# INTERIM COVID-19 CLINICAL MANAGEMENT GUIDELINES

## SUMMARY DOCUMENT

**DRAFTED BY:**

**COVID-19 CLINICAL MANAGEMENT COMMITTEE (CCMC)**

**MINISTRY OF HEALTH**

**15 APRIL 2021**

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**Summary: Siting of care for COVID-19 patients**

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| ✓ | All Covid-19 infected patients need to be triaged by severity of disease. After triage, all Covid-19 infected patients are to be prioritised for admission based on assessed risk of deterioration and developing complications. The assessment includes time point of infection, clinical parameters, and risk factors including age, clinical comorbidities, and BMI. |
| ✓ | Patients who have mild disease and low risk of complications should be monitored for clinical deterioration using parameters such as temperature, pulse rate and oxygen saturation. |
| ✓ | Routine imaging of the chest is not needed for all patients especially those with mild disease. It is indicated for patients with abnormal vital signs or clinical signs of pneumonia. |
| ✓ | Patients with moderate or severe disease should be closely monitored in the hospital setting and risks of deterioration should be assessed using chest radiography, laboratory markers such as C-reactive protein, or clinical risk scores |

**Note:** the classification of COVID-19 clinical severity and description for each grade of severity can be found on page 8 of the full guideline document

**COVID-19 Clinical Management Recommendations on Siting of Care**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | All Covid-19 infected patients need to be triaged by severity of disease. After triage, all Covid-19 infected patients are to be prioritised for admission based on the assessed risk of deterioration and developing complications. The assessment includes time point of infection, clinical parameters, and risk factors including age, clinical comorbidities, and BMI. | IV | C | Moderate | Y |
| 2 | Patients who have mild disease and low risk of complication should be monitored for clinical deterioration using parameters such as temperature, pulse rate and oxygen saturation. | V | D | Weak | Y |
| 3 | Routine imaging of the chest is not needed for all patients especially those with mild disease. It is indicated for patients with abnormal vital signs or clinical signs of pneumonia. | IV | C | Moderate | Y |
| 4 | Patients with moderate or severe disease should be | IV | C | Moderate | Y |

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| | closely monitored in the hospital setting and risks of deterioration should be assessed using chest radiography, laboratory markers such as C-reactive protein, or clinical risk scores. | | | | |

For further details on the acute COVID-19 care recommendations, please also refer to the *Treatment Guidelines for COVID-19* developed by the National Centre for Infectious Diseases and the Chapter of Infectious Disease Physicians (https://www.ncid.sg/Health-Professionals/Diseases-and-Conditions/Pages/COVID-19.aspx)

**Summary: Clinical Management of Critically Ill COVID-19 Patients**

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| ✓ | Patients should be admitted to ICU based on the severity of their clinical condition and resource availability. Each hospital should determine early referral criteria for evaluation by the ICU team. |
| ✓ | The critical care management of patients with COVID-19 should not differ substantially from the management of other critically ill patients. Attention should be paid to the primary process leading to the ICU admission, but also to underlying comorbidities and nosocomial complications. |
| **Ventilatory Support** | |
| ✓ | For adults with COVID-19 and acute hypoxemic respiratory failure despite conventional oxygen therapy, we recommend high-flow nasal cannula (HFNC) oxygen over non-invasive positive pressure ventilation (NIPPV). |
| ✓ | In the absence of an indication for endotracheal intubation, we recommend a closely monitored trial of NIPPV for adults with COVID-19 and acute hypoxemic respiratory failure for whom HFNC is not available. |
| ✓ | For adults with COVID-19 who are receiving supplemental oxygen, we recommend close monitoring for worsening respiratory status and that intubation, if it becomes necessary, be performed by an experienced practitioner in a controlled setting. |
| ✓ | For patients with persistent hypoxemia despite increasing supplemental oxygen requirements in whom endotracheal intubation is not otherwise indicated, we recommend considering a trial of awake prone positioning to improve oxygenation. |
| ✓ | For mechanically ventilated adults with COVID-19 and acute respiratory distress syndrome (ARDS), we recommend using low tidal volume (VT) ventilation (VT 4–8 mL/kg of predicted body weight) over higher tidal volumes (VT >8 mL/kg). |
| ✓ | For mechanically ventilated adults with COVID-19 and refractory hypoxemia despite optimized ventilation, we recommend prone ventilation for 12 to 16 hours per day over no prone ventilation. |

**COVID-19 Clinical Management Recommendations of Critically Ill COVID-19 Patients**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | Patients should be admitted to ICU based on the severity of their clinical condition and resource availability. Each hospital should determine early referral criteria for evaluation by the ICU team. | IV | C | Moderate | Y |
| 2 | The critical care management of patients with COVID-19 should not differ substantially from the management of other critically ill patients. Attention should be paid to the primary process leading to the ICU admission, but also to underlying comorbidities and nosocomial complications. | V / Ungraded | D | Weak<br><br>Good Practice | N |
| 3 | For adults with COVID-19 and acute hypoxemic respiratory failure despite conventional oxygen therapy, we recommend high-flow nasal cannula (HFNC) oxygen over non-invasive positive pressure ventilation (NIPPV). | V / Ungraded | D | Weak<br><br>Good Practice | N |
| 4 | In the absence of an indication for endotracheal intubation, we recommend a closely monitored trial of NIPPV for adults with COVID-19 and acute hypoxemic respiratory failure for whom HFNC is not available. | V / Ungraded | D | Weak<br><br>Good Practice | N |

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| 5 | For adults with COVID-19 who are receiving supplemental oxygen, we recommend close monitoring for worsening respiratory status and that intubation, if it becomes necessary, be performed by an experienced practitioner in a controlled setting. | V / Ungraded | D | Weak<br><br>Good Practice | N |
| 6 | For patients with persistent hypoxemia despite increasing supplemental oxygen requirements in whom endotracheal intubation is not otherwise indicated, we recommend considering a trial of awake prone positioning to improve oxygenation. | II | B | Moderate | Y |
| 7 | For mechanically ventilated adults with COVID-19 and acute respiratory distress syndrome (ARDS), we recommend using low tidal volume (VT) ventilation (VT 4–8 mL/kg of predicted body weight) over higher tidal volumes (VT >8 mL/kg). | I | A | Strong | N |
| 8 | For mechanically ventilated adults with COVID-19 and refractory hypoxemia despite optimized ventilation, we recommend prone ventilation for 12 to 16 hours per day over no prone ventilation. | II | B | Strong | N |

**Summary: Anticoagulation in COVID-19 patients**

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|  | We recommend that thromboembolic risk assessment, e.g. the PADUA score, be done as part of the admission process for COVID-19 patients at out-of-hospital facilities. Persons at high risk of venous thromboembolism (VTE) should be assessed for thromboprophylaxis with an appropriate agent and duration at an acute hospital. |
|  | All COVID-19 patients should have thrombotic and bleeding risk assessments such as the PADUA score and the VTE bleed score upon diagnosis. |
|  | In patients with mild/moderate COVID-19 infection, we recommend risk stratification of patients, such as with the PADUA risk score, to determine whether pharmacological thromboprophylaxis is warranted. |
|  | In patients with severe COVID-19 infection, we recommend pharmacological thromboprophylaxis unless contraindicated. |
|  | Patients should be educated on general measures to prevent thromboembolism or seek urgent consultation for symptoms of thromboembolism. |
|  | Patients should be encouraged to maintain hydration and to avoid immobility, to reduce the risk of thromboembolism. |
|  | D-dimer should not be used as a screening tool for VTE. It should be used as a diagnostic tool of exclusion |
|  | Therapeutic anticoagulation doses, or doses higher than for prophylaxis, should not be used without confirmation of thrombosis. |
|  | Routine antiplatelet prophylaxis for all COVID recovered patients are not recommended at this point. |

**COVID-19 Clinical Management Recommendations by Haematology**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | We recommend that thromboembolic risk assessment, e.g. the PADUA score, be done as part of the admission process for COVID-19 patients at out-of-hospital facilities. Persons at high risk of venous thromboembolism (VTE) should be assessed for thromboprophylaxis with an appropriate agent and duration at an acute hospital. | V | D | Weak | N |
| 2 | All COVID-19 patients should have thrombotic and bleeding risk assessments such as the PADUA score and the VTE bleed score upon diagnosis. | V | D | Weak | N |
| 3 | In patients with mild/moderate COVID-19 infection, we recommend risk stratification of patients, such as with the PADUA risk score, to determine whether pharmacological thromboprophylaxis is warranted. | V | D | Weak | N |
| 4 | In patients with severe COVID-19 infection, we recommend pharmacological thromboprophylaxis unless contraindicated. | V | D | Weak | N |
| 5 | Patients should be educated on general measures to prevent thromboembolism or seek urgent consultation | V | D | Weak | N |

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| | for symptoms of thromboembolism. | | | | |
| 6 | Patients should be encouraged to maintain hydration and to avoid immobility, to reduce the risk of thromboembolism. | V | D | Weak | N |

**Summary: Aspirin use in active or recovered COVID-19 patients with coronary artery disease (CAD)**

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|  | In patients with known CAD, and not on any other anti-thrombotic or anti-coagulant for other reasons, aspirin use should be continued as secondary prevention. |
|  | Aspirin may be considered in individuals aged 40-70 with high ASCVD risk but not at increased risk of bleeding. |
|  | Routine aspirin use in active or recovered COVID-19 patients without known CAD is not recommended because there is insufficient data to demonstrate clinical benefit AND because aspirin use is not without risk. |

**Summary: Evaluation of chest pain and dyspnoea in recovered COVID-19 patients in primary care setting**

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|  | COVID-19 has been associated with increased incidence of acute coronary syndrome, myocarditis, arrhythmias and pulmonary embolism. Active or recovered COVID-19 patients with cardiovascular symptoms of chest pain, dyspnoea and palpitations should be evaluated, even in the absence of typical cardiovascular risk factors. |
|  | Use of the Well's score and CAD consortium risk score should be part of the risk assessment for COVID-19 patients presenting with chest pain or dyspnoea. |
|  | ECG, troponins, BNP (or NT-pro-BNP), D-dimer and CXR should be considered as part of the workup. |

**COVID-19 Clinical Management Recommendations by Cardiology**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | In patients with known CAD, and not on any other anti-thrombotic or anti-coagulant for other reasons, aspirin use should be continued as secondary prevention. | V | D | Weak | N |
| 2 | Aspirin may be considered in individuals aged 40-70 with high ASCVD risk but not at increased risk of bleeding. | V | D | Weak | N |
| 3 | COVID-19 has been associated with increased incidence of acute coronary syndrome, myocarditis, arrhythmias and pulmonary embolism. Active or recovered COVID-19 patients with cardiovascular symptoms of chest pain, dyspnoea and palpitations should be evaluated, even in the absence of typical cardiovascular risk factors. | IV | C | Moderate | N |
| 4 | Use of the Well's score and CAD consortium risk score should be part of the risk assessment for COVID-19 patients presenting with chest pain or dyspnoea. | V | D | Weak | N |
| 5 | ECG, troponins, BNP (or NT-pro-BNP), D-dimer and CXR should be considered as part of the workup. | IV | C | Moderate | N |

**Summary: Clinical Management of Respiratory Issues**

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| ✓ | Pulmonary rehabilitation should be considered in COVID-19 patients with chronic obstructive pulmonary disease (COPD), but there is insufficient evidence to recommend it routinely for COVID-19 patients. |
| ✓ | Long term oxygen therapy for chronic hypoxaemia should be considered in patients with COVID 19 and concomitant COPD. |
| ✓ | Recovered patients with abnormal chest X-ray (CXR) findings should be followed up till resolution and a repeat CXR may be required at 7-12 weeks. No further investigations or follow-up is otherwise required in the absence of persisting symptoms or CXR abnormalities. |
| ✓ | Where further evaluation is indicated, computed tomography of the thorax (CT thorax) and a full lung function test may be considered. Lung function tests should be performed only when the patient is no longer infectious. |
| ✓ | Patients with COVID-19 and Acute Respiratory Distress Syndrome (ARDS) will need longer term follow-up with repeat lung function testing and /or radiological imaging at appropriate intervals depending on their clinical status. |

**COVID-19 Clinical Management Recommendations by Respiratory Medicine**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | Pulmonary rehabilitation should be considered in COVID-19 patients with chronic obstructive pulmonary disease (COPD), but there is insufficient evidence to recommend it routinely for COVID-19 patients. | I | A | Strong | N |
| 2 | Long term oxygen therapy for chronic hypoxaemia should be considered in patients with COVID 19 and concomitant COPD. | I | A | Strong | N |
| 3 | Recovered patients with abnormal chest X-ray (CXR) findings should be followed up till resolution and a repeat CXR may be required at 7-12 weeks. No further investigations or follow-up is otherwise required in the absence of persisting symptoms or CXR abnormalities. | V | D | Weak<br><br>Good Practice | N |
| 4 | Where further evaluation is indicated, computed tomography of the thorax (CT thorax) and a full lung function test may be considered. Lung function tests should be performed only when the patient is no longer infectious. | V | D | Weak<br><br>Good Practice | N |
| 5 | Patients with COVID-19 and Acute Respiratory Distress Syndrome (ARDS) will need longer term follow-up with repeat lung function testing and | V | D | Weak<br><br>Good Practice | N |

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| | /or radiological imaging at appropriate intervals depending on their clinical status. | | | | |

**Summary: Stroke in COVID-19 patients**

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|  | Different stroke subtypes (e.g. ischemic stroke, haemorrhagic stroke, cerebrovenous thrombosis) have been reported in patients with COVID-19 infection. Stroke can occur during the acute COVID-19 hospitalisation and weeks and months following COVID-19 recovery. |
|  | Ischemic stroke patients with a history of COVID-19 infection who present early should be considered for intravenous recombinant tissue plasminogen activator (TPA) and endovascular treatment. |
|  | Acute stroke treatment (intravenous TPA and endovascular treatment) should not be delayed by the need to await COVID-19 serology and RNA results. |
|  | Stroke patients with a history of COVID-19 infection will benefit from intensive care monitoring (e.g. endotracheal intubation and mechanical ventilation), interventions (e.g. external ventricular drainage, decompression hemicraniectomy and ventriculoperitoneal shunt) and rehabilitation as clinically indicated. |
|  | Depending on investigational findings of stroke mechanisms, antiplatelet or anticoagulation may be prescribed for secondary stroke prevention in ischemic stroke patients with a history of COVID-19 infection. |
|  | Not all ischemic stroke patients with a history of COVID-19 infection require long-term oral anticoagulation. |

**COVID-19 Clinical Management Recommendations by Neurology**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | Different stroke subtypes (e.g. ischemic stroke, haemorrhagic stroke, cerebrovenous thrombosis) have been reported in patients with COVID-19 infection. Stroke can occur during the acute COVID-19 hospitalisation and weeks and months following COVID-19 recovery. | II | B | Strong | Y |
| 2 | Ischemic stroke patients with a history of COVID-19 infection who present early should be considered for intravenous recombinant tissue plasminogen activator (TPA) and endovascular treatment. | IV | C | Moderate | Y |
| 3 | Acute stroke treatment (intravenous TPA and endovascular treatment) should not be delayed by the need to await COVID-19 serology and RNA results. | IV | C | Moderate | Y |
| 4 | Stroke patients with a history of COVID-19 infection will benefit from intensive care monitoring (e.g. endotracheal intubation and mechanical ventilation), interventions (e.g. external ventricular drainage, decompression hemicraniectomy and ventriculoperitoneal shunt) and rehabilitation as clinical indicated. | IV | C | Moderate | Y |

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| 5 | Depending on investigational findings of stroke mechanisms, antiplatelet or anticoagulation may be prescribed for secondary stroke prevention in ischemic stroke patients with a history of COVID-19 infection. | IV | C | Moderate | Y |

**Summary: Psychological and Mental Health in COVID-19 patients**

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|  | We recommend considering comprehensive psycho-social care assessment and support to at risk and vulnerable patients inflicted with COVID-19 infection and/or persistent post-acute COVID-19 infection symptoms, including but not limited to elderly and individuals living alone who may experience barriers to care. |
|  | In patients with acute COVID-19, we recommend referral to the Psychiatric Consultation Liaison multidisciplinary team (Psych CL-MDT) for assessment and management of the following where indicated:<br>• neuropsychiatric presentations,<br>• psychiatric responses to acute COVID-19 infection and consequences of isolation, quarantine and treatment complications,<br>• acute exacerbation or relapse of pre-existing psychiatric illness in acute COVID infection. |
|  | We recommend that ASQ Toolkit could be used for the acute COVID-19 patient presenting with emotional distress and existential issues, to screen for acute suicide risk, while PHQ-2 could be used for screening of depressive mood. |
|  | For COVID-19 recovered patients with persistent post-acute COVID-19 neuropsychiatric symptoms, we recommend Psychiatric Consultation Liaison multidisciplinary team (Psych CL-MDT) assessment and management. |
|  | Mass psychiatric screening in patients with new COVID-19 infection, or patients who have recovered from COVID-19 infection is not recommended. |

**COVID-19 Clinical Management Recommendations by Psychiatry**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | We recommend considering comprehensive psycho-social care assessment and support to at risk and vulnerable patients inflicted with COVID-19 infection and/or persistent post-acute COVID-19 infection symptoms, including but not limited to elderly and individuals living alone who may experience barriers to care. | V | D | Moderate | N |
| 2 | In patients with acute COVID-19, we recommend referral to the Psychiatric Consultation Liaison multidisciplinary team (Psych CL-MDT) for assessment and management of the following where indicated:<br>• neuropsychiatric presentations,<br>• psychiatric responses to acute COVID-19 infection and consequences of isolation, quarantine and treatment complications,<br>• acute exacerbation or relapse of pre-existing psychiatric illness in acute COVID infection. | III | B | Strong | N (case series in preparation) |
| 3 | We recommend that ASQ Toolkit could be used for the acute COVID-19 patient presenting with emotional distress and existential issues, to screen for acute suicide risk, while PHQ-2 could be used for screening of depressive mood.. | V | D | Moderate | N |
| 4 | For COVID-19 recovered patients with persistent post-acute COVID-19 neuropsychiatric symptoms, we recommend Psychiatric Consultation Liaison | IV | C | Moderate | N |

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| | multidisciplinary team (Psych CL-MDT) assessment and management of persisting neuropsychiatric presentations and persistent post-acute COVID-19 symptoms arising from COVID-19 infection. | | | | |

**Summary: Paediatric care in COVID-19**

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| ✓ | In the current pandemic setting, all children with Kawasaki Disease/ MIS-C should be tested for COVID-19 both by PCR and by serology |
| ✓ | Children hospitalized with COVID-19 should have a full blood count (FBC) and liver function tests (LFTs) performed, while other tests (e.g. C-reactive protein [CRP], lactate dehydrogenase [LDH], chest X-ray [CXR]) may be performed if clinically indicated. Computed tomography (CT) of the chest should **not** be routinely performed and done only if clinically indicated. |
| ✓ | Children hospitalized with COVID-19 should have routine psychosocial assessment. |
| ✓ | Children with COVID-19 should be assessed for the development of Kawasaki's Disease / Multisystem Inflammatory Syndrome in Children (MIS-C) by WHO criteria. |
| ✓ | Infants with COVID-19 should be with a familiar caregiver during hospital isolation. Older children who are assessed to have sufficient maturity and independence should be counselled for separation from non-COVID-19 infected parents. The management of younger children should take into account his/her level of maturity and independence. |
| ✓ | Infants who are breastfed should continue to do so with appropriate infection prevention and control (IPC) measures in place, unless mothers are too unwell to breastfeed or choose not to, regardless of whether mothers or their infants have suspected or confirmed COVID-19 infection. IPC measures would include wearing of surgical masks, as well as good hand hygiene and sanitation practices. |
| ✓ | Children with clinically significant or worsening COVID-19 pulmonary or systemic disease should be given oxygen and/ or supportive treatment; dexamethasone can be considered in children who require oxygen. |
| ✓ | Children discharged with COVID-19 who are incontinent/wearing diapers and attending preschool/childcare centre/other school, should receive leave of absence from school for up to 6 weeks from time of diagnosis or onset of illness, whichever is earlier. |

**COVID-19 Clinical Management Recommendations for Paediatric Care**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | In the current pandemic setting, all children with Kawasaki Disease/ MIS-C should be tested for COVID-19 both by PCR and by serology | V | D | Weak | N |
| 2 | Children hospitalized with COVID-19 should have a full blood count (FBC) and liver function tests (LFTs) performed, while other tests (e.g. C-reactive protein [CRP], lactate dehydrogenase [LDH], chest X-ray [CXR]) may be performed if clinically indicated. Computed tomography (CT) of the chest should not be routinely performed and done only if clinically indicated. | IV | C | Moderate | Y |
| 3 | Children hospitalized with COVID-19 should have routine psychosocial assessment. | V | D | Weak | Y |
| 4 | Children with COVID-19 should be assessed for the development of Kawasaki's Disease (KD) / Multisystem Inflammatory Syndrome in Children | IV | C | Moderate | N |

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| | (MIS-C) by WHO criteria. | | | | |
| 5 | Infants with COVID-19 should be with a familiar caregiver during hospital isolation. Older children who are assessed to have sufficient maturity and independence should be counselled for separation from non-COVID-19 infected parents. The management of younger children should take into account his/her level of maturity and independence. | IV | C | Moderate | Y |
| 6 | Infants who are breastfed should continue to do so with appropriate infection prevention and control (IPC) measures in place, unless mothers are too unwell to breastfeed or choose not to, regardless of whether mothers or their infants have suspected or confirmed COVID-19 infection. IPC measures would include wearing of surgical masks, as well as good hand hygiene and sanitation practices. | IV | C | Moderate | Y |
| 7 | Children with clinically significant or worsening COVID-19 pulmonary or systemic disease should be given | V | D | Weak | N |

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| | oxygen and/ or supportive treatment; dexamethasone can be considered in children who require oxygen. | | | | |
| 8 | Children discharged with COVID-19 who are incontinent/wearing diapers and attending preschool/childcare centre/other school, should receive leave of absence from school for up to 6 weeks from time of diagnosis or onset of illness, whichever is earlier). | V | D | Weak | N |

**Summary: Geriatric and palliative care in COVID-19**

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| ✓ | Older patients with COVID-19 may present atypically. Hence, diagnostic tests should be administered if suspicion is high based on epidemiological risk factors, even if they are not showing clinical symptoms of COVID-19. |
| ✓ | During periods of society-wide activity restriction, older patients may be at risk of social isolation and experience barriers to healthcare. Healthcare providers should take steps to ensure that their health needs continue to be met, which may include telemedicine, house visits and home delivery of medications. |
| ✓ | Good palliative care should be provided in severe COVID-19, including end-of-life planning. As isolation may exacerbate grief and bereavement, palliative care should include empathetic communication with next-of-kin. |

**COVID-19 Clinical Management Recommendations for Geriatric and Palliative Care**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | Older patients with COVID-19 may present atypically. Hence, diagnostic tests should be administered if suspicion is high based on epidemiological risk factors, even if they are not showing clinical symptoms of COVID-19. | V | D | Weak | N |
| 2 | During periods of society-wide activity restriction, older patients may be at risk of social isolation and experience barriers to healthcare. Healthcare providers should take steps to ensure that their health needs continue to be met, which may include telemedicine, home visits and home delivery of medications. | V | D | Weak | N |
| 3 | Good palliative care should be provided in severe COVID-19, including end-of-life planning. As isolation may exacerbate grief and bereavement, palliative care should include empathetic communication with next-of-kin. | V | D | Weak | N |

**Summary: Obstetric Care in COVID-19 Pregnant Women**

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|  | Infected pregnant women have increased risk of developing more severe illness compared to non-pregnant woman. All infected pregnant women should be assessed by multidisciplinary healthcare team to assess risks to both mother and foetus. Monitoring including oxygen saturation, standard blood tests, chest X-rays and foetal scans can be safely used. |
|  | There has been an observed increase in the risk of premature labour in pregnant women with COVID 19. The decision on timing and mode of delivery will need to be individually assessed based on maternal and foetal medical condition. |
|  | There is a small possibility of the virus passing from the mother to the baby in the womb or upon birth (vertical transmission) but the risk is very low, and the majority of infected babies have very mild symptoms. |
|  | There has been no evidence of increased stillbirth, neonatal death or congenital malformations in babies of women with COVID-19. |
|  | The rate of neonatal COVID-19 infection is no greater with vaginal deliveries compared to caesarean deliveries. Therefore, COVID-19 should not be a specific indication for caesarean birth and usual obstetric indications for caesarean deliveries should apply. |

**COVID-19 Obstetric Clinical Management Recommendations**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | Infected pregnant women have increased risk of developing more severe illness compared to non-pregnant woman. All infected pregnant women should be assessed by multidisciplinary healthcare team to assess risks to both mother and foetus. Monitoring including oxygen saturation, standard blood tests, chest X-rays and foetal scans can be safely used. | IV | D | Weak | N |
| 2 | There has been an observed increase in the risk of premature labour in pregnant women with COVID 19. The decision on timing and mode of delivery will need to be individually assessed based on maternal and foetal medical condition. | IV | D | Weak | N |
| 3 | There is a small possibility of the virus passing from the mother to the baby in the womb or upon birth (vertical transmission) but the risk is very low, and the majority of infected babies recover well. | IV | D | Weak | N |
| 4 | There has been no evidence of increased stillbirth, neonatal death or congenital | IV | D | Weak | N |

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| | malformations in babies of women with COVID19. | | | | |
| 5 | The rate of neonatal COVID-19 infection is no greater with vaginal deliveries compared to caesarean deliveries. Therefore, COVID-19 should not be a specific indication for caesarean birth and usual obstetric indications for caesarean deliveries should apply | IV | D | Moderate | N |

For further details on the obstetric recommendations, please also refer to the committee opinion developed by the College of Obstetricians & Gynaecologists, *Singapore on Management of Pregnancy and Birth in Women with Coronavirus Diseases (COVID-19)* which was published in April 2020.

**Summary: Persistent post-acute COVID-19 symptoms in recovered COVID-19 patients**

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| ✓ | Chronic symptoms have been reported in recovered COVID-19 patients, and include fatigue, cough, shortness of breath, headache/body ache, diarrhoea, nausea, chest/abdominal pain and confusion.<br><br>These symptoms may be due to organ injury from COVID infection, post viral chronic fatigue syndrome, neurological dysfunction or psychological syndromes.<br><br>We recommend opportunistic screening of these symptoms in recovered patients. |
| ✓ | In patients who have these symptoms, there should be appropriate assessment and initial symptomatic treatment and monitoring by primary care providers, with escalation of care to relevant multidisciplinary specialties if necessary, to determine diagnosis and management of organ injury, chronic fatigue syndrome (myalgic encephalomyelitis), dysautonomia, cognitive disturbance or psychological syndromes. |
| ✓ | This entity remains undefined in our population. We recommend further research into the surveillance for prevalence and severity of lingering COVID symptoms in our recovered patients. |

**COVID-19 Clinical Management Recommendations on Persistent Post-Acute COVID-19 Symptoms**

| SN | Recommendation | Level of Evidence | Grade of Evidence | Strength of Recommendation | Supported by Local Evidence? |
|---|---|---|---|---|---|
| 1 | Chronic symptoms have been reported in recovered COVID-19 patients, and include fatigue, cough, shortness of breath, headache/body ache, diarrhoea, nausea, chest/abdominal pain and confusion.<br><br>These symptoms may be due to organ injury from COVID infection, post viral chronic fatigue syndrome, neurological dysfunction or psychological syndromes.<br><br>We recommend opportunistic screening of these symptoms in recovered patients. | V | D | Weak | N |
| 2 | In patients who have these symptoms, there should be appropriate assessment and initial symptomatic treatment and monitoring by primary care providers, with escalation of care to relevant multidisciplinary specialties if necessary, to determine diagnosis and management of organ injury, chronic fatigue syndrome (myalgic encephalomyelitis), dysautonomia, cognitive disturbance or psychological syndromes. | V | D | Weak | N |
| 3 | This entity remains undefined in our population. We recommend further research into the surveillance for prevalence and severity of lingering COVID symptoms in our recovered patients. | V | D | Weak | N |

## COVID-19 CLINICAL MANAGEMENT COMMITTEE MEMBERS:

| Role / Specialty | SN | Member | Designation, Institution |
|---|---|---|---|
| Chairman | 1 | A/Prof Dan Yock Young | Senior Consultant & Head, Dept of Medicine, NUH |
| Advisor | 2 | Prof Leo Yee Sin | Executive Director, NCID |
| Infectious Diseases | 3 | Dr Shawn Vasoo | Clinical Director, NCID |
| | 4 | A/Prof Tan Thuan Tong | Senior Consultant & Head, Infectious Diseases, SGH |
| | 5 | A/Prof Helen Oh | Senior Consultant, Infectious Diseases, CGH |
| | 6 | A/Prof Hsu Li Yang | Vice Dean (Global Health), SSHSPH<br><br>Consultant, ACE Public Health & Surveillance |
| Respiratory / Critical Care | 7 | A/Prof Phua Ghee Chee | Senior Consultant & Head, Respiratory and Critical Care Medicine, SGH<br><br>Chairman, Chapter of Respiratory Physicians, AMS |
| | 8 | Dr Benjamin Ho | Senior Consultant, Respiratory and Critical Care Medicine, TTSH |
| | 9 | A/Prof Phoa Lee Lan | Senior Consultant, Respiratory & Critical Care<br>Head of Department, Dept of General Medicine, KTPH |
| Cardiology | 10 | Adj Asst Prof Chia Yew Woon | Senior Consultant & Director, Coronary Care Unit, TTSH |
| | 11 | A/Prof Yeo Khung Keong | Senior Consultant, Cardiology, NHCS<br><br>Chairman, Chapter of Cardiologists, AMS |
| | 12 | Asst Prof Lim Toon Wei | Senior Consultant, Dept of Cardiology, NUHCS |
| Rheumatology / Immunology | 13 | Prof Fong Kok Yong | Senior Consultant, Dept of Rheumatology and Immunology, SGH |
| | 14 | Adj A/Prof Bernard Thong | Senior Consultant, Dept of Rheumatology, Allergy and Immunology; Divisional Chairman Medicine, TTSH<br><br>Chairman, Section of Clinical Immunologists and Allergists, AMS |

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| Haematology | 15 | A/Prof Lee Lai Heng | Senior Consultant, Haematology, SGH<br><br>Chairman, Chapter of Haematologists, AMS |
| | 16 | Dr Yap Eng Soo | Senior Consultant, Dept of Haematology-Oncology, NCIS |
| Paediatrics | 17 | Dr Chan Si Min | Senior Consultant & Head, Paediatric Infectious Diseases, NUH |
| | 18 | Adj A/Prof Thoon Koh Cheng | Senior Consultant & Head, Infectious Disease Service, KKH |
| Neurology | 19 | A/Prof N. Thirugnanam Umapathi | Senior Consultant, Neurology, NNI |
| | 20 | A/Prof Raymond Seet | Senior Consultant, Neurology, NUH<br><br>Chairman, Chapter of Neurologists, AMS |
| Internal Medicine | 21 | A/Prof Melvin Chua | Senior Consultant & Head, Dept of General Medicine, SKGH |
| Psychological Health | 22 | A/Prof John Wong | Senior Consultant, Dept of Psychological Medicine, NUH<br><br>Chairman, College of Psychiatrists, AMS |
| | 23 | Adj Asst Prof Mok Yee Ming | Senior Consultant & Chief, Dept of Mood and Anxiety; Regional Chief, Central Region, IMH |
| Geriatric Medicine | 24 | Dr Laurence Tan | Consultant, Geriatric Medicine, KTPH |
| | 25 | Adj A/Prof Ian Leong | Deputy Divisional Chairman, Integrative & Community Care<br>Clinical Director, Division for Central Health<br>Senior Consultant, TTSH |
| Obstetrics | 26 | A/Prof Yong Tze Tein | Head & Senior Consultant,<br>Department of Obstetrics & Gynaecology,<br>Singapore General Hospital |

**COVID-19 CLINICAL MANAGEMENT COMMITTEE SECRETARIAT:**

Dr Nicole Lee Chaluangco, Medical Officer, Communicable Diseases Division

Dr Chua Shuxian Calida, Resident, Communicable Diseases Division

Dr Mas'Uud Samsundin, Resident, Communicable Diseases Division

Dr Wycliffe Wei, Senior Resident, Communicable Diseases Division

Dr Loke Hsi-Yen, Senior Resident, Communicable Diseases Division