019-nCoV lung injury

<table>
<thead>
<tr>
<th>Outcomes of corticosteroid therapy*</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MERS-CoV Delayed clearance of viral RNA from respiratory tract†</td>
<td>Adjusted hazard ratio 0.4 (95% CI 0.2-0.7)</td>
</tr>
<tr>
<td>SARS-CoV Delayed clearance of viral RNA from blood‡</td>
<td>Significant difference but effect size not quantified</td>
</tr>
<tr>
<td>SARS-CoV Complication: psychosis³</td>
<td>Associated with higher cumulative dose, 10,975 mg vs 6,780 mg hydrocortisone equivalent</td>
</tr>
<tr>
<td>SARS-CoV Complication: diabetes⁴</td>
<td>33 (35%) of 95 patients treated with corticosteroid developed corticosteroid-induced diabetes</td>
</tr>
<tr>
<td>SARS-CoV Complication: avascular necrosis in survivors⁵</td>
<td>Among 40 patients who survived after corticosteroid treatment, 12 (30%) had avascular necrosis and 30 (75%) had osteoporosis</td>
</tr>
<tr>
<td>Influenza Increased mortality⁶</td>
<td>Risk ratio for mortality 1.75 (95% CI 1.3-2.4) in a meta-analysis of 6548 patients from ten studies</td>
</tr>
<tr>
<td>RSV No clinical benefit in children⁷⁸⁹</td>
<td>No effect in largest randomised controlled trial of 600 children, of whom 305 (51%) had been treated with corticosteroids</td>
</tr>
</tbody>
</table>

CoV=coronavirus. MERS=Middle East respiratory syndrome. RSV=respiratory syncytial virus. SARS=severe acute respiratory syndrome. *Hydrocortisone, methylprednisolone, dexamethasone, and prednisolone.

Table: Summary of clinical evidence to date

Russell Lancet 2020
Co-infections

- One small study: Among COVID-19 patients in Qingdao, 24 (80.00%) of them had IgM antibodies against at least one respiratory pathogen, compared to 20% in Wuhan.

- 6% of patients with COVID-19 tested for other viruses had other infections (coronavirus, influenza A virus, rhinovirus, and influenza A H3N2).

  https://www.medrxiv.org/content/10.1101/2020.02.29.20027698v2
  https://www.medrxiv.org/content/10.1101/2020.02.12.20022327v2

- In MERS critically ill patients, 18% had bacterial co-infections and 5% viral co-infection

  Arabi CCM 2017

- The recent 2019 ATS/IDSA clinical practice guidelines recommend standard antibacterial therapy to be initially prescribed for adults with community-acquired pneumonia who test positive for influenza.

  Uyeki TM et al Clin Infect Dis 2019
# Registered clinical trials

## Antivirals

- Remdesivir
- Anti-retrovirals: Lopinavir-Ritonavir, Darunavir and Cobicistat, ASC09/Ritonavir
- Anti-influenza antivirals: Arbidol, Baloxavir, Favipiravir
- Azvudine
- Chloroquine phosphate
- Hydroxychloroquine
- Recombinant human angiotensin-converting enzyme 2 (rhACE2)
- Ribavirin
Remdesivir

- High priority antiviral by WHO prioritizations list.

- In vitro activity against MERS-CoV, SARS-CoV and Ebola virus.

- Ongoing trials in China for severe and non-severe COVID-19 and in USA.
RESPIRATORY SUPPORT
Respiratory Support

- NIV/HFNC/Mask CPAP not contraindicated but results in aerosol production—must be delivered in a negative pressure isolation room
- Most patients will have type I resp failure but require higher levels of CPAP than can be delivered with HFNC
- Helmet CPAP may be the best NI option where available
- Full face mask NIV may be an option
- The rate of failure of NIV with COVID-19 is high
- In general early IPPV is encouraged
Use of NIV

- Selected patients in early stages and milder forms of acute hypoxemic respiratory failure.

- Avoid in shock, multiorgan failure, or large amount of secretions.

- Patients who do not show signs of early recovery, NIV may well delay but not avoid invasive ventilation.
Mechanical ventilation

- Standard protective ventilation
  - Tidal Volume 4-8 mls/kg IBW
  - Plateau pressure < 30 cm H2O
  - Driving Pressure < 15 cm H2O
  - Early NDMR if indicated
  - Appropriate PEEP
  - Prone Ventilation if indicated
  - Daily CXR may not be neccessary

https://youtu.be/qx2z26IL6g8
Rescue Therapy

• NO
  – (but minimise circuit breaks)

• ECMO
  – as per advice of MMH ECMO team
Preventing Infection while on IPPV

- Closed circuit suctioning
- High efficiency filter (e.g., BS EN 23328-1)
- Minimise circuit breaks
- Clamp ETT if circuit breaks necessary
Causes of death

- Respiratory Failure: 36 (53%)
- Respiratory Failure with Myocardial Damage/Heart Failure: 5 (7%)
- Myocardial Damage/Heart Failure: 22 (33%)
- Unknown: 5 (7%)

Legend:
- Orange: Respiratory Failure
- Yellow: Respiratory Failure with Myocardial Damage/Heart Failure
- Green: Myocardial Damage/Heart Failure
- Light Green: Unknown
Treatment of shock

• As per surviving sepsis guidelines
• Early use of noradrenaline
• Avoid excessive volume administration
• Treat AKI as per standard ICU patient
OUTCOME
80% non-severe

15% severe, not critical

5% critical

Guan et al NEJM 2020
Yang et al Lancet Resp 2020

Mortality
0.1%
2-3%
8%
42-62%
COVID-19 Fatality Rate by AGE

Death rate

- 10-19: 0.2%
- 20-29: 0.2%
- 30-39: 0.2%
- 40-49: 0.4%
- 50-59: 1.3%
- 60-69: 3.6%
- 70-79: 8.0%
- 80+: 14.8%
Figure 2

A

B

C

D

E

F

Days from illness onset

Days from illness onset

Days from illness onset

Days from illness onset

Days from illness onset

Days from illness onset
**COVID-19 IN NUMBERS**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>People each infected case passes on to</td>
<td>2–3 people</td>
<td></td>
</tr>
<tr>
<td>Ascertainment rate</td>
<td>10–25%</td>
<td></td>
</tr>
<tr>
<td>Attack rate</td>
<td>30–60%</td>
<td></td>
</tr>
<tr>
<td>Hospitalisation*</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Symptoms*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Critical</td>
<td>2–10%</td>
<td></td>
</tr>
<tr>
<td>Mortality*</td>
<td>3.5%</td>
<td></td>
</tr>
<tr>
<td>Incubation</td>
<td>Up to 14 days</td>
<td></td>
</tr>
<tr>
<td>Infective</td>
<td>14–24 days</td>
<td></td>
</tr>
</tbody>
</table>

* In those identified

All data are estimates

Data as of 07/03/2020
Inter Hospital transfer and COVID-19

- May be occasionally required
- Standard inter-hospital protocols apply with additional infections prevention and control precautions (full PPE worn by all crew and appropriate ventilator tubing filters)
Conclusions

• COVID-19 is a novel coronavirus that causes severe hypoxic respiratory failure in about 5% of cases
• Mortality is high in patients who require ICU admission
• The scale of infection will put ICU capacity under severe pressure
• There is no directed treatment or vaccine
Main priorities for critical care teams

- Be prepared
- Triage appropriately
- Prevent HCW and nosocomial infection
- Intubate early
- Conservative fluid strategy for shock
- Supportive care is the mainstay of treatment
- Typically require long periods of IPPV (7-10 days)
Suggested ARDS Mechanical Ventilation Protocol

For Confirmed or Suspected COVID-19

March 2020
ACUTE HYPOXIC RESPIRATORY FAILURE – PF RATIO <200

Patient Suitable for Critical Care?

COVID 19 PRESENT OR SUSPECTED

- ANTIBIOTICS
- Conservative Fluid Strategy or Furosemide

OXYGEN THERAPY via FACEMASK – Target PO2: 8 – 10kPa, SaO2>90

IMPROVED PFR >200

- Consider CPAP via HELMET (if available) – 5-10cmH2O

Reassess at 30 mins. IF P:F ratio <200 consider intubation
IF NOT IMPROVED AT 12 HOURS (P:F ratio < 150, respiratory distress) INTUBATE

COVID 19 negative?

- HFNC ok

NOT IMPROVED PFR<200

- COVID 19 negative?

- HFNC ok

INTUBATE AND VAC-PEEP – Propofol/Remi Sedation
Acute Hypoxic Respiratory Failure due to COVID-19 PaO$_2$/FiO$_2$ < 200

Intubate – VAC Ventilation
TV 350ml Female (adjust)
TV 425ml Male (adjust)
Sedate to RASS -4
Limited use of RM*
PEEP = 10cmH$_2$O

After 2 hours reassess

PaO$_2$/FiO$_2$ < 125
Bilateral Infiltrates CXR
Moderate-Severe ARDS
Continue sedation RASS-4
Administer Cis-Atracurium

PaO$_2$/FiO$_2$ > 125
Bilateral Infiltrates CXR
Moderate ARDS
Sedate to RASS -2
Continue Vent Strategy
Moderate to Severe ARDS PaO$_2$/FiO$_2$<125

**AC Ventilation**
- Sedate to RASS -4
- Cisatracurium (BIS <60)
- TV<6ml/kg IBW
- PEEP/Paw Adjusted to Keep PaO$_2$ >8kPa

**Consider APRV**

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**Every 4 hours reassess**

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**PaO$_2$/FiO$_2$ <100**
- Turn the patient PRONE for 16 hours
- Reassess every 2 h
- No Improvement
- Consider iNO/ECMO*

**PaO$_2$/FiO$_2$ >100 <200**
- Moderate ARDS
- Continue cisatracurium
- For 48 hours

**Discontinue NDMR after 48 hours, Reassess PFR**

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**PaO$_2$/FiO$_2$ >200**
- Turn off NDMR
- Vent Liberation Protocol

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**Consider**

*Note: ECMO = Extracorporeal Membrane Oxygenation*
At 24h PF Ratio > 200

- PEEP <10 and Lung Compliance >40 ml/cmH₂O

  Yes: Wean Sedation, Wean to PSV
  - COVID-19 Negative: Liberate to HFNC / CPAP

  No: Continue Mechanical Ventilation

Liberate Only When PFR >250

- Liberate to Oxygen by Facemask, Max flow 6L

Ventilator Liberation Protocol
ARDSnet PEEP Protocol

**OXYGENATION GOAL:** PaO₂ 55-80 mmHg or SpO₂ 88-95%
Use a minimum PEEP of 5 cm H₂O. Consider use of incremental FiO₂/PEEP combinations such as shown below (not required) to achieve goal.

<table>
<thead>
<tr>
<th>FiO₂</th>
<th>0.3</th>
<th>0.4</th>
<th>0.4</th>
<th>0.5</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
<th>0.7</th>
</tr>
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<tbody>
<tr>
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<td>5</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>12</td>
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</table>

<table>
<thead>
<tr>
<th>FiO₂</th>
<th>0.7</th>
<th>0.8</th>
<th>0.9</th>
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<td>14</td>
<td>14</td>
<td>16</td>
<td>18</td>
<td>18-24</td>
</tr>
<tr>
<td>HEIGHT feet</td>
<td>HEIGHT cm</td>
<td>TV 6ml/kg</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>------------</td>
<td>-----------</td>
<td>-----------</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5' 0</td>
<td>152.4</td>
<td>275</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>5' 1</td>
<td>155</td>
<td>290</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5' 2</td>
<td>158</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5' 3</td>
<td>160</td>
<td>315</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5' 4</td>
<td>163</td>
<td>330</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5' 5</td>
<td>165</td>
<td>340</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5' 6</td>
<td>168</td>
<td>360</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5' 7</td>
<td>170</td>
<td>370</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5' 8</td>
<td>173</td>
<td>385</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5' 9</td>
<td>175</td>
<td>400</td>
<td></td>
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</tr>
<tr>
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<td>178</td>
<td>410</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5' 11</td>
<td>181</td>
<td>425</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6' 0</td>
<td>183</td>
<td>440</td>
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<tr>
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<td>186</td>
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<tr>
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<td>188</td>
<td>465</td>
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</tr>
<tr>
<td>6' 3</td>
<td>191</td>
<td>480</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6' 4</td>
<td>193</td>
<td>495</td>
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</tbody>
</table>
MAXIMAL ALLOWABLE TIDAL VOLUMES BASED ON PREDICTED BODY WEIGHT (PBW)

<table>
<thead>
<tr>
<th>HEIGHT feet</th>
<th>HEIGHT cm</th>
<th>TV 6ml/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>5' 0</td>
<td>152.4</td>
<td>300</td>
</tr>
<tr>
<td>5' 1</td>
<td>155</td>
<td>315</td>
</tr>
<tr>
<td>5' 2</td>
<td>158</td>
<td>330</td>
</tr>
<tr>
<td>5' 3</td>
<td>160</td>
<td>340</td>
</tr>
<tr>
<td>5' 4</td>
<td>163</td>
<td>355</td>
</tr>
<tr>
<td>5' 5</td>
<td>165</td>
<td>370</td>
</tr>
<tr>
<td>5' 6</td>
<td>168</td>
<td>380</td>
</tr>
<tr>
<td>5' 7</td>
<td>170</td>
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</tr>
<tr>
<td>5' 8</td>
<td>173</td>
<td>410</td>
</tr>
<tr>
<td><strong>5' 9</strong></td>
<td><strong>175</strong></td>
<td><strong>425</strong></td>
</tr>
<tr>
<td>5' 10</td>
<td>178</td>
<td>440</td>
</tr>
<tr>
<td>5' 11</td>
<td>181</td>
<td>450</td>
</tr>
<tr>
<td>6' 0</td>
<td>183</td>
<td>465</td>
</tr>
<tr>
<td>6' 1</td>
<td>186</td>
<td>480</td>
</tr>
<tr>
<td>6' 2</td>
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<tr>
<td>6' 3</td>
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<td>505</td>
</tr>
<tr>
<td>6' 4</td>
<td>193</td>
<td>520</td>
</tr>
</tbody>
</table>
Useful Resources:


https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/algorithms/

https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/guidance/