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How do you assess and manage risk of severe COVID-19 illness in primary healthcare workers?

Context

- Healthcare workers (HCWs) are at increased risk of contracting SARS-CoV-2 (COVID-19).
- HCWs have the right to a safe workplace.
- The clinical spectrum of SARS-CoV-2 infection (COVID-19) varies from asymptomatic to life-threatening illness.
- Risk of severe COVID-19 illness rises with age.
- Some health conditions and/or risk factors increase the risk of severe COVID-19 illness. Evidence of the specific conditions that increase the risk of severe COVID-19 illness continues to evolve.
- The risk of severe COVID-19 illness associated with some chronic conditions increases with increasing number of comorbidities.
- Assessing risk of severe COVID-19 illness if SARS-CoV-2 is contracted is best performed by a senior clinician or the HCW's nominated care provider. The allocation of duties based on this assessment and advice will vary between health services depending on local lines of management.
- Aboriginal and Torres Strait Islander peoples do not have an inherently higher risk of severe COVID-19 illness. However, higher prevalence of chronic conditions, comorbidities and the associated higher risk of severe COVID-19 illness at younger ages than non-Indigenous peoples is well recognised. To avoid catastrophic impact of COVID-19, Aboriginal and Torres Strait Islander peoples must be prioritised at all levels of response to the coronavirus pandemic.
- Advice from the Australian Health Protection Principal Committee identifies people at high risk of severe COVID-19 illness if they:
    - are ≥70 years
    - have had an organ transplant and are on immune suppressive therapy
    - have had a bone marrow transplants in the last 24 months or are on immune suppressive therapy for graft versus host disease
    - have a haematologic (blood) cancer, e.g. leukaemia, lymphoma or myelodysplastic syndrome diagnosed within the last 5 years
    - are having chemotherapy or radiotherapy.
- There is consistent evidence of higher risk of severe COVID-19 illness with older age, cardiovascular disease, cerebrovascular disease, hypertension, diabetes and chronic obstructive pulmonary disease. The odds of severe COVID-19 illness with these co-morbidities are at least twice that compared to people without these conditions.
- There is some evidence of higher risk of severe COVID-19 illness among people with chronic kidney disease and cancer, people who smoke and males, but findings are not consistent. Some reviews found evidence of significantly higher risk, whereas other studies did not.
- Pregnant women are known to be more vulnerable to other viral respiratory infections, such as influenza, and there is some emerging evidence that pregnant women may be at higher risk of

developing severe COVID-19 illness. In addition, many HCWs are experiencing stress and anxiety related to the pandemic which may be further heightened for pregnant women.

Summary of recommendations

- Assess HCWs for risk of severe illness if they contract COVID-19 ensuring that identified conditions (as per table below), as well as individual circumstances, are taken into account. Use a shared decision making approach in evaluating level of risk, the HCW's tolerance of risk and making recommendations such as allocation of duties. Consider using the Department of Health COVID-19 Action Plan to document advice.

Risk of severe illness if COVID-19 is contracted	Who	Recommendation
High	▪ ≥70 years old ▪ have had an organ transplant and are on immune suppressive therapy ▪ have had a bone marrow transplants in the last 24 months or are on immune suppressive therapy for graft versus host disease ▪ have a haematologic (blood) cancer e.g. leukaemia, lymphoma or myelodysplastic syndrome diagnosed within the last 5 years ▪ are having chemotherapy or radiotherapy ▪ have 2 or more chronic conditions or 1 condition that is severe/poorly controlled.	Consider no patient contact and offer alternative roles and duties such as (and not limited to): ▪ telehealth services ▪ developing community information & health promotion resources ▪ managing recalls ▪ QI activities ▪ liaising with hospitals and PHNs In settings where there is no known community transmission, at a minimum, avoid contact with patients with symptoms suggestive of COVID-19
Moderate	▪ ≥65–69 years old ▪ have specific health conditions ○ cardiovascular disease (coronary artery disease, heart failure) ○ poorly controlled hypertension ○ cerebrovascular disease/stroke ○ obesity class II or III (BMI≥40) ○ chronic renal failure ○ chronic lung disease (excluding mild, or moderate asthma) ○ non-haematological cancer (diagnosed in last 12 months) ○ diabetes ○ chronic liver disease ○ some neurological conditions ○ some chronic inflammatory conditions and treatments	Consider no patient contact for patients with fever and/or respiratory symptoms and for confirmed, probable and close contacts of people with COVID-19. In settings where there is no known community transmission, at a minimum, minimise contact with patients with fever and/or respiratory symptoms and follow standard and droplet precautions (goggle, mask, gloves and gown) when reviewing these patients. For all other patients maintain usual duties, following standard infection control and prevention guidelines and

	○ primary or acquired immunodeficiency ▪ HCWs who currently smoke.	advice from the local public health unit.
Low	All other HCWs	Maintain usual duties, following standard infection control and prevention guidelines and advice from the local public health unit

- For pregnant women, consider individual preferences in avoiding patient-facing roles to minimise risk of infection, to minimise anxiety and to support emotional wellbeing.
- Aim for optimal management of known chronic conditions to reduce risk of severe illness if SARS-CoV-2 (COVID-19) is contracted.
- Adopt a strengths-based approach to discussing risk of severe COVID-19 illness focussing on actions to minimise risk.
- Promote and support smoking cessation for HCWs.

Recommendations and rationale

Recommendation: Assess HCWs for risk of severe illness if they contract SARS-CoV-2 (COVID-19) ensuring that identified conditions (as per table below) as well as individual circumstances are taken into account. Use a shared decision making approach in evaluating level of risk, the HCW's tolerance of risk and making recommendations such as allocation of duties. Consider using the Department of Health COVID-19 Action Plan to document advice.

Risk of severe illness if COVID-19 is contracted	Who	Recommendation
High	▪ ≥70 years old ▪ have had an organ transplant and are on immune suppressive therapy ▪ have had a bone marrow transplants in the last 24 months or are on immune suppressive therapy for graft versus host disease ▪ have a haematologic (blood) cancer eg leukaemia, lymphoma or myelodysplastic syndrome diagnosed within the last 5 years ▪ are having chemotherapy or radiotherapy ▪ have 2 or more chronic conditions or 1 condition that is severe/poorly controlled.	Consider no patient contact and offer alternative roles and duties such as (and not limited to): ▪ telehealth services ▪ developing community information & health promotion resources ▪ managing recalls ▪ QI activities ▪ liaising with hospitals and PHNs In settings where there is no known community transmission, at a minimum, avoid contact with patients with fever and/or respiratory symptoms.

Moderate	▪ ≥65-69 years old ▪ have specific health conditions ○ cardiovascular disease (coronary artery disease, heart failure) ○ poorly controlled hypertension ○ cerebrovascular disease/stroke ○ obesity class II or III (BMI≥40) ○ chronic renal failure ○ chronic lung disease (excluding mild, or moderate asthma) ○ non-haematological cancer (diagnosed in last 12 months) ○ diabetes ○ chronic liver disease ○ some neurological conditions ○ some chronic inflammatory conditions and treatments ○ primary or acquired immunodeficiency ▪ HCWs who currently smoke	Consider no patient contact for patients with fever and/or respiratory symptoms and for confirmed, probable and close contacts of people with COVID-19. In settings where there is no known community transmission, at a minimum, minimise contact with patients with fever and/or respiratory symptoms and follow droplet precautions (goggle, mask, gloves and gown) when reviewing these patients. For all other patients maintain usual duties, following standard infection control and prevention guidelines.
Low	All other HCWs	Maintain usual duties, following standard infection control and prevention guidelines.

The term health care workers (HCWs) is intended to include any staff member providing care in a health care facility. This includes both clinical and non-clinical staff, and Aboriginal and Torres Strait Islander HCWs and non-Indigenous HCWs.

In line with the NSW *Work Health and Safety Act 2011*,[1] Safe Work Australia COVID-19 Work Health and Safety (WHS) advice states that workers can refuse to work if they feel the work is unsafe, "if there is a reasonable concern you would be exposed to a serious risk to your health and safety from an immediate or imminent hazard – this could include exposure to the COVID-19 virus".[2]

To protect all HCWs, we recommend a risk assessment is performed for each HCW to ensure individual circumstances are considered in evaluating risk level and recommended action. Risk assessments should be carried out by senior clinical staff or the HCW's nominated care provider. The risk categories are summarised below, followed by the underlying evidence.

High risk of severe illness if COVID-19 is contracted

Where possible, we recommend that the following groups consider no patient contact:

- all HCWs ≥70 years old
- HCWs who have had an organ transplant and are on immune suppressive therapy
- HCWs who have had a bone marrow transplants in the last 24 months or are on immune suppressive therapy for graft versus host disease
- HCWs who have a haematologic (blood) cancer, e.g. leukaemia, lymphoma or myelodysplastic syndrome diagnosed within the last 5 years
- HCWs who are having chemotherapy or radiotherapy
- HCWs who have 2 or more chronic conditions or 1 condition that is severe/poorly controlled.

In these roles, HCWs could provide Telehealth where infrastructure allows[3, 4] and/or develop COVID-19 health promotion resources and/or manage recalls.

In communities with no known community transmission, at a minimum, HCWs should avoid contact with patients presenting with fever and/or respiratory symptoms if they are at high risk of developing severe illness if COVID-19 is contracted.

Moderate risk of severe illness if COVID-19 is contracted

Where possible, we recommend that the following groups consider additional precautions and/or minimise contact with confirmed or suspected COVID-19 cases:

- all HCWs ≥65-69 years old
- HCWs with specific health conditions:
  - cardiovascular disease (coronary artery disease, heart failure)
  - poorly controlled hypertension
  - cerebrovascular disease/stroke
  - obesity class II or III (BMI≥40)
  - chronic renal failure
  - chronic lung disease (excluding mild, or moderate asthma)
  - non-haematological cancer (diagnosed in last 12 months)
  - diabetes
  - chronic liver disease
  - some neurological conditions
  - some chronic inflammatory conditions and treatments
  - primary or acquired immunodeficiency
- HCWs who currently smoke.

These HCWs may consider minimising contact with patients with fever and/or respiratory symptoms. These HCWs should maintain duties providing care for other patients.

Low risk of severe illness if COVID-19 is contracted

For all other HCWs, we recommend that they continue their usual roles, following standard infection control and prevention guidelines.

Evidence underlying risk categorisation

Current Department of Health (DoH)/AHPPC guidelines (6 July 2020)

In considering provisions for essential workers, such as HCWs, the DoH refers to advice from the Australian Health Protection Principal Committee (AHPPC) identifying groups that have an elevated risk of severe COVID-19 related illness.[5] They identify that people are "more likely to suffer severe illness due to COVID-19" if they are: ≥70 years, have had an organ transplant and are on immune suppressive therapy, had a bone marrow transplant in the last 24 months or are on immune suppressive therapy for graft versus host disease. Additionally, those with blood cancers diagnosed within the last five years or people undergoing chemotherapy or radiotherapy.

Consistent with AHPPC advice, the DoH identify that people "might be more likely to suffer moderate illness due to COVID-19" if they have specific health conditions or health risk factors, including: chronic renal (kidney) failure, heart disease (coronary heart disease or failure), chronic lung disease (excludes mild or moderate asthma), a non-haematological cancer (diagnosed in the last 12 months), diabetes, severe obesity with a BMI ≥40 kg/m2, chronic liver disease, some neurological conditions, some chronic inflammatory conditions and treatments, other primary or acquired immunodeficiency and or poorly controlled blood pressure.[6]

They also identify that increasing age (even for those younger than 70 years), being male, and experiencing poverty "might also increase your risk of moderate or severe illness" due to COVID-19.

Regardless of age, AHPPC note that having two or more conditions, or having conditions that are severe are poorly controlled, may further increase your risk of severe illness.

Synthesis of peer-reviewed literature

The Australian National University (ANU) undertook a review of published meta-analyses examining risk factors for severe illness following COVID-19 infection; available here.[7] Definitions and measures of severity varied between meta-analyses. Some analysed associations to specific outcomes such as mortality or admission to the intensive care unit. Others used a broad composite term which included mortality and ICU admission as well as other indicators of severe disease such as acute respiratory distress syndrome, requirement of mechanical ventilation, refractory or progressive disease. Details on definitions used within the meta-analyses have been provided within the review.

The review identified consistent evidence that people of older age, and people with hypertension, cardiovascular disease, cerebrovascular disease/history of stroke, diabetes, and chronic obstructive pulmonary disease (COPD) were at a higher risk of severe disease following COVID-19 infection. Compared to without the condition, the estimated risk of severe outcomes among COVID-19 patients was around 2-4 times higher for hypertension, 2–5 times higher for cardiovascular disease and cerebrovascular disease, 2-4 times higher for diabetes, and 3–6 times higher for COPD.

The review identified some evidence that people with chronic kidney disease or cancer, people who smoke, and males, may also be at a higher risk of severe outcomes following COVID-19 infection, but findings were not consistent. Some meta-analyses found evidence of significantly higher risk, whereas other meta-analyses did not. While we currently lack clear evidence on the association between these factors and risk of severe illness following COVID-19 infection, these conditions are recognised by AHPPC as risk factors and we adopt a conservative approach and include them as potential risk factors on clinical grounds.

HCWs with two or more chronic conditions may be at further elevated risk[1].[8]

Recommendation: For pregnant women, consider individual preferences in avoiding patient-facing roles to minimise risk of infection, to minimise anxiety and to support emotional wellbeing.

Pregnancy

Although not included in the DoH advice or AHPPC guidelines, risks to pregnant HCWs must be considered. While the review identified insufficient evidence on the relationship between pregnancy and risk of severe illness following COVID-19 infection[7] emerging research published since suggests a potential increased risk among pregnant women[1].[9] Pregnant women are known to be more vulnerable to other viral respiratory infections, such as influenza, and may therefore be at higher risk of developing severe illness following COVID-19 infection. Further, in the context of the current pandemic, pregnant HCWs may understandably be anxious about their health and the health of their baby. Pregnant women of any gestation should therefore be given the choice of whether to work in direct patient-facing roles during the COVID-19 pandemic. Where reallocation to lower-risk duties is not possible, it is advised that extra consideration be given to allow these staff to work from home or take leave of absence.[10]

The UK Royal College of Obstetricians and Gynaecologists recommends that pregnant HCWs beyond 28 weeks' gestation, and pregnant HCWs with a chronic condition, be advised to stay at home from work.[11] These workers may be able to undertake work from home such as telehealth consultations, governance, or administrative duties. If HCWs in this risk group continue to work on site at their health service, it is advised that they not be deployed in patient-facing roles.

Pregnant HCWs before 28 weeks' gestation may choose to remain working in patient-facing roles following a risk assessment advising that it is safe for them to do so. In this instance, employers should support pregnant HCWs by minimising risk of transmission. Employers can make modifications to the work environment to limit contact with suspected or confirmed COVID-19 cases, and following standard infection control and prevention guidelines. Where possible, all pregnant women are advised to avoid working with patients with suspected or confirmed COVID-19 infection in environments where a greater number of aerosol-generating procedures are performed. These include operating theatres, respiratory wards and intensive care/high dependency units.

[1] This evidence was not included in the systematic search because it was outside of the search dates (ending 23 June 2020) or because it was not captured within the scope of the search (limited to reviews and meta-analyses of published papers).

Guidelines on COVID-19 risks for pregnant women

Source of guidelines	Advice on COVID-19 during pregnancy
United Kingdom Royal College of Obstetricians and Gynaecologists (May 22) [11]	There is as yet no robust evidence that pregnant women are more likely to become infected than other healthy adults. However, given that pregnant women who contract significant respiratory infections (e.g. influenza, SARS) in the third trimester (>28 weeks) are found to become seriously unwell, the UK government has taken a precautionary approach to include pregnant women as a vulnerable group. No current evidence that COVID-19 causes miscarriage, development issues or fetal abnormalities for the baby. However, emerging evidence now suggests that vertical transmission Is probable, as reported in a single case, in which baby was discharged from hospital and well. Previous coronaviruses have not been shown to cause fetal abnormalities, and the absence of reports of increased incidence of fetal abnormality (at routine scans) in Asia indicates no difference for COVID-19. Although the evidence to date indicates no evidence of harm, it is not possible to give complete assurance to any pregnant women that contracting COVID-19 carries no risk to herself (beyond that experienced by a non-pregnant healthy individual) and her baby. Evidence is actively being sought and guidelines will continue to be updated. **Recommendations (general, before 28 weeks' gestation):** ▪ Pregnant women of any gestation should have a risk assessment with their manager, and employers should modify the working environment to limit contact with suspected or confirmed COVID-19 patients to minimise risk of infection. ▪ Pregnant women under 28 weeks' gestation can only continue to work in direct patient-facing roles if following a risk assessment this is deemed safe, subject to modification of working environment and deployment to suitable alternative duties. Employers should support pregnant women in this choice. Suitable alternative duties might include remote triage, telephone consultations, governance or administrative roles. ▪ Pregnant women of any gestation should not be required to continue working if this is not supported by a risk assessment. ▪ Pregnant women who choose to work in patient facing roles after occupational health risk assessment, prior to the third trimester of pregnancy, should be supported to do so by minimising risk of transmission through established methods. Use of personal protective equipment (PPE) and risk assessments according to

	current guidance will provide pregnant workers with protection from infection. ▪ However, where possible, pregnant women are advised to avoid working in some working environments (e.g. operating theatres, respiratory wards and intensive care/high dependency units) with patients with suspected or confirmed COVID-19 infection, due to higher risk of exposure to the virus through the greater number of aerosol-generating procedures (AGPs) performed. **Recommendations (HCWs after 28 weeks' gestation or with underlying health condition such as heart or lung disease at any gestation)** ▪ Women in this category should be recommended to stay at home. For many healthcare workers, this may present opportunities to work flexibly from home in a different capacity, for example by undertaking telephone or videoconference consultations, or taking on administrative duties. ▪ Staff in this risk group who have chosen not to follow government advice and attend the workplace must not be deployed in roles where they are working with patients. Services may want to consider deploying these staff to support other activities such as education or training needs (e.g. in IPC or simulation).
The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) (March 25) [10] and (August 6) [12]	The risk to pregnant healthcare workers is impacted by the nature of their professional activities and exposure. Pregnant women should be considered a vulnerable group. At this time, pregnant women do not appear to be more severely unwell if they develop COVID-19 infection than the general population. It is expected that the large majority of pregnant women will experience only mild or moderate cold/flu like symptoms. However, pregnant women are potentially at increased risk of complications from any respiratory disease due to the physiological changes that occur in pregnancy. These include reduced lung function, increased cardiac output, increased oxygen consumption and changed immunity. RANZCOG recommends that, where possible, pregnant HCWs be allocated to patients, and duties, that have reduced exposure to patients with, or suspected to have, COVID-19 infection. All personnel should observe strict hygiene protocols and have full access to Personal Protective Equipment (PPE). The College also urges employers to be sensitive to the fact that pregnant women are, appropriately, often anxious about their own health and protective of their unborn baby. Consideration should be given to reallocation to lower-risk duties, working from home or leave of absence.

Recommendation: Aim for optimal management of known chronic conditions to reduce risk of severe illness if COVID-19 is contracted

Regardless of risk level, we recommend that all **HCWs ensure optimal management of known chronic conditions to** reduce risk of severe illness if COVID-19 is contracted, and to maintain optimal health and wellbeing. If chronic conditions are well controlled, risk of severe illness may be reduced.[5]

Recommendation: Adopt a strengths based approach to discussing risk of severe COVID-19 illness focussing on actions to minimise risk.

HCW should be informed there is no biological difference between Aboriginal and Torres Strait Islander peoples and non-Indigenous people in risk of severe illness following contraction of COVID-19. However, at a given age, Aboriginal and Torres Strait Islander peoples are more likely than non-Indigenous peoples to experience chronic conditions, and to experience multiple chronic conditions (comorbidities). This means that at the population level, Aboriginal and Torres Strait Islander peoples face a higher risk of severe COVID-19 illness compared to non-Indigenous people of the same age. This is a result of structural inequalities, which are at least in part both historical and ongoing impacts of Australia's colonial history. For example, Aboriginal and Torres Strait Islander people are more likely than non-Indigenous people to live in areas where there is inadequate access to quality housing and to live in crowded housing. Aboriginal and Torres Strait Islander peoples may be less likely than non-Indigenous people to be able to access appropriate health care if they do contract COVID-19. These factors increase the risk of COVID-19 infection and/or severe illness following infection, and make Aboriginal and Torres Strait Islander peoples a priority population in the context of COVID-19.[5]

Care must be taken ensure cultural identity is not used as an indicator of vulnerability. At the same time, it is important to make sure that Aboriginal and Torres Strait Islander peoples are identified as a priority population throughout all phases of the pandemic response.

It is critical that Aboriginal and Torres Strait Islander leaders are involved in developing and implementing recommendations around the identification of populations at risk of severe COVID-19 illness and the appropriate actions to protect them.

Recommendation: Promote and support smoking cessation for HCWs.

Smoking cessation for HCWs should be promoted and supported

Exposure to cigarette smoke increases the risk of acquiring respiratory infections, for both smokers and non-smokers exposed to second-hand smoke. It is well established that smoking is harmful to the respiratory system. Smoking increases the risk of developing chronic respiratory disease and increases the risk that acquired respiratory infections will become severe.[13, 14] While some results from the ANU evidence review were inconsistent, the majority of the current evidence available shows that smoking significantly increases an individual's risk of severe COVID-19 illness.[7] The WHO reports that quitting smoking reduces the risk of acquiring COVID-19, including by reducing hand-to-mouth transmission of the virus.[13, 14]

Smoking cessation reduces cardiovascular risk and improves respiratory function. For people who currently smoke we strongly recommend smoking cessation to decrease the risk of hand-to-mouth COVID-19 transmission and improve outcomes if COVID-19 is contracted. Smoking cessation for HCWs should be promoted and supported.

Related topics

Infection prevention and control:

- RACGP Infection prevention and control standards

Use of PPE

- RACGP Infection prevention and control standards

RACGP

- Coronavirus (COVID-19) information for GPs

Smoking cessation

- Supporting smoking cessation: A guide for health professionals (RACGP)
- National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people (NACCHO-RACGP)

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[1] Research School of Population Health, Australian National University

[2] A joint initiative of the National Aboriginal Community Controlled Health Organisation, Royal Australian College of General Practitioners and Lowitja Institute. Additional contributors to this guidance included: Expert Reviewers Atkinson D, Armstrong K; Executive Group Belfrage M, Agostino J, Thurber K, Senior T, Chamberlain C, and Freeman K; and Expert Committee.