# Evidence check

4 November 2020

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.

# Infection control recommendations in the emergency department according to local transmission risk

## Evidence check question

What personal protective equipment (PPE) and other infection control measures are implemented in the emergency department (ED) during COVID-19; and do they differ according to levels of community transmission?

## In brief

### Peer reviewed literature

Studies of ED infection control measures in response to COVID-19 are predominantly descriptive in nature, and generally do not provide detail regarding levels of local disease prevalence. Risk assessment in the ED generally considers the risk an individual patient has of contracting COVID-19 based on their history and clinical picture, rather than adopting a population perspective, which considers local transmission rates. Frequently reported infection control or risk mitigation measures used in EDs include the following.

- **Recommendations for PPE use** – PPE recommendations are mainly based on patient risk stratification or assessments of aerosol generating procedures. Studies describe the use of full PPE when interacting with patients with symptoms or high risk epidemiological history, when working in designated ‘fever clinics’ or triage, or when performing aerosol generating procedures.(1-6). One study from Europe found that 82% of EDs surveyed implemented surgical mask use for patients.(4)
- **Triage** – dedicated triage stations either in tents or prefab houses located outside the main ED building, at the entrance or inside the ED in a separate area.(1, 5, 7-19)
- **Zoning or partitioning of the ED areas** – division of triage, waiting and clinical areas in the ED into separated zones for placing patients based on their COVID-19 risk stratification.(2, 3, 8-13, 18, 20-25) Some recommend differential PPE and the use of protocols for healthcare providers working in different zones.(2, 7, 24)
- **Negative pressure rooms** – use of fans in existing structures, or medical tents are described.(4, 8, 10, 11, 26)



Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.

- **Telemedicine** – audio and video devices or call centres to provide assessment or consultation for patients either before they present to ED, or while being triaged or waiting or isolating in the ED rooms, especially for those not in immediate need for physical examination or resuscitation.(7, 8, 18, 19, 22, 27-30)
- **Healthcare worker cross-infection prevention** – a range of interventions are described including: reducing the number of non-clinical employees in the ED; using telemedicine, separating dining, rest and office areas and partitioning spaces using transparent boards; using portable computers, using instant messaging for disseminating information; regular monitoring and logging of healthcare provider symptoms; and enhanced cleaning of work areas and equipment.(3, 5, 12, 28, 31, 32)
- **Portable or mobile diagnostic testing equipment** – use of portable X-ray in different zones of ED or a truck equipped with diagnostic devices.(11, 33)

## Grey literature

- The Clinical Excellence Commission advises that in situations of increased risk, it is important to be able to escalate the infection prevention and control precautions to align with the risk of community transmission and onward spread. Risk may change based on geographical locations of spread. Changes to risk of COVID-19 can be based on the identification of transmission in key areas: 1. geographic clusters; 2. level of community transmission; and 3. local health district, local government area or state.(34)
- In Australia, jurisdictional public health units are responsible for defining the level of risk and authorising the escalation of risk. (35)
    - New South Wales: Based on direction from the Public Health Emergency Operations Centre and local transmission data in the last two weeks.(34)
    - Queensland: Informed by direction from the Chief Health Officer and the State Health Emergency Coordination Centre, taking into account the risk of community transmission.(36)
- The Australian Government Department of Health advises that in geographic areas with significant community transmission of COVID-19 and in specified clinical settings, healthcare workers may need to take extra precautions above those usually indicated for standard and transmission-based precautions.(35)
    - South Australia Health advises that if sustained community transmission is occurring, all patients should be considered as possibly infected or COVID-19 risk.(37) It is advised that in geographic areas of moderate to high risk of community transmission, all patients presenting to ED should wear a surgical mask where tolerated.(34, 36)
    - In Victoria, the levels of PPE use are described as Tiers 0 to 3, according to the level of patient risk for COVID-19 and type of clinical procedure being undertaken. However, in late August, this advice was updated to remove Tier 0 level in hospitals and healthcare settings (application of standard precautions for patients assessed as low to no risk for COVID-19), due to the high prevalence of COVID-19 in the state.(38, 39)
    - In Western Australia and South Australia, guidance on infection control has been provided based on the understanding that there is low or no community transmissions in these states.(37, 40) As such, these guidelines reflect a mix of standard and transmission-based precautions based on patient transmission risk.

- The appropriate use of PPE is frequently included in guidance on infection or transmission control in various healthcare settings, including EDs. In line with the advice from the Australian Government, the following is advice from the Australasian College of Emergency Medicine for EDs.
    - **Contact and droplet precautions** be used for clinical care in regions with low community transmission for suspected COVID-19 patients (according to current epidemiological and clinical criteria). However, this is not suitable for performing aerosol generating procedures on suspected or confirmed COVID-19 patients, or clinical management of confirmed COVID-19 patients.
    - **Airborne precautions** be used for clinical care in regions with high community transmission for suspected COVID-19 patients (according to current epidemiological and clinical criteria), and when performing aerosol generating procedures on suspected or confirmed COVID-19 patients at any community transmission level; for all confirmed COVID-19 patients.(41, 42)
- The Australasian College for Emergency Medicine also outlines other infection controls, the implementation of which will vary according to the level local community transmission.(42)
    - **Use of telehealth** where appropriate to provide care to reduce the need for patients to attend health facilities.
    - **Screening at entry** to health facilities; **limit** and monitor points of entry; limit visitor numbers.
    - **Administrative controls** such as policies, appropriate infrastructure, triage and placement of patients, physical distancing guidance, staff to patient ratios and staff training.
    - **Environmental and engineering controls** aimed at reducing the spread of pathogens and the contamination of surfaces and inanimate objects, such as adequate spacing between staff and patients, patients and patients; correct cleaning and disinfection procedures; well ventilated isolation rooms.
    - **Standard precautions**, including hand hygiene for all patients.
    - Patients and health workers should observe **respiratory hygiene and cough etiquette**.
    - **Universal source control measures** including the use of surgical masks by health facility staff to reduce transmission of infection between staff, as well as from patients or visitors to staff; and requiring patients and visitors to wear facemasks when entering or moving around health facilities.
- In the USA, several organisations outline guidance on triage, limiting the point of entry, clearly directing people to the registration desk and having a separate registration desk for those with COVID-19 symptoms, universal masking, appropriate PPE, separate waiting areas, frequent cleaning and disinfecting and social distancing.(43-46)
- The Government of Canada has key preparedness points for EDs including extra space, patient flow strategies, measures of enhancing capacity and screening and treatment protocols.(47)
- The Royal College of Emergency Medicine in the UK have an ED social distancing escalation plan with green, amber, red and black levels reflecting different levels of concern.(48) Guidance on inpatient use and conservation of PPE from Emory University in the UK outlines PPE configurations for EDs including universal masking of hospital staff.(49)

- The Ministry of Health, NZ has three alert levels of PPE where community transmission is low and high (this is not specific to the ED setting).(50)

## Limitations

Guidance on infection control should be interpreted in the context of disease prevalence and this information is rarely provided by the included publications. The implications of increased use of PPE and other infection control measures in healthcare settings have not been considered in this review. This review includes international publications from the grey literature, where targeted searches were done on specific countries, but this may not be complete.

## Background

In response to COVID-19, many health systems internationally have implemented escalation plans in EDs and acute care settings to respond to different phases of the pandemic. These are often tiered systems and include strategies on things such as PPE and infection control, organisation and physical layout, triage, testing and signage. The rapidly changing environment of COVID-19 provides challenges to maintaining and updating guidance to best reflect local situations, both in the context of disease prevalence and understanding the demand of unplanned ED presentations more broadly.

Factors related to individual risk, (for example presence of symptoms, contact with confirmed cases, potential exposure through clusters or travel to high risk areas) as well as factors related to population risk (for example local prevalence and locally-acquired cases, speed of identification and isolation of confirmed cases, level of testing and proportion of tests that are positive, presence of cases amongst hospital patients or staff) should both be used to assess level of risk and establish appropriate screening and testing approaches and guide use of PPE.

## **Methods** (Appendix 1)

PubMed and Google were searched on the 9 October 2020.

## Results

### Table 1. Peer reviewed sources

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| COVID-19 in Seattle-early lessons learned<br>Miller, et al. 2020(8) | • A multicentre case study of six EDs in Seattle, USA.<br>• Triage: all EDs set up waiting areas for potential respiratory patients. When presenting, patients are typically greeted by a clinical staff member wearing PPE. The exact PPE varies by institution; some are in mask and gloves, others also add full gown and goggles or facemask.<br>• Several EDs have set up, or are in the process of setting up, tents for surge capacity of patients with respiratory complaints.<br>• Many EDs are developing sub-waiting rooms for respiratory isolation, walling off areas, and installing fans to create a negative pressure environment.<br>• In some cases, only a limited in-person exam is performed and much of the history is via telephone between the patient in their ED room and the physician present outside the room. Some EDs are setting up video devices to augment a focused in-person evaluation.<br>• Testing: now that commercial testing is increasingly available, community-based testing is starting. Protocols are determined at each hospital, but no longer require notifying the Department of Health.<br>• At least three hospitals have set up drive-by COVID-19 testing sites.<br>• Several additional physicians were placed on work restrictions after confirmed COVID-19 exposure. Once these physicians tested negative for COVID-19, they were allowed to return to work while wearing a mask and being monitored for symptoms. |
| A pediatric emergency department protocol to avoid intrahospital spread of SARS-CoV-2 during the outbreak in Bergamo, Italy<br>Nicastro, et al. 2020(9) | • Single centre case report in Bergamo, Italy.<br>• A protocol was adopted on 6 March 2020 and included three parts; triage, risk assessment and management in the ED.<br>• Spatial reorganisation of the ED with the creation of separate routes access for suspected COVID-19 and standard patients.<br>• Triage: children and caretakers with acute respiratory tract infection, with or without fever, are approached with an FFP2/N95 masked staff member and receive a two-item questionnaire, addressing the risk of community or intrafamilial transmission. Patient are triaged |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | with a yellow bracelet if suspected, have a separate waiting room and undergo protected transfers. A white bracelet means standard route with standard ED management.<br>• At the time of writing (27 March 2020), 17 confirmed paediatric COVID-19 cases were identified at the institution. |
| Emergency department preparation for COVID-19: accelerated care units<br>Noble, et al. 2020(11) | • Single centre case report in San Francisco, USA.<br>• Rapid deployment of two military-grade negative-pressure medical tents, named accelerated care units.<br>• The tents were operationalised over a six-day period from delivery on 2 March to patient care on 8 March 2020.<br>• Once the accelerated care units had been erected in the parking area adjacent to the ED.<br>• Accelerated care unit-1: full triage, patient care occurs in chairs, rapid treat and release without nursing involvement after triage process and/or waiting area for evaluation by a provider; portable X-ray available inside.<br>• Accelerated care unit-2: treatment cots and trolleys where a nurse is assigned to each patient, higher acuity patients, full ED treatments available. |
| Reorganising the emergency department to manage the COVID-19 outbreak<br>Quah, et al. 2020(10) | • Single centre case study in Singapore.<br>• The health system use the disease outbreak response condition (DORSCON). DORSCON is a colour-coded framework that shows the current infectious disease situation and provides guidelines. The colour codes vary from green (mild) to yellow (severe and minimal community spread), orange (severe and contained spread) and red (severe and spreading widely).<br>• The first instance of local transmission was picked up in ED on 3 Feb 2020, and DORSCON was upgraded to orange on 7 Feb 2020.<br>• In orange, ambulance crew and hospital staff don PPE with full-length gown, N95 masks and goggles when attending to patients. All patients picked up are provided with surgical masks.<br>• The ED has two entrances, one at the front of the department and one at the rear. At the onset of the DORSCON yellow period, the rear entrance was closed.<br>• All patients coming to the ED undergo fever screening before they are triaged or registered. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | • An isolation area (that has been set up for SARS) was made a negative pressure area with its own ventilation and airflow system. Patients presenting at the ED fitting the high risk criteria at fever screening used these areas. When these were full, the hospital cancelled elective procedures and transferred the management of the adjacent 40-bedded ambulatory surgery centre, to the ED. All staff working in these areas are clothed in full PPE.<br>• The hospital activated a forward fever screening area to screen ambulant patients being referred to the hospital either by primary care clinics or coming on their own accord.<br>• The ED teamed up with the infectious disease department and drew up disposition protocols for possible infectious disease patients. |
| Emergency medicine telehealth for COVID-19: minimize front-line provider exposure and conserve personal protective equipment<br>Russi, et al. 2020(27) | • A perspective on the use of Mayo Clinic Emergency Medicine Telehealth (TeleEM) program previously used for rural EDs to support the academic campus during the pandemic.<br>• Mayo Clinic contracts with InTouch Health software and hardware solutions for synchronous acute care telehealth programs.<br>• This software has a platform feature called 'multi-presence' allowing for multiple participants to engage a patient simultaneously. The TeleEM team can bring in cardiology, critical care, neurologic, critical care, paediatric intensive care, telestroke, teleneonatology, teleobstetrics, as well as emergency medicine telepharmacy.<br>• The main benefits to using telehealth internally are to conserve PPE and reduce the healthcare worker exposure when safely possible. |
| Less social emergency departments: implementation of workplace contact reduction during COVID-19<br>Sangal, et al. 2020(28) | • Recommendation and implementation of workplace distancing in one ED in Connecticut, USA.<br>• Strategies used to reduce healthcare worker-to-healthcare worker transmission.<br>  • As patient volumes decreased, the department decreased provider shifts by 42%.<br>  • Other shifts have been staggered through the day to minimise the number of healthcare workers in the ED at any given time.<br>  • Maximise the use of in-hospital telemedicine consults. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | • Reduce the number of non-essential personnel, such as volunteers and research assistants.<br>• Reduce high numbers of staff working in close proximity through highlighting high risk areas such as the break room, or centralised computers with high user turnover, and suggesting alternative strategies such as staggering breaks or using portable computers.<br>• Signage to remind staff of workplace distancing.<br>• Tape off or removing chairs in high risk areas.<br>• Provide food through individually packaged meals to decrease communal food sharing and in turn allow staff to eat separately.<br>• Strategies used to reduce healthcare worker-to-patient transmission.<br>• Implement rapid assessment areas outside of the facility, such as a tent, to reduce entry and in turn exposure, of patients and staff to COVID-19.<br>• Reduce the time any individual patient is exposed to staff by performing a single focused exam by a competent provider.<br>• Telemedicine by more senior staff members.<br>• Nursing staff encouraged to batch tasks to minimise the number of times the patient room is accessed.<br>• Collecting patient mobile phone number to allow facetime or rapid video conversation. |
| Emergency department management of the COVID-19 pandemic<br>Schreyer, et al. 2020(1) | • A multicentre case report of three EDs in Philadelphia, USA.<br>• Screening and triage was based on the guidance from the Centres for Disease Control and Prevention. A set of questions was added to existing ED triage asking about fever, cough, shortness of breath, international travel and contact with a person known or suspected to have COVID-19.<br>• Barriers of thick corrugated plastic with zippered doors were installed, each with a translucent area of plastic to be able to monitor patients from the adjacent nurses' station.<br>• Existing negative pressure rooms were designated for sicker respiratory patients on arrival and who were more likely to need aerosol generating procedures.<br>• A tent was placed outside the ambulance and adjacent walk-in entrances of the ED. A nurse was positioned outside those entrances during peak arrival times, directing stable patients with respiratory complaints or fever to be triaged in the tent. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | • A list of ‘‘accommodated ED providers’’ who were older than 60 years of age or diabetics, immunocompromised, or had cardiopulmonary comorbidities or those who lived with immunocompromised family at home were allowed to self-assign to a non-respiratory ED team.<br>• PPE at all three sites followed Centres for Disease Control and Prevention guidelines. Special enhanced droplet precautions (gown, gloves, surgical mask, and eye protection) were followed for patients with symptoms concerning for COVID-19. |
| Dynamic adaptation to COVID-19 in a Singapore paediatric emergency department<br>Tan et al, 2020(26) | • A narrative review of one tertiary paediatric ED perspective and experience managing the outbreak situation in Singapore.<br>• The ED was segregated into high , intermediate and low risk areas. A tent was built to increase capacity for low risk patients. Floor-to-ceiling partitions were built as a barrier from the main ED, to serve low risk patients needing procedural sedation and X-rays. They have Intermediate and low risk categories are used to balance exposure risks to patients and healthcare professionals with resource utilisation of PPE.<br>• High-risk area: patients and caregivers considered ‘suspect’ based on symptoms and travel history were housed in the existing ED isolation facility with negative-pressure resuscitation bay and private consult rooms.<br>• Intermediate-risk area: ‘at risk’ patients andcaregivers with fever or acute respiratory symptoms were issued surgical face masks and managed here.<br>• Low-risk area: for patients with no travel or contact history, fever or acute respiratory symptoms. |
| Electronic personal protective equipment: a strategy to protect emergency department providers in the age of COVID 19<br>Turer, et al. 2020(29) | • This report suggests the use of a electronic ePPE as a strategy to protect ED care providers and conserve PPE while providing rapid access to emergency care for low risk patients during COVID-19.<br>• Electronic PPE was defined as an approach using telemedicine tools to perform medical screening exams while the care provider is immediately available on-site to physically examine or resuscitate the patient if screening warrants such action.<br>• To minimise risk, the authors recommend performing medical screening exams using electronic PPE on low risk patients with reassuring vital signs, few comorbidities, and chief complaints |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | suggesting lower respiratory infection (such as fever, cough, shortness of breath). |
| An adapted emergency department triage algorithm for the COVID-19 pandemic.<br>Wallace, et al. 2020(16) | • This paper describes an adapted COVID-19 triage algorithm for EDs guided by the evidence and responses to prior pandemics, with recommendations for clinician PPE use for each level of encounter in the setting of an ongoing PPE shortage.<br>• The algorithm adheres to Centres for Disease Control and Prevention prevention guidelines and supports discharge of patients with mild symptoms coupled with explicit and strict return precautions and infection control education.<br>• The proposed triage algorithm was designed to facilitate the timely evaluation of patients under investigation in an organised fashion that optimises patient triage, minimises unnecessary clinician exposure, standardises care, and maximises appropriate resource use in the setting of an ongoing PPE shortage. |
| Providing uninterrupted care during COVID-19 pandemic: experience from Beijing Tiantan Hospital<br>Wang, et al. 2020(17) | • A brief report highlighting Beijing Tiantan Hospital's rapid response to the pandemic to protect staff from infection and maintain routine care.<br>• Patient screening and admission: a total of 340 beds were designated for COVID-19. Some units or services were combined in order to minimise the workforce needs and to improve operation efficiency.<br>• ED patients must be screened with a chest CT scan and a throat swab culture. According to their illness, they will be admitted to the transitional care unit of the corresponding department if suspected of COVID-19 in order to reduce the risk of infection.<br>• Screening of returning employees: all staff, including contractors, volunteers and medical students, returning back to Beijing must be screened by a physician at the screening clinic, including completing the epidemiological questionnaires, having their body temperatures taken, and undergoing blood tests and a chest X-ray. |
| Containing COVID-19 in the emergency department: the role of improved case detection and segregation of suspect cases | • A study at Singapore General Hospital described the infrastructural modifications in the ED during COVID-19.<br>• The designated 'fever area' was expanded by taking over the adjacent ambulatory surgery centre and converting it into an expanded fever area, in which staff wore full PPE. Within the fever area, partitions (2m high) were set up between trolleys to |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| Wee, et al. 2020(2) | construct temporary cubicles and trolleys were spaced 2m apart, to reduce the risk of droplet spread; partitions and trolleys were wiped down after each patient.<br>• Traffic flows for patients managed in the fever areas were separated from the rest of the ED. Subsequently, to accommodate the rising number of patients, a sheltered carpark offsite was modified into an additional fever screening area for well patients with upper respiratory tract symptoms.<br>• Over the three month study period, among the 1,841 patients presented with respiratory illness, 70 were confirmed to have SARS-CoV-2. However, there were no cases of nosocomial transmission from intra-ED exposure. |
| Redesigning emergency department operations amidst a viral pandemic.<br>Whiteside, et al. 2020(18) | • This review addresses ways to adapt departmental operations to better manage in times of elevated disease burden, specifically identifying areas of intervention to help limit crowding and spread.<br>• The authors suggested limiting unnecessary ED visits via establishment of a call-centre, isolate patients through effective triage and geographic segregation, mitigate viral spread with appropriate screening and PPE, and address equipment and medication stock concerns. |
| Not just little adults: preparing a children's emergency department for COVID-19<br>Adamson, et al. 2020(3) | • A report article from a stand-alone children's ED in the UK.<br>• In March 2020, anticipating a surge in acute paediatric patients, the department developed a rapid assessment and triage process and a protocol for 'eyeballing' children at the ED front door and sending well-appearing children home. In April 2020, a restriction of one carer per child was imposed.<br>• ED area was divided into two: orange area for patients with COVID-19 symptoms or who were instructed to self-quarantine and green area for patients who were assessed as low risk. Each area had its own separate triage areas, registration points and staff.<br>• Children presenting to other adult EDs, which were experiencing a surge in adult patients, were diverted to this ED.<br>• Minor injuries were followed-up remotely, where possible, at the discretion of the orthopaedic and plastic team.<br>• PPE including fluid repellent gowns, filtering facepiece masks, eye protection and gloves were placed in 'grab bags'. The resuscitation and major trauma teams wore full PPE (level 3). |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | Clinicians taking throat swabs wore level 2 PPE (surgical mask, apron, gloves and eye protection). Wheeze guideline was modified to emphasise the use of inhalers.<br>• Clinical guidelines and patient information leaflets were updated frequently, and a WhatsApp group was established for ED staff to disseminate information.<br>• The authors caution that although there was a low attendance of paediatric patients at the ED during the pandemic, the recovery phase may bring new challenges due to vulnerable children returning to the ED after the lock-down, difficulties in maintaining social-distancing, schools reopening and winter season approaching. |
| Rapid response infrastructure for pandemic preparedness in a tertiary care hospital: lessons learned from the COVID-19 outbreak in Cologne, Germany, February to March 2020<br>Augustin, et al. 2020(21) | • A rapid communication report from a tertiary hospital in Germany.<br>• University Hospital Cologne established a COVID-19 rapid response infrastructure following the reporting of the first case in Germany on 25 February 2020.<br>• A decommissioned building was set up as a response centre to divert suspected patients from the ED. Patients wore masks upon entering and were triaged.<br>  ○ Patients with critical conditions in need of in-depth medical assessment were redirected to ED.<br>  ○ Patients with known COVID-19 exposure history were placed in two separate waiting rooms depending on risk-based stratification.<br>  ○ Patients without a known COVID-19 exposure history and who were not severely ill were referred to general practitioners or home treatment. Symptomatic patients were asked to self-quarantine until cleared by the test.<br>• Risk evaluation meetings were held regularly, and practice guidelines were updated frequently. |
| Utilizing telemedicine in a novel approach to COVID-19 management and patient experience in the emergency department<br>Bains, et al. 2020(30) | • An article from two EDs in New York, USA.<br>• Telemedicine carts were placed in the isolation rooms to lower PPE consumption and minimise COVID-19 infection and transmission.<br>  ○ Telemedicine carts were equipped with high-definition cameras and were solely for video and audio communication (no note-taking). The isolation rooms also |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | had landline telephones. Clinicians provided consultation from their workstation.<br>○ ED staff were trained in using and instructing patients to use the carts.<br>• Telemedicine carts were used for 261 COVID-19 patient interactions from March to May 2020. This initiative improved patient-provider communication and safety, conserved PPE use, allowed social workers and other service providers to interact with patients without entering the isolation rooms or more effectively than via phone, and allowed patients to interact with family members virtually. |
| COVID-19: resetting ED care<br>Boyle and Henderson, 2020(51) | • An editorial from the UK.<br>• Authors elaborate on the Royal College of Emergency Medicine recommendations on ED resetting and potential strategies.<br>○ Improved infection control: improving the cleaning of ED areas, providing PPE for staff and training staff in infection control.<br>○ Reducing overcrowding: setting maximum occupancy threshold, offering alternative care for lower acuity patients and<br>○ Redesigning or rebuilding the ED to allow for improved infection control and patient flow. |
| Preparedness and response to pediatric COVID-19 in European emergency departments: a survey of the REPEM and PERUKI networks<br>Bressan, et al. 2020(4) | • A cross-sectional survey study from Italy.<br>• This survey was collected from ED directors or delegates of 102 centres in 18 European countries in March 2020. At the time of the survey:<br>○ 34% of the centres did not have contingency plans, and 36% did not have simulation preparations<br>○ more than 90% of the centres cancelled planned outpatient visits, surgery or admissions for paediatric patients in response to COVID-19<br>○ 75% of EDs reorganised beds in paediatric wards, and 70% implemented telemedicine.<br>○ 52% of EDs recommended the use of surgical masks for staff pre-triage, 27% recommended FFP2/N95, and 8% recommended FFP3/N100 |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | ○ 43% of EDs recommended the use of surgical masks for staff during patient examination, 49% recommended FFP2/N95, and 11% recommended FFP3/N100<br>○ 82% of EDs implemented surgical mask use for patients<br>○ 17% of EDs had negative-pressure isolation rooms.<br>• There were variations in ED response to COVID-19 across various countries in Europe. |
| An integrated strategy for the prevention of SARS-CoV-2 infection in healthcare workers: a prospective observational study<br>Cattelan, et al. 2020(5) | • A prospective observational study from Italy.<br>• The infection control policy adopted by one hospital in Italy between 21 February and 16 April 2020 included the following.<br>○ Integrated infection control surveillance system: fast triage prior to entering ED, separating potentially infected and non-infected patients, installing hand disinfection facilities, implementing strict PPE use and training, establishing a surveillance system for monitoring healthcare worker infection and transmission.<br>○ Advanced triage: tents were located outside the ED, which was open 24 hours, seven days a week. Patients presenting to advanced triage were instructed to disinfect hands, wear masks and gloves and undergo COVID-19 testing. Patients were triaged based on their symptoms and test results. Staff wore respirators (unless there was a shortage), gloves and water-resistant long-sleeved gowns, and those performing swab tests or seeing symptomatic patients wore face shields.<br>○ Healthcare workers were monitored for symptoms before the start of each shift, were instructed to self-isolate if developed symptoms, received mandatory training on infection control and PPE use and were tested for COVID-19 every 7-10 days.<br>• 7595 patients, among whom 5.2% were COVID-19 positive, and 72.5% were symptomatic, were assessed in the advanced triage area. None of the healthcare workers who worked in the advanced triage area were infected with COVID-19.<br>• The hospital infection control policy was effective in preventing COVID-19 infection and transmission among healthcare workers. |
| Infection control strategies of patient | • Correspondence from a hospital in Taiwan. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| diversion in response to COVID-19<br>Chang, et al. 2020(22) | • The infection control strategies that were implemented in the outpatient medical services of the ED included the following.<br>  ○ Medical diversion control: implementing temperature screening station, mask-wearing and hand sanitisation measures, checking travel, occupation, contact, and cluster history status and prohibiting nonpatients, people from accompanying the patient, patients with symptoms and risky history from entering the hospital.<br>  ○ Separating patients with suspected COVID-19 symptoms from general patients at the emergency triage.<br>  ○ Setting up a quarantine clinic for asymptomatic patients and those returning from specific countries.<br>  ○ Providing telemedicine for patients in home-isolation.<br>• Providing online appointments for chronic prescriptions. |
| Emergency department infection control strategies in response to COVID-19<br>Chen, et al. 2020(12) | • Correspondence from a hospital in Taiwan.<br>• Policies of the ED in response to COVID-19 included the following.<br>  ○ Fever screening station was established for isolating patients with unknown emerging infectious disease and which was equipped with negative pressure equipment.<br>  ○ Daily temperature monitoring and recording of the staff.<br>  ○ Detecting abnormal body temperature of the personnel in the ED using infrared body temperature detector.<br>  ○ Separate inspection station outside the ED for checking travel, occupation, contact and cluster history and symptoms of the patients and their families.<br>  ○ Management of epidemic prevention supplies.<br>  ○ Separating ED and outpatient departments.<br>  ○ Cleaning and disinfecting the work area before leaving each shift work. |
| Buffer areas in emergency department to handle potential COVID-19 community infection in Taiwan<br>Chen, et al. 2020(23) | • A letter to the editor from Taiwan.<br>• To reduce the risk of infection, graded waiting areas were implemented in the EDs and patients were placed in those areas based on their risk stratification. Seats in those areas were installed 1m apart from each other. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | ○ Area A: located outside the hospital with good ventilation for high risk patients with fever or respiratory symptoms and travel or exposure history.<br>○ Area B: located inside the ED hall with separate air conditioning system for intermediate risk patients with fever or respiratory symptoms, but without travel history to highly endemic countries.<br>○ Area C: located inside the ED hall with separate air conditioning system for undetermined risk patients.<br>• During four weeks of implementing graded waiting areas, 1 in 6 patients who were placed in Area A, 3 in 172 patients in Area B and none of the 36 patients in Area C were infected with COVID-19. |
| Dividing the emergency department into red, yellow, and green zones to control COVID-19 infection; a letter to editor<br>Chong 2020(24) | • A letter to the editor from Taiwan.<br>• To reduce the risk of infection, graded waiting areas were implemented in the EDs and patients were placed in those areas based on their risk stratification.<br>○ Red zone: includes triage tents set up outside the ED and negative-pressure isolation rooms for high-to-medium risk patients. Healthcare providers working in red zone are required to wear full level of PPE, including N95 respirator, gown, gloves, eye protection, apron.<br>○ Yellow zone: includes indoor triage, waiting room, consultation rooms, observation rooms and nursing station for low risk patients. Healthcare workers working in yellow zone are required to wear surgical mask, gown, gloves, eye protection.<br>○ Green zone: includes areas reserved for healthcare providers for donning PPE, inventory, planning and dining. Healthcare providers are not required to wear PPE.<br>• Establishing zones within the ED can help to reduce the risk of cross-infection and conserve PPE. |
| European Society For Emergency Medicine position paper on emergency medical systems' response to COVID-19 | • A position paper from the European Society for Emergency Medicine.<br>• With regards to prevention and control of COVID-19 transmission in ED settings, the society recommends the following. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| Garcia-Castrilllo, et al. 2020(19) | ○ Setting up a prehospital system and team where the patient, family or the general practitioner can alert the team of a suspected case. Prehospital team in PPE meets the patient outside the ED setting and assesses and decides if the patient would need to be transferred to the ED or home-quarantined.<br>○ For patients directly presenting to the ED, immediate assessment of the infection risk in a specific triage area is recommended. Based on the assessment, suspected patients will be sent to the isolation rooms or dedicated rooms or sent home for quarantine.<br>○ Providing training for healthcare providers on use and disposal of PPE and providing psychological support for the workforce.<br>○ Implementing engineering measures to ensure isolation and minimisation of movement of suspected cases while maintaining physical distancing and air ventilation.<br>○ Extra waste management and cleaning protocols. |
| Emergency management in fever clinic during the outbreak of COVID-19: an experience from Zhuhai<br>Jiang, et al. 2020(13) | • An article from a fever clinic in China.<br>• Three operational steps were taking to prevent and control the COVID-19 transmission.<br>○ Facility set-up: prefab houses were built outside the ED to extend the existing infection clinics. 13 special rooms were set up, including separate fever clinic rooms and waiting areas for patients with symptoms or high risk epidemiological history, patients with symptoms but without epidemiological history and paediatric patients. Those facilities were divided into clean, potentially contaminated and contaminated zones. Passageways were divided and clearly identified for use for staff, patient and waste. Triage stations were set up at all entrances of the hospital.<br>○ Human resources management: fever clinics provided 24/7 services and sufficient staff were allocated on a four-period/day basis. Staff were provided with online and offline training and underwent emergency drills. Staff wore adequate PPE and clinic areas had good ventilation.<br>○ A three-level triaging system were established. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| | ▪ Level 1: a triaging station outside the outpatient building was set up to take body temperatures and epidemiological history of the arrivals. An infrared thermometer was installed at the front door of the outpatient building.<br>▪ Level 2: a triaging station at the entrance of each treatment area was set up to take body temperatures and epidemiological history of the patients, their families.<br>▪ Level 3: a guidance desk inside each treatment area was set up to check and ensure that primary screening was correctly undertaken. |
| South Korea's responses to stop the COVID-19 pandemic<br>Kang, et al. 2020(14) | • An article from South Korea<br>• Hospital countermeasure strategies in relation to infection control in ED included the following.<br>○ Setting up separate clinics to receive and assess patients with respiratory symptoms outside EDs.<br>○ Setting up selective clinics with trucks equipped with X-rays and computed tomography outside EDs.<br>○ Building container-based clinics which maintained negative pressure, used for isolating potential COVID-19 cases.<br>○ Setting up safe clinics for placing patients with respiratory symptoms unrelated to COVID-19.<br>○ All visitors to the hospital are required to wear masks.<br>○ ED areas were separated into screening unit, acute care unit (negative pressure rooms for confirmed cases) and intensive isolation room (for extremely severe cases).<br>• With limited stocks of masks, healthcare workers working with confirmed cases were allowed to use more than one mask a day, others were asked to use only one mask (N95) and reuse it after storing in a labelled zip-bag. When certain PPE was out of stock, it was reused. |
| COVID - 19 case study in emergency medicine preparedness and response: from personal | • A case study article from a hospital in the USA.<br>• Infection control measures in the ED included the following. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| protective equipment to delivery of care<br>Leiker, et al. 2020(6) | ○ Protocols were developed or adjusted for triaging, PPE use, and cleaning and sanitising of common areas and diagnostic testing areas.<br>○ Fit testing and training in mask use were provided for healthcare workers.<br>○ Healthcare workers working with confirmed or suspected COVID-19 cases were required to wear full PPE. Patients under investigation were placed in a room with clear precaution signs. Patients who were not under investigation were placed in another room and healthcare workers interacting with those patients were only required to wear a surgical mask.<br>• When N95 masks were in shortage, some staff wore surgical mask over the N95 to prevent contamination of the N95 masks. |
| Emergency department triage in the era of COVID-19: The Sheba Medical Center Experience<br>Levy, et al. 2020(25) | • A case study article from a medical centre in Israel.<br>• A triage nurse in full PPE was stationed at the entrance of the ED and screened patients for symptoms, epidemiological and medical history. Based on the screening indications, patients were directed to different sections of the ED.<br>○ Clean ED: for patients no symptoms of epidemiological history.<br>○ Biological ED: for patients who meet one or more of the COVID-19 positive screening criteria.<br>▪ Green section: for patients with no clinical symptoms but with high epidemiological suspicion.<br>▪ Yellow section: for patients with high clinical suspicion with or without epidemiological history and who have less severe symptoms and able to walk.<br>▪ Red section: for patients with high clinical suspicion with or without epidemiological history and who have more severe symptoms and are prone. |
| Fight COVID-19 beyond the borders: emergency department patient diversion in Taiwan | • A letter to the editor from Taiwan<br>• A unique patient diversion strategy was implemented in the ED, including the following. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| Lien, et al. 2020(15) | ○ A pre-triage unit was set up outside the ED. It was staffed with a nurse, two security guards (one responsible for entry gate control, which was equipped with infrared thermal camera, and another for patient traffic control) and one administrative officer (for checking patient immigration records). Patients were directed to three clinic areas depending on their screening indications.<br>▪ Special clinic 1: negative pressure room for patients with respiratory distress and high epidemiological history.<br>▪ Special clinic 2: for paediatric patients with fever or respiratory symptoms and high epidemiological history.<br>▪ Special clinic 3: for adult patients with fever or respiratory symptoms and high epidemiological history. Patients maintained six foot distance from others and physicians communicated with patients via intercom. Suspected pneumonia patients were transferred to a tent until admission. Others received swab testing in another tent. |
| Cross-infection control of coronavirus disease 2019 at the emergency department in Taiwan<br>Lin, et al. 2020(32) | • A case study article from Taiwan<br>• The cross-infection control measures recommended included:<br>○ Assessing and keeping a record of healthcare providers' symptom, travel, contact and cluster histories each week<br>○ Regularly monitoring and keeping a record of body temperatures<br>○ First-line clinical workers wearing PPE, including helmets, gloves, face shields, and N95 masks, before entering ED<br>○ Setting up outdoor triage and isolated waiting rooms and showering rooms outside the ED for healthcare workers<br>• Separating work and rest areas and maintaining 2 metres physical distancing, disinfecting shared equipment's and separating dining and office areas with acrylic board |
| A double triage and telemedicine protocol to optimize infection control in an emergency department in Taiwan during the COVID-19 | • A retrospective feasibility study from Taiwan.<br>• A double triage and telemedicine protocol were developed as infection-control measures.<br>○ Double triage system. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| pandemic: retrospective feasibility study<br><br>Lin, et al. 2020(7) | ▪ Triage 1: located at the entrance for screening for patient's travel, occupation, contact and cluster history.<br>▪ Triage 2: for patients who posed COVID-19 infection risk.<br>▪ Healthcare workers wore full PPE (an N95 face mask, a waterproof gown, a non-disposable face shield, a hair cap, shoe sleeves, and two layers of gloves) when working in the clinic. A nurse checked and kept a record of the time when healthcare workers appropriately donned and doffed PPE and entered and left the clinic.<br>○ Telemedicine was used to conduct interviews with patients before healthcare workers entered the clinic to conduct other procedures. |
| Hospital emergency management of emerging infectious disease using instant communication technology<br><br>Lin, et al. 2020(31) | • A letter to the editor from Taiwan.<br>• The authors discuss the use of instant communication devices (not phones or handheld transceivers) and messaging apps as communication tools in hospital emergency management, including to manage the threat of emerging infectious diseases such as COVID-19.<br>• They advise the following.<br>○ The chat group members should be solicited in a planned way, considering information security and communication efficiency. Each section (e.g. operation, planning, finance, admin, command staff) should have their own independent chat groups.<br>○ The messages in the chat groups need to be regulated. Use simple words and common terminology.<br>○ Instant communication devices should be sterilised regularly. Notify chat group members to regularly sterilise their hands and mobile devices.<br>• They conclude that hospital emergency management should be updated with both innovation and technology. |
| Reducing the consumption of personal protective equipment by setting up a multifunctional sampling | • A letter to the editor from Taiwan.<br>• To minimise the amount of PPE, healthcare professionals, sanitation workers, and isolation space workers were required to identify and test high risk COVID-19 patients in the ED. |

| Source | Summary |
|---|---|
| **Peer reviewed sources** | |
| station in the emergency department to screen for COVID-19 infection in Taiwan<br><br>Lin, et al. 2020(52) | • The authors established a multi-functional sample collection station for COVID-19 testing in front of the ED. This station features:<br>  ○ a thick and clear divider between the patient and medical personnel<br>  ○ three pairs of gloves attached to the outside wall<br>  ○ a thin gap between the divider and the building was sealed<br>  ○ communication with ED personnel and patients using a small two-way broadcast system.<br>  ○ a secure medical waste disposal.<br>• The researchers found that the use of these stations considerably conserved the amount of PPE, sampling time and sanitation resources. |

**Table 2. Grey literature**

| Source | Summary |
|---|---|
| **Grey literature** | |
| Australia | |
| COVID-19 guidance on the use of personal protective equipment by health care workers in areas with significant community transmission, version 2<br>*Published 6 August 2020*<br>Australian Government Department of Health 2020 (35) | • This document advises that in geographic areas with significant community transmission of COVID-19 (as defined by jurisdictional public health units) and in specified clinical settings, healthcare workers may need to take extra precautions above those usually indicated for standard and transmission-based precautions.<br>• Routine clinical care<br>○ In geographic areas with significant community transmission of COVID-19:<br>▪ in all clinical settings, use standard precautions (including eye protection) AND wear a surgical mask.<br>▪ for routine non-hospital care and hospital care of individual patients with suspected, probable or confirmed COVID-19, who are in quarantine or have acute respiratory symptoms, use contact and droplet precautions, including eye protection.<br>• Challenging patient behaviours in specified clinical settings<br>○ Particulate filter respirators such as P2 or N95 respirators, should be used in EDs in areas with significant community transmission, where one or both of the following apply.<br>▪ For the clinical care of patients with suspected, probable or confirmed COVID-19, who have cognitive impairment, are unable to cooperate, or exhibit challenging behaviours (such as shouting). In this context, consider the use of contact, droplet and airborne precautions (including eye protection), including the use of a particulate filter respirator, instead of a surgical mask.<br>▪ Where there are high numbers of suspected, probable or confirmed COVID-19 patients AND a risk of challenging behaviours and/or unplanned aerosol generating procedures (e.g. including intermittent use of high flow oxygen). In this setting, consider extended use of particulate filter |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | respirators, for up to four hours, if tolerated, to avoid the need for frequent changes of face covering.<br>○ The guideline explains that recent experience in these settings, suggests an increased risk of healthcare worker infection, despite apparent compliance with infection control precautions. Anecdotally, this increased risk is associated with challenging behaviours by patients who find instructions hard to follow (e.g. secondary to cognitive impairment or mental illness), especially in the first week of infection, when viral load may be high. These transmissions seem to have occurred in the setting of prolonged, close patient contact.<br>• The document also provides guidance on aerosol generating procedures (use contact, droplet and airborne precautions and perform in a closed door single negative pressure room, vacate for 30 minutes after procedure). |
| Guidance on the use of personal protective equipment (PPE) in hospitals during the COVID-19 outbreak, v 4.0<br>*Updated 24 April 2020*<br>Australian Government Department of Health 2020 (41) | • These recommendations are based on current evidence, current status of COVID-19 in Australia, risk assessment and expert advice. It is specified that this guidance will be updated as new information becomes available.<br>• This guidance is intended for healthcare workers in hospital settings including the ED.<br>• General guidance on procedures performed on patients who are suspected or confirmed cases of COVID-19<br>○ Management of hospital patients in whom COVID-19 is NOT suspected: standard precautions, observing cough etiquette and respiratory hygiene, physical distancing (at least 1.5m).<br>○ Management of patients with acute respiratory symptoms and/or suspected or proven COVID19: patients are required to wear surgical mask upon presentation to hospital AND placed in a single room with the door closed or a physically separated closed area designated for suspected COVID-19 cases OR negative pressure room if aerosol generating procedure performed.<br>○ Environmental hygiene (routine and frequent cleaning of frequently touched surfaces).<br>○ Transmission-based precautions |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | ▪ Contact and droplet precautions should be used for the routine care of patients in quarantine or isolation, or under investigation for or with confirmed COVID-19.<br>▪ The use of nebulisers should be avoided and alternative medication administration devices (e.g. spacers) used.<br>▪ Contact and airborne precautions should be used when performing aerosol generating procedures.<br>• PPE advice specific to EDs<br>○ Contact and droplet precautions should be used for routine care of COVID-19 patients in the ED except when an aerosol generating procedure (including passage of an endotracheal tube) is required.<br>○ Contact and airborne precautions should be used for care of COVID-19 patients when performing an aerosol generating procedure.<br>▪ Aerosol generating procedures should be performed in a negative pressure room (or a standard isolation room with door closed).<br>▪ The number of persons present in the room should be minimised. |
| Clinical guidelines for the management of COVID-19 in Australasian emergency departments, version 4.3<br>*Updated 4 September 2020*<br>Australasian College for Emergency Medicine 2020 (42) | Infection control and prevention<br>• PPE is one part of a package of measures to prevent transmission of COVID-19. Other controls, the implementation of which will vary according to the level local community transmission.<br>○ Use telehealth where appropriate to provide care to reduce the need for patients to attend health facilities.<br>○ Screening at entry to health facilities; limit and monitor points of entry; limit visitor numbers.<br>○ Administrative controls such as policies, appropriate infrastructure, triage and placement of patients, physical distancing guidance, staff to patient ratios and staff training. |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | ○ Environmental and engineering controls aimed at reducing the spread of pathogens and the contamination of surfaces and inanimate objects such as adequate spacing between staff and patients, patients and patients; correct cleaning and disinfection procedures; well ventilated isolation rooms.<br>○ Standard precautions, including hand hygiene (5 Moments) for all patients.<br>○ Patients and health workers should observe respiratory hygiene and cough etiquette.<br>○ Universal source control measures including:<br>▪ the use of surgical masks by health facility staff to reduce transmission of infection between staff, as well as from patients or visitors to staff<br>▪ patients and visitors wear facemasks when entering or moving around health facilities.<br>○ In addition to using standard precautions, individuals including family members and visitors should use contact and droplet precautions before entering the room of suspected or confirmed COVID-19 patients.<br>○ Equipment should be either single-use and disposable, or dedicated equipment (e.g. stethoscopes, blood pressure cuffs and thermometers). If equipment needs to be shared among patients, clean and disinfect it between use for each individual patient.<br>○ Keyboards, phones, pagers and other mobile devices should be protected from contamination and cleaned regularly.<br>• PPE recommendations for EDs<br>○ Contact and droplet precautions<br>▪ Use for clinical care in regions with low community transmission for suspected COVID-19 patients (according to current epidemiological and clinical criteria).<br>▪ NOT suitable for aerosol generating procedures on suspected or confirmed COVID-19 patients, or clinical management of confirmed COVID-19 patients. |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | ○ Airborne precautions<br>▪ Use for clinical care in regions with high community transmission for suspected COVID-19 patients (according to current epidemiological and clinical criteria), and when performing aerosol generating procedures on suspected or confirmed COVID-19 patients at any community transmission level; for all confirmed COVID-19 patients.<br>○ PPE for clinical care of patients without any current epidemiological and clinical criteria who are at low risk for COVID-19<br>▪ Clinical staff are recommended to:<br>• use a surgical face mask<br>• practice hand hygiene<br>• use gloves for patient contact and additional standard precautions as indicated<br>• in areas of high community transmission, use eye protection.<br>• PPE in specific clinical situations |

| | No PPE | Surgical Mask | Surgical Mask<br>• - Use gloves, and consider eye protection for patient contact (low community transmission)<br>OR<br>• Contact and droplet PPE (high community transmission) | Contact and Droplet PPE<br>• Surgical mask<br>• Eye protection<br>• Gloves<br>• Gown / apron<br>• Consider hair cover | Airborne PPE<br>• N95/P2 respirator<br>• Eye protection<br>• +/- face shield<br>• Gloves<br>• Long sleeved gown +/- apron<br>• Hair cover or hood |
|---|---|---|---|---|---|
| **Staff not directly in contact with patients** | ✓ In regions with low/ no community transmission | ✓ In regions with higher community transmission | | | |
| **> 1.5m distance at all times*** | | | | | |
| **Limited, short duration patient contact (clinical support staff)** | | | ✓ Depending on low or high community transmission | | |
| **COVID assessment clinic** | | | | ✓ (risk assessment†) | ✓ (risk assessment†) |
| **Triage** | | | | ✓ (risk assessment†) | ✓ (risk assessment†) |
| **Clinical staff in direct contact with patients** Assess COVID risk status and AGP likelihood | | | ✓ Patients screened negative or minimal for COVID risk and no respiratory symptoms (risk assessment†) | ✓ Fever or acute respiratory infection or, screened suspected or definite COVID, no AGPs Regions with low community transmission | ✓ Severe acute respiratory infection (or undifferentiated case requires AGPs + admission) or suspected COVID-19 in high community transmission regions; confirmed COVID-19 in any region |
| **Performing Aerosol Generating Procedures (AGPs)** | | | | ✓ No or minimal COVID risk, low or no community transmission | ✓ Suspected or confirmed COVID, or region of high community transmission |
| **Prolonged direct clinical care in higher risk patient environments** | | | | ✓ Clinical ED areas with cohorted fever or acute respiratory infection or, screened suspected or definite COVID no AGPs Regions of low community transmission (risk assessment†) | ✓ Clinical ED areas with cohorted severe acute respiratory infection (or undifferentiated case requires AGPs + admission) unknown or suspected COVID-19 in regions of high community transmission, and, confirmed COVID-19 in all transmission regions (risk assessment†) |
| **Resuscitation Team** | | | | ✓ No AGPs (risk assessment††) | ✓ Likely AGPs (risk assessment††) |
| **Trauma Team** | | | | ✓ No AGPs (risk assessment††) | ✓ Likely AGPs (risk assessment††) |
| **Paediatric patients with AGPs** | | | | ✓ (risk assessment††) | ✓ (risk assessment††) |

NSW GOVERNMENT Health

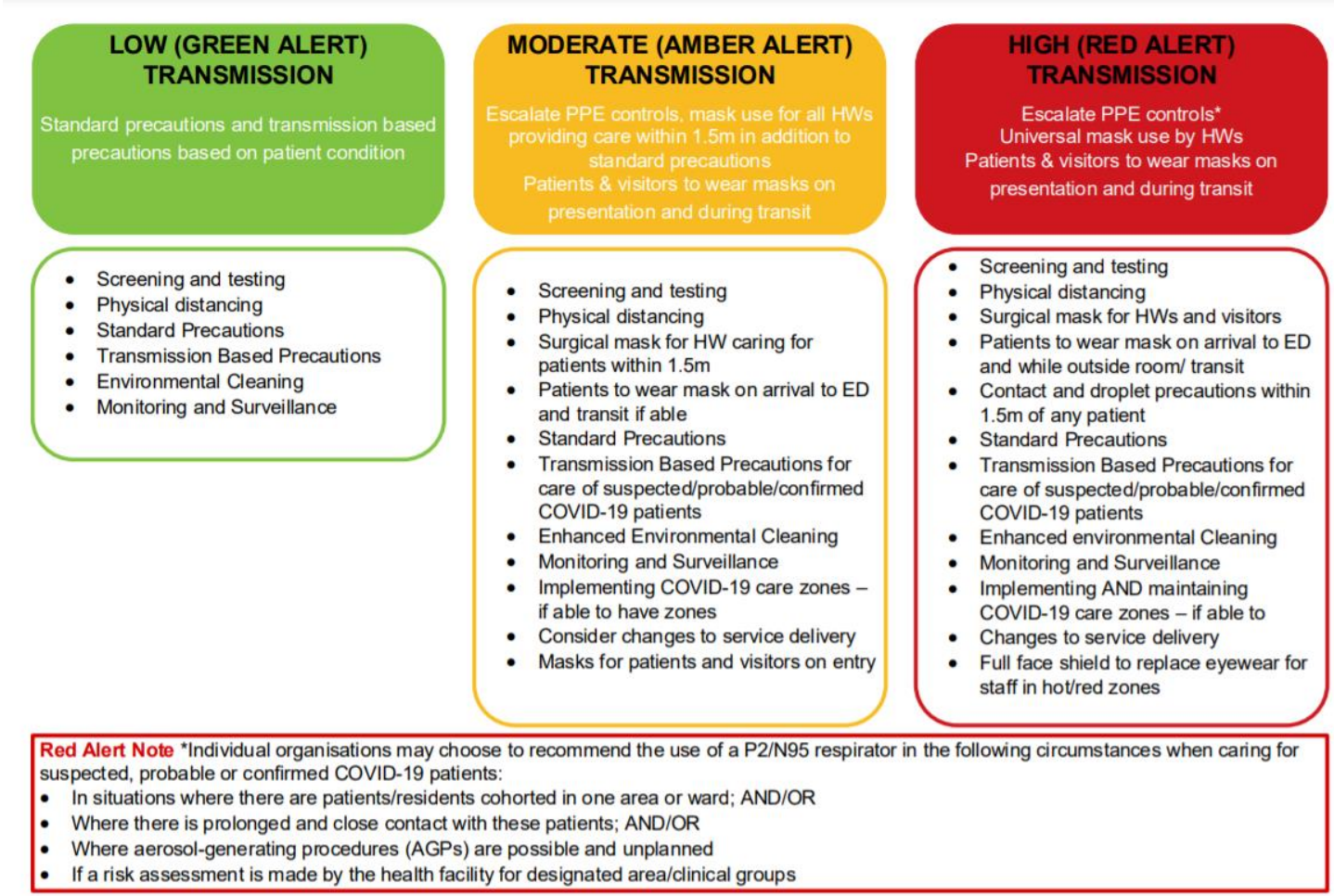
Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.

| Source | Summary |
|---|---|
| **Grey literature** | |
| [Emergency department – PPE quick reference guide, version 4.1]<br>*First published 27 April 2020*<br>*Reviewed on 14 September 2020*<br>Clinical Excellence Commission 2020 (53) | • A quick reference guide for PPE use in EDs.<br>• Any variation to this guidance must be based on local risk assessment and made in conjunction with facility management, local infectious diseases physician, public health unit, infection prevention and control and advice from the Clinical Excellence Commission. The transmission levels must be checked against the Response and Escalation Risk Matrix. |

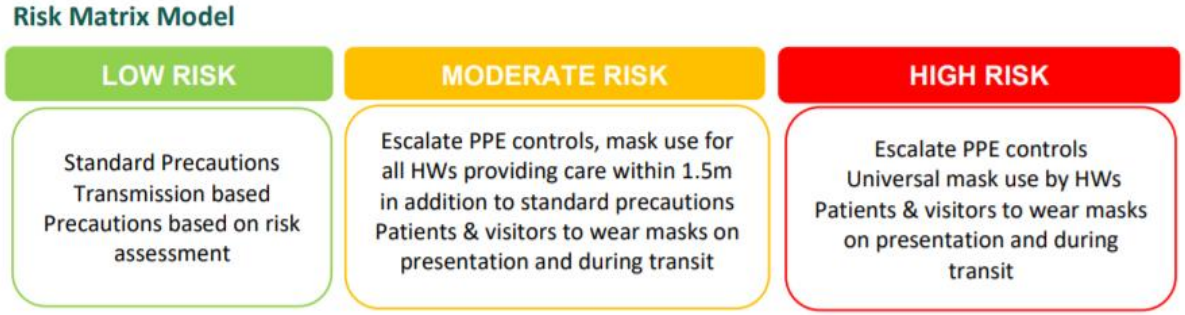
## PPE use at Different Transmission Levels

| RISK LEVEL (see next page) | The appropriate PPE (mask, eye protection, apron/gown, gloves) should be selected by staff as per risk assessment or as directed by their department/ hospital management and infection control team. | | |
|---|---|---|---|
| | LOW (GREEN ALERT) TRANSMISSION | MODERATE (AMBER ALERT) TRANSMISSION | HIGH (RED ALERT) TRANSMISSION |
| When interacting with a patient with **LOW PROBABILITY** of COVID infection (i.e. no fever, no respiratory symptoms, no close contact with a confirmed case). | **STANDARD PRECAUTIONS**<br>For all patient care. | **STANDARD PRECAUTIONS**<br>Surgical mask within treatment space (within 1.5m in patient zone).<br>Eye protection as per risk assessment. | **CONTACT and DROPLET PRECAUTIONS**<br>(within 1.5m in patient zone). |
| When interacting with a patient with **HIGH PROBABILITY** of COVID infection (i.e. fever, respiratory symptoms, close contact with confirmed case). | **CONTACT and DROPLET**<br>Surgical mask, eye protection, apron/gown and gloves within treatment space (within 1.5m in patient zone). | | |
| When performing respiratory AGP on patient suspected, probable or confirmed with COVID-19 | **CONTACT, DROPLET and AIRBORNE**<br>P2/N95 respirator, full face shield/eyewear, gown and gloves.<br>Use of PAPR and additional PPE may be considered as per local Infection Prevention and Control following review of evidence and risk assessment<br>**HW must be trained and competent in use of PPE.**<br>HWs who are responders for cardiac arrests have practiced the safe, effective and quick donning of PPE required for contact, droplet and airborne precautions | | |

**Vulnerable HWs**: Health workers (HW) should be individually risk assessed to determine their suitability for clinical areas. Wearing a surgical mask when within 1.5 metres of any patient will reduce this risk and should be considered in the risk assessment.

| Source | Summary |
|---|---|
| **Grey literature** | |
| |  |

| Source | Summary |
|---|---|
| **Grey literature** | |
| COVID-19 infection prevention and control response and escalation framework, version 1.0<br>*Published July 2020*<br>Clinical Excellence Commission 2020 (34) | • A key focus during escalation is the use of PPE, including surgical masks, in response to the level of community transmission. Continual risk assessment of patients should apply in all care settings.<br>• General principles – apply to all settings and all scenarios<br>○ The fundamental principles of infection prevention and control must be applied across all settings at all times. These principles apply across all scenarios and are listed here.<br>1. Administrative and engineering controls as per infection prevention<br>2. Physical distancing<br>3. Standard precautions for all healthcare interactions<br>4. Hand hygiene<br>5. Enhanced cleaning of high touch surfaces<br>6. Ensure relevant staff have completed donning and doffing and fit checking assessment<br>7. Ensure there is on-site, readily available testing for staff<br>8. Health workers to stay at home if they are unwell<br>9. Entry screening for visitors and staff as per NSW Health guidelines.<br>• Application of risks<br>○ During situations of increased risk, it is important to be able to escalate the infection prevention and control precautions to align with the risk of community transmission and onward spread. Risk may change based on geographical locations of spread. Changes to risk of COVID-19 can be based on the identification of transmission in key areas.<br>1. Geographic clusters<br>2. Level of community transmission |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | 3. Local health district, local government area or state.<br>○ Authorisation for an escalation of risk should be based on direction from PHEOC and the Clinical Excellence Commission and local transmission data in the last two weeks.<br>  <br><br>• Patients presenting directly to the ED<br>○ Low transmission: standard precautions apply. Patients to wear a mask only if acute respiratory illness suspected or confirmed.<br>○ Moderate transmission: all patients to wear a surgical mask if possible, on presentation and during transit if possible. Mask to remain in situ if in open areas or if unable to maintain physical distance.<br>○ High transmission: all patients to wear a surgical mask on presentation and during transit if possible.<br>• Health workers<br>○ Providing care within 1.5m of patients<br>▪ Low transmission: standard precautions apply. Physical distancing to apply at all staff breaks.<br>▪ Moderate transmission: all staff to wear surgical mask in addition to standard precautions. Physical distancing to apply at all staff breaks. Healthcare workers to follow contact and droplet |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | precautions if patient suspected or confirmed COVID-19. Airborne precautions for all aerosol generating procedures for patients with suspected or confirmed COVID-19 or acute respiratory illness.<br>▪ High transmission: Healthcare workers to follow contact and droplet precautions. Airborne precautions for all aerosol generating procedures. Physical distancing to apply at all staff breaks.<br>○ No contact within 1.5m of patients<br>▪ Low transmission: standard precautions apply.<br>▪ Moderate transmission: standard precautions apply.<br>▪ High transmission: surgical masks.<br>• Visitors<br>○ Low transmission: standard precautions apply.<br>○ Moderate transmission: visitors, including carers and family, must wear a mask before entering the facility (own mask or provided by the facility).<br>○ High transmission: reduce visitors to essential only. |
| Interim infection prevention and control guidelines for the management of COVID-19 in healthcare settings, version 1.14<br>*Published 4 Oct 2020*<br>Queensland Health 2020 (36) | Infection prevention and control measures for EDs.<br>• Patient management at arrival<br>○ Take steps to ensure that patients presenting with symptoms of respiratory infection are identified at triage and are directed to the fever clinic (or special assessment areas, where this is in place). For example:<br>▪ place alert signage at the entrance to the ED redirecting patients presenting with symptoms of respiratory infection to the fever clinic or to immediately make themselves known to triage |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | ▪ provide symptomatic patients with a surgical mask to wear (in geographic areas of moderate to high risk of community transmission, all patients presenting to hospital should wear a surgical mask where tolerated, unless they are an inpatient in their own bed).<br>▪ ensure that relevant questions are asked at the point of triage regarding possible contact with suspect, probable or confirmed cases of COVID-19, recent travel history, and whether the person has been directed to quarantine or isolate<br>▪ ensure that patients presenting with respiratory symptoms do not share the same waiting area with other patients and are immediately placed in an isolation room if COVID-19 infection is suspected<br>▪ ensure patients are directed to perform hand hygiene on arrival and there is a means for them to do so, and ensure patients are directed to practice respiratory hygiene and cough etiquette.<br>Use of PPE and scrubs<br>• The report also refers to Pandemic Response Guidance: Personal protective equipment in healthcare delivery for guidance about escalation of PPE use in healthcare facilities based on assessment of risk of community transmission of COVID-19. Escalation of risk category will be informed by direction from the Chief Health Officer and the State Health Emergency Coordination Centre, taking into account the risk of community transmission.<br>• Staff transporting the patient should remove PPE in the receiving ward or area, e.g. prior to returning to the ED, if the staff member is not remaining with the patient.<br>• Healthcare facilities may consider providing facility laundered scrubs as an alternative to uniforms or personal apparel for healthcare workers working in areas such as fever clinics, EDs, infectious diseases wards, intensive care units or other areas where they are providing care for many patients suspected or confirmed to have COVID-19. Scrubs provided for this purpose should be laundered by the hospital linen service and should not be worn outside the healthcare facility, that is, the healthcare worker should wear their uniform or personal apparel to and from the healthcare facility. |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | Managing demand<br>• Hospital and health services should have in place systems to rapidly assess and manage symptomatic people for COVID-19. Depending on demand and capacity, this may be through current ED procedures or through special assessment areas, referred to as 'fever clinics' in this document.<br>  ○ For most interaction with patients in a fever clinic the patient should be managed using contact, droplet and standard precautions.<br>• Hospital and health services may also consider increasing local telehealth options to decrease demand on ED services. Patients could be assessed via telehealth consultation with a clinician to decide whether any clinical management is required, or whether they meet the criteria for testing. This could provide reassurance to the 'worried well' and potentially prevent unnecessary presentations. |
| Pandemic response guidance: personal protective equipment in healthcare delivery, version 1.1<br>*Published 23 August 2020*<br>Queensland Health 2020 (54) | • This guidance about escalation of PPE use during healthcare delivery is based on assessment of risk of community transmission of COVID-19. The escalation of PPE aims to minimise the risk for acquisition of COVID-19 infection by healthcare workers, patients and visitors. In addition to infected patients, healthcare workers are at risk for acquisition of SARS-CoV-2 from co-workers with COVID-19 infection.<br>• This guidance refers to three PPE escalation levels. PPE escalation will be informed by direction from the Chief Health Officer and the State Health Emergency Coordination Centre, taking into account the risk of community transmission. These risk determinations can be localised (for example, in the event of a local outbreak or cluster of COVID-19), regional or state-wide. Ongoing risk assessment of patients should occur in all care settings in order to inform the most appropriate PPE required for specific clinical interactions.<br>• Standard precautions are required for all patients regardless of their known or presumed infectious status. Standard precautions are the primary strategy for minimising the risk of infection and must be used as part of day-to-day practice when providing healthcare. In accordance with standard precautions, a surgical mask and protective eyewear should always be worn when providing healthcare to a patient with acute respiratory infection symptoms. Table 1 outlines the recommended escalation of PPE for use in healthcare. |

| Source | Summary |
|---|---|
| **Grey literature** | |

- Continuous surgical mask use is recommended for healthcare workers during periods of moderate and high community transmission of COVID-19, to reduce the risk of transmission of COVID-19 between healthcare workers and patients and amongst healthcare workers. This will require healthcare workers who work in clinical areas and common workspaces to continuously wear a surgical mask during their routine activities throughout the entire shift. Healthcare workers who generally work alone in their own office will be required to wear a mask when outside of their office if physical distancing cannot be maintained.

Table 1. Recommended PPE escalation according to risk of unexpected COVID-19 infections in patients or healthcare workers

(in addition to standard precautions +/- transmission-based precautions if indicated for another reason)

| | | Low risk<br>e.g. no or few cases; cases only in quarantine; small numbers of linked cases | Moderate Risk<br>e.g. a series of unlinked cases; high numbers of locally-acquired cases; cases with high numbers of local contacts | High Risk<br>e.g. high numbers of unlinked cases; sustained community transmission |
|---|---|---|---|---|
| HEALTHCARE STAFF | Routine care<br>For suspected / probable / confirmed COVID-19 patients | Surgical mask<br>Protective eyewear<br>Gown<br>Gloves | Surgical mask<br>Protective eyewear<br>Gown<br>Gloves | Surgical mask *<br>Protective eyewear<br>Gown<br>Gloves |
| | Aerosol generating procedures<br>For suspected / probable / confirmed COVID-19 patients | P2/N95 respirator<br>Protective eyewear<br>Gown<br>Gloves | P2/N95 respirator<br>Protective eyewear<br>Gown<br>Gloves | P2/N95 respirator<br>Protective eyewear<br>Gown<br>Gloves |
| | Aerosol generating procedures<br>For non-COVID-19 patients | Nil | Surgical mask<br>Protective eyewear | P2/N95 respirator<br>Protective eyewear |
| | Routine care of non-COVID-19 patients (within 1.5m) | Nil | Surgical mask<br>Protective eyewear | Surgical mask<br>Protective eyewear |
| | Hospital staff during activities other than direct patient care | Not Applicable | Surgical mask when physical distancing > 1.5m cannot be maintained (e.g. ward rounds, handover, meetings) | Surgical mask when physical distancing > 1.5m cannot be maintained (e.g. ward rounds, handover, meetings) |
| Patients - suspected / probable / confirmed COVID-19 (excluding paediatric patients) | | Surgical mask<br>where tolerated, unless inpatient in own bed | Surgical mask<br>where tolerated, unless inpatient in own bed | Surgical mask<br>where tolerated, unless inpatient in own bed |
| Patients - non-COVID-19 (excluding paediatric patients) | | Nil | Surgical mask<br>where tolerated, unless inpatient in own bed | Surgical mask<br>where tolerated, unless inpatient in own bed |
| Visitors | | Nil | Surgical mask OR<br>Own mask if adequate<br>(fabric mask with at least 3 layers) | Surgical mask OR<br>Own mask if adequate<br>(fabric mask with at least 3 layers) |

*Use of P2/N95 respirators may be considered in areas with significant community transmission in the following circumstances:
For the clinical care of patients with suspected, probable or confirmed COVID-19, who have cognitive impairment, are unable to cooperate, or exhibit challenging behaviours (see reference). In this context, consider the use of contact, droplet and airborne precautions (including eye protection), including the use of a P2/N95, instead of a surgical mask.
Where there are high numbers of suspected, probable or confirmed COVID-19 patients AND a risk of challenging behaviours and/or unplanned aerosol- generating procedures (e.g. including intermittent use of high flow oxygen). In this setting, consider extended use of P2/N95, for up to 4 hours, if tolerated, to avoid the need for frequent changes of face covering.
https://www.health.gov.au/resources/publications/iceg-guidance-ppe-health-workers-community-transmission

| Source | Summary |
|---|---|
| **Grey literature** | |
| Infection prevention and control COVID-19 personal protective equipment (PPE) decision matrix, version 2.2<br><br>*Updated 15 September 2020*<br><br>Government of South Australia, SA Health 2020 (37) | • The guidance in this document provides PPE advice and applies to:<br>  ○ hospitalised patients, including day procedure areas<br>  ○ all patients in the ED, outpatient clinics and COVID-19 testing clinics.<br>• The document provides PPE advice and general infection control recommendations relating to COVID-19 including:<br>  ○ when testing patients for COVID-19<br>  ○ PPE for staff when providing care<br>  ○ room accommodation for the patient.<br>• The advice in this fact sheet is based on the understanding that currently, South Australia is not considered to have significant community transmission of COVID-19, as the situation evolves this document will be updated as required.<br>• In geographic areas with significant community transmission of COVID-19 (as defined by SA Health) and in specified clinical settings, healthcare workers may need to take extra precautions above those usually indicated for standard and transmission-based precautions.<br>• PPE recommendations in geographic areas with significant community transmission of COVID-19<br>  ○ In all clinical settings, at a minimum, use standard precautions, including eye protection and a surgical mask (level 2 or higher) refer to local health facility advice.<br>  ○ For routine care of individual patients with suspected, probable or confirmed COVID-19, who are in quarantine or isolation or have acute respiratory symptoms, at a minimum, use contact and droplet precautions. Clinicians and local health networks should also undertake a local risk assessment to guide extra PPE requirements e.g. use of P2/95 respirators (or equivalent). |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | • For further guidance on the use of PPE by healthcare workers in areas with significant community transmission, the document refers to COVID-19 Guidance on the use of personal protective equipment by health care workers in areas with significant community transmission.<br>• The document also provides summarised PPE recommendations for COVID-19<br>  ○ Patients with suspected, probable or confirmed COVID-19<br>  ○ Patients with epidemiological or clinical risk factors for COVID-19<br>  ▪ Risk factors for epidemiological exposure currently include people from areas in South Australia or overseas or interstate with increased risk of community spread transmission.<br>  ○ Patients without epidemiological risk factors for COVID-19<br>  ▪ If sustained community transmission is occurring, all patients should be considered as possibly infected or COVID-19 risk.<br>  ○ Aerosol generating procedures.<br>Table. Patients with epidemiological or clinical risk factors for COVID-19 |

| Actions | | Patients WITH risk factors (includes geographical areas with significant community transmission) AND <u>WITH</u> COVID-19 signs and symptoms | Patients WITH risk factors (includes geographical areas with significant community transmission) AND <u>WITHOUT</u> COVID-19 signs and symptoms |
|---|---|---|---|
| Patient PPE (if able to tolerate) | | Surgical mask (level 1), hand hygiene, cough etiquette | Surgical mask (level 1), hand hygiene, cough etiquette |
| Aerosol generating procedure is **NOT** required | Health care worker PPE | Minimum as per the SoNG surgical mask (level 2 or 3), long sleeved gown, gloves, face shield or goggles<br>OR<br>Based on clinician and LHN risk assessment, P2/N95 respirator (or equivalent) with goggles/safety glasses and a face shield, long sleeved gown, gloves<br>Refer to table 1. | Surgical mask (level 2 or 3), long sleeved gown, gloves, face shield or goggles<br>OR<br>Based on clinician and LHN risk assessment, P2/N95 respirator (or equivalent) with goggles/safety glasses and a face shield, long sleeved gown, gloves |
| | Room accommodation for patient | Single room | Single room |
| | Restriction on entry to patient's room after patient leaves | No<br>Allocate time for environmental cleaning | No<br>Allocate time for environmental cleaning |
| Aerosol generating procedure **IS** required **and/or** the patient is exhibiting aerosol generating behaviours **and/or** there is a risk of a high velocity fluid strike to the P2/N95 respirator (or equivalent) | Health care worker PPE | P2/N95 respirator (or equivalent) with goggles/safety glasses and a face shield, long sleeved gown, gloves | P2/N95 respirator (or equivalent) with goggles/safety glasses and a face shield, long sleeved gown, gloves |
| | Room accommodation for patient | Negative pressure room if available, otherwise single room with the door closed | Negative pressure room if available otherwise single room |
| | Restriction on entry to patient's room after the patient leaves | Following an AGP, the room should remain vacant for at least 30 minutes, followed by appropriate environmental cleaning<br>Entry within 30 minutes only by persons wearing a P2/N95 respirator (or equivalent), long sleeved gown, gloves, face shield or goggles | Following an AGP, the room should remain vacant for at least 30 minutes, followed by appropriate environmental cleaning<br>Entry within 30 minutes only by persons wearing a P2/N95 respirator (or equivalent), long sleeved gown, gloves, face shield or goggles |

**NOTE:** Also refer to LHN policy and procedures.

| Source | Summary |
|---|---|
| **Grey literature** | |
| Assessment and streaming in emergency departments and urgent care centres coronavirus (COVID-19)<br><br>*Updated 8 October 2020*<br><br>Victoria Department of Health and Human Services 2020 (55) | Guidance on assessment and streaming based on levels of COVID-19 risk factors<br>• Having COVID-19 risk factors (known to be positive, epidemiological risk factors, presence of symptoms, where a history cannot be obtained, other new onset COVID-19 symptoms)<br>  ○ Staff PPE[1]: P2/N95 respirator, gown, gloves, protective eyewear<br>  ○ Patient PPE: Mask if practical<br>  ○ Test if meets testing criteria<br>  ○ Isolate and cohort<br>  ○ Discharge clean with an appropriate disinfection solution<br>  ○ Epidemic thunderstorm asthma: exercise discretion around cohorting suspected and confirmed COVID-19 patients as well as those with asthma in order to save lives. Test (as appropriate) where possible.<br>• No COVID-19 risk factors<br>  ○ Staff PPE[1]: Surgical mask, protective eyewear. Addition of gowns and gloves as per standard precautions<br>  ○ Patient PPE: Mask if practical<br>  ○ Test (rapid if available) if planned for emergency surgery<br>  ○ Routine discharge clean.<br>• Potential COVID-19 risk factors (e.g. older patients with new onset atypical COVID-19 symptoms and no alternative explanation; residents of an aged care facility)<br>  ○ Consider whether isolating, cohorting and testing is indicated based on the local prevalence of COVID-19, other epidemiological risk factors, and clinical reasoning<br>1. P2/N95 respirator, gown, gloves and protective eyewear are required when providing frequent, prolonged, episodes of care to suspected or confirmed COVID-19 patients, when working within areas where suspected or confirmed COVID-19 patients are cohorted (such as in EDs and urgent care centres), where there is a risk of unplanned aerosol generating procedures or aerosol generating behaviours in suspected or confirmed COVID-19 patients and when undertaking aerosol generating procedures on a person with suspected or confirmed COVID-19. Unless damp, soiled or a break is taken, a mask may be worn for up to four hours. |

| Source | Summary |
|---|---|
| **Grey literature** | |
| Coronavirus disease 2019 (COVID-19) infection prevention and control guideline, version 4.1<br><br>*Updated 10 September 2020*<br><br>Victoria Department of Health and Human Services 2020 (39) | • Guidance not specific to EDs, but to hospitals and healthcare settings in general.<br>• Includes standard precautions for: hand hygiene, respiratory hygiene and cough etiquette, PPE, and routine environmental cleaning.<br>• Also includes guidance for transmission-based precautions which include: early recognition of suspect cases and immediate action, use of face coverings and masks, physical distancing, patient placement and cohorting, patient movement, and signage.<br>• Under guidance for conventional use of PPE, the levels of use required are described as Tier 0 to Tier 3 according to the level of patient risk for COVID-19 and type of clinical procedure being undertaken.<br>  ○ Tier 0 standard precautions: for patients assessed as low to no risk for COVID-19, that is, they do not meet the clinical criteria for COVID-19. Currently not applicable in Victorian healthcare facilities due to current high prevalence of COVID-19 in Victoria.<br>  ○ Tier 1 area of higher clinical risk: in areas where the person is not suspected[1] or confirmed to have COVID-19.<br>  ○ Tier 2: droplet and contact precautions. Limited contact, for a short duration, in a controlled environment with a person who is suspected or confirmed to have COVID-19.<br>  ○ Tier 3: airborne and contact precautions. Undertaking aerosol generating procedures on a person with suspected or confirmed COVID-19. Settings where suspected or confirmed COVID-19 patients are cohorted, where frequent, prolonged episodes of care are provided. In uncontrolled settings where suspected or confirmed COVID-19 patients are cohorted, to avoid the need for frequent changes of N95/P2 respirators, or settings where suspected or confirmed COVID-19 patients are cohorted and there is risk of unplanned aerosol generating procedures and/or aerosol generating behaviours, such as screaming, shouting, crying out, or vomiting.<br><br>1 Suspected includes person in quarantine or where history cannot be obtained |

| Source | Summary |
|---|---|
| **Grey literature** | |
| [Coronavirus (COVID-19) – a guide to the conventional use of PPE](#)<br>*Updated 27 August 2020*<br>Victoria Department of Health and Human Services 2020 (38) | Table 1: Conventional use<br>Due to the current high prevalence of COVID-19 in Victoria and advice regarding the universal use of masks in the community, Tier 0 is currently not applicable. |

| Tier | For use in | Hand hygiene | Disposable gloves | Level 1 gown and plastic apron | Disposable gown | Surgical mask | P2 / N95 respirator | Eye protection |
|---|---|---|---|---|---|---|---|---|
| Tier 0 – Standard precautions | For people assessed as low risk or no risk for COVID-19, that is, they do not meet the clinical criteria for COVID-19 | ✓ | As per standard precautions | As per standard precautions | As per standard precautions | As per standard precautions | ✗ | As per standard precautions |
| Tier 1 – Area of higher clinical risk | In areas where the person is NOT suspected or confirmed to have COVID-19 | ✓ | As per standard precautions | As per standard precautions | As per standard precautions | ✓ Minimum level 1 | ✗ | ✓ Face shield where practical |
| Tier 2 – Droplet and contact precautions | Limited contact, for short episodes of care, in a controlled environment with a person who is suspected or confirmed to have COVID-19 | ✓ | ✓ | ✓ | or ✓ Level 2, 3 or 4 | ✓ Level 2 or 3 | ✗ | ✓ Face shield where practical |

| Source | Summary |
|---|---|
| **Grey literature** | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tier 3 – Airborne and contact precautions and aerosol generating procedures | Undertaking an aerosol generating procedures on a person with suspected or confirmed COVID-19<br>Settings where suspected or confirmed COVID-19 patients are cohorted, where frequent, prolonged episodes of care are provided<br>In uncontrolled settings where suspected or confirmed COVID-19 patients are cohorted, to avoid the need for frequent changes of N95/P2 respirators<br>Settings where suspected or confirmed COVID-19 patients are cohorted and there is risk of unplanned aerosol generating procedures and/or aerosol generating behaviours | ✓ | ✓ | ✗ | or ✓ Level 2, 3 or 4 | ✗ | ✓ | ✓ Face shield where practical |

Table 2: Conventional use – contextual guide

Due to the current high prevalence of COVID-19 in Victoria and advice regarding the universal use of masks in the community, Tier 0 is currently not applicable.

| Tier | For use in | Further context – examples |
|---|---|---|
| Tier 0 – Standard precautions | For patients assessed as low or no risk for COVID-19, that is, they do not meet the clinical criteria for COVID-19 | Healthcare workers may require gloves, surgical face mask, gown or apron or eye protection where there is a risk of exposure to or splashes from blood or body fluids |

| Source | Summary |
|---|---|
| **Grey literature** | |

| | | |
|---|---|---|
| | | Healthcare workers performing an aerosol generating procedure on a person identified as low or no risk of COVID-19 may choose to wear a surgical face mask, gown or apron and eye protection as part of standard precautions |
| Tier 1 – Area of higher clinical risk | In areas where the person is NOT suspected or confirmed to have COVID-19 | Healthcare workers not involved in the direct care of COVID-19 patients<br>Undertaking surgery or aerosol generating procedures on patients confirmed as COVID-19 negative or who are screened as low risk<br>Patients with aerosol generating behaviours who are not confirmed or suspected of COVID-19 |
| Tier 2 – Droplet and contact precautions | Limited contact, for short episodes of care, in a controlled environment with a person who is suspected or confirmed to have COVID-19 | Patient transfer within a facility of a confirmed or suspected COVID-19 cases<br>Cleaning and disinfection of room where there has been no aerosol generating procedures performed or if 30 mins has elapsed since the aerosol generating procedure<br>Healthcare workers at ambulance arrival and handover areas where the patient is confirmed or suspected of having COVID-19<br>Handling deceased persons with confirmed or suspected COVID-19<br>Family members and visitors to a person with COVID-19 at a hospital<br>Healthcare workers transporting suspected COVID-19 patients in ambulance<br>Working at a COVID-19 testing site and/or undertaking testing for COVID-19 |
| Tier 3 – Airborne and contact precautions and aerosol generating procedures | Undertaking an aerosol generating procedure on a person with suspected or confirmed COVID-19<br>Settings where suspected or confirmed COVID-19 patients are cohorted, where frequent, prolonged episodes of care are provided | Healthcare workers in dedicated COVID-19 wards (even if treating suspected covid-19 patients)<br>Healthcare workers in areas within EDs or urgent care centres where suspected or confirmed COVID-19 patients are being treated<br>Cleaning and disinfection of a room where there has been an aerosol generating procedure performed within the previous 30 mins |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | <table><tr><td></td><td>In uncontrolled settings where suspected or confirmed COVID-19 patients are cohorted, to avoid the need for frequent changes of N95/P2 respirators<br><br>Settings where suspected or confirmed COVID-19 patients are cohorted and there is risk of unplanned aerosol generating procedures and/or aerosol generating behaviours.</td><td></td></tr></table> |
| Fact sheet for visitors to hospital Coronavirus (COVID-19) update<br><br>*Updated 8 August 2020*<br><br>Victoria Department of Health and Human Services 2020 (56) | • This update outlines new rules for visitors to hospitals, including at the ED.<br>• As of Wednesday 22 July 2020, in most cases, only a single carer is allowed to visit hospitals. Visits will be for one hour unless there is a need for a longer visit. A face covering must be worn by all Victorians when leaving home. There are limitations imposed on visitors for different care settings.<br>• For accompanying the patient to the ED, the rule specifies this must be done by a single visitor with limits of one visit per day, for a maximum of one hour.<br>• However, different limitations may apply based on the circumstance<br>  ○ Single visitor number of visits per day and duration of visit determined by the time required to provide essential support.<br>  ▪ If the visitor is providing essential care and support necessary for the patient's physical, emotional or social wellbeing that cannot be delivered by the health service care team or via electronic means<br>  ▪ If the visitor is providing interpreter or informal language support to enable the delivery of care by the care team.<br>  ○ Multiple visitors without time limits |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | ▪ If the patient's medical condition is life threatening, they can have two visitors at any one time. There are no limits on the number or duration of visits.<br>▪ If the patient is dying and/or receiving end-of-life care, they can have two visitors at any one time. There are no limits on the number or duration of visits.<br>• For permitted visitors the hospitals must ensure that visitors:<br>○ are screened and their visit recorded. Details recorded must include contact details, date and time of the visit<br>○ have their temperature checked on arrival to the hospital and prior to entering the ward area<br>○ aged 12 and over should be provided with a single use mask when entering the hospital if they do not have their own face covering. For those who cannot wear a mask, a face shield will be provided. All Victorians must wear a face covering when they leave home.<br>○ must wash their hands with soap or use an alcohol-based hand sanitiser before and after using the lifts, holding railings and every time they enter or exit a patient's room<br>○ must stay in the patient's room at all times and limit movement around the building. Quick trips to the bathroom or to purchase food can be made<br>○ limit the number of personal items brought into the hospital<br>○ leave the hospital when the visit is over. They should not visit other areas of the hospital or spend time in public areas, including lobbies, waiting areas, lifts, cafeterias and vending machines. Single use masks should be discarded when leaving the hospital.<br>○ If the patient can have more than one type of visitor (for example, for end-of-life care purposes), there must not be more than two people with the patient at the one time (with the exception of a hospital worker). |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | • The document also provides guidance on: visiting patients who are suspected or confirmed cases of COVID-19; staying in touch with patients who are in hospital; restrictions on hospital workers; and exemptions to the special rules. |
| Physical distancing in emergency departments and urgent care centres Coronavirus (COVID-19) update<br><br>*Updated 24 July 2020*<br><br>Victoria Department of Health and Human Services 2020 (57) | • This document provides advice to staff working in EDs and urgent care centres on physical distancing measures to protect the health of themselves, patients and visitors. It provides principles for health services to follow where possible, however it may need to be locally adapted by each health service.<br>• While specific to the ED and urgent care centre settings, this document does not specify that the recommendations are based on community transmission or other risk levels.<br>• Overarching principles include the following.<br>  ○ Ensure staff are aware not to attend the health service for work if unwell or meet the current coronavirus (COVID-19) testing criteria. Encourage testing for those who meet the criteria.<br>  ○ Where appropriate, redirect well patients who are presenting primarily for coronavirus (COVID-19) swabbing to their nearest testing site, such as a hospital respiratory clinic, general practice respiratory clinic, drive-through or pop-up sites, or their local doctor.<br>  ○ Screen patients, visitors and staff for symptoms of COVID-19 as they enter a health service.<br>  ○ Display signage demonstrating respiratory hygiene, cough etiquette and physical distancing.<br>  ○ Increase access to hand sanitiser and disinfectant products throughout the ED or urgent care centre.<br>  ○ For enclosed rooms, limit the number of people present to maintain appropriate space (4m$^2$ per person) and use signage to indicate safe capacity.<br>  ○ Encourage staff, patients and visitors to maintain 1.5m distance from one another where possible.<br>  ○ Regularly clean frequently touched surfaces throughout the ED or urgent care centre.<br>• The document also provides guidance specific to: |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | ○ PPE[1]<br>○ cohorting and isolation[1]<br>○ triage and registration<br>○ ambulance offload<br>○ infection control in ED settings including:<br>▪ waiting room<br>▪ treatment areas<br>▪ meetings<br>▪ staff break rooms<br>▪ managing patient flow and escalation<br>▪ design (or renovation) of the ED.<br>1 Aligns with guidance provided in other Victorian government documents included in this Evidence Check |
| Coronavirus disease - 2019 (COVID-19) infection prevention and control in Western Australian healthcare facilities, version 8<br><br>*Updated 31 August 2020* | • These guidelines are based on the current available evidence, the current status of COVID19 in Australia, current knowledge of the transmission of coronaviruses and may change as more evidence becomes available. In Western Australia (WA) there is currently no evidence of community transmission (at the time of update). The majority of cases in WA have been acquired overseas or are direct contacts of these cases.<br>• General principles of infection prevention and control<br>○ There are two tiers of precautions to prevent the transmission of infectious agents; standard precautions and transmission-based precautions.<br>▪ Standard precautions are intended to be applied to the care of all patients in a healthcare facility, regardless of whether the presence of an infectious agent is suspected or has been confirmed. |

| Source | Summary |
|---|---|
| **Grey literature** | |
| Government of Western Australia Department of Health 2020 (40) | Implementation of standard precautions is the primary strategy for the prevention of disease transmission in an healthcare facility. Standard precautions include hand hygiene, respiratory hygiene, reprocessing of reusable medical devices, sharps and waste disposal and environmental cleaning.<br>▪ Transmission-based precautions are implemented for patients known or suspected to be infected or colonised with an infectious agent, where transmission is not completely interrupted using standard precautions alone. The three categories of transmission-based precautions are contact, droplet and airborne precautions and are implemented based on the route of transmission of the infectious agent.<br>○ Standard precautions apply to all patients at all times including the use of PPE if required (may include a risk assessment of potential occupational exposures depending on clinical activity or procedure being undertaken). The use of contact, droplet and airborne precautions are to be applied when appropriate, for all patient presentations.<br>○ For patients admitted to a WA healthcare facility who are not suspected of having COVID-19 there are no additional PPE requirements beyond what you would normally use, including when aerosol generating procedures are performed. Standard PPE and operating theatre attire are all that is required.<br>○ For patients admitted to a WA healthcare facility who are suspected, probable or confirmed of having COVID-19 or have acute respiratory symptoms, the implementation of standard, contact and droplet precautions is required. For patients undergoing aerosol generating procedures, or have severe disease requiring admission to an intensive care unit and for those patients who either require prolonged episodes of care, or exhibit aerosol generating or challenging behaviours (these may include aggression, screaming, shouting) and physical distance cannot be maintained, the addition of airborne precautions is required.<br>• The following actions should be undertaken when a patient presents to an ED or urgent care centre that may be a suspected, probable or confirmed case of COVID-19.<br>○ Mask use: place a single-use surgical mask on the patient (a level 1 barrier surgical mask is suitable) |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | ○ Isolation: for any confirmed COVID-19 patient, isolate the patient in a negative pressure isolation room, when available, or a single room with the door closed. For suspected or probable cases, if these options are not available, patients should be placed in a designated isolation area that is separate from other patient areas and is not to be used as a thoroughfare. Patients in the designated isolation area are to be separated by a distance of at least 1.5m from other patients.<br>○ Cough etiquette and hand hygiene: the patient should be instructed to cover their mouth and nose with a flexed elbow or tissue when coughing or sneezing, dispose of the tissue immediately and perform hand hygiene.<br>○ Entering patient rooms: any person entering the patient room or designated isolation area is to don PPE. Non-essential personnel are not to enter rooms or designated isolation areas of patients with suspected or confirmed COVID-19.<br>○ Signage: clear signage indicating the appropriate transmission-based precautions and required PPE is to be placed at the entrance of the patient room or in a prominent position at the entry to the designated isolation area.<br>○ Assessment and testing: conduct a medical assessment and collect respiratory specimens in accordance with current recommendations contained in the *Testing Criteria for SARS-CoV-2 in WA.* If a patient presents to an outpatient setting including mental health facility, who meets the criteria and who reports respiratory symptoms, the patient should be managed in conjunction with the closest COVID-19 clinic or ED depending on the patient's condition. |
| **United Kingdom** | |
| Emergency department infection prevention and control (IPC) during the coronavirus pandemic | Physical environment<br>• ED waiting rooms should implement social distancing (2m) through expansion of waiting areas, or other options e.g. multiple separate waiting areas, using additional space outside of the ED, staggered arrivals e.g. wait in car, |

| Source | Summary |
|---|---|
| **Grey literature** | |
| *Published in June 2020*<br>The Royal College of Emergency Medicine 2020 (48) | appointment-based approach for some conditions. All waiting areas should have access to facilities for hand hygiene for patients.<br>• EDs should proactively identify the maximum occupancy of their clinical areas and waiting areas that allow safe social distancing. There should be a robust escalation process and surge planning to prevent these maximum occupancy thresholds being exceeded.<br>• The reception area should be provided with screens and modifications, such as loop systems, for those patients who have hearing difficulties. Protocols should be in place to minimise the risk to reception staff from clinical staff as well as patients.<br>• All patients not well enough to be waiting in the waiting room should be in ED cubicles.<br>• For those ED cubicles which do not have doors or physical separation between bays, consideration should be given to alteration to give an enhanced level of protection by the addition of floor to ceiling enclosures.<br>• It should be clear to all staff working in the ED what level of PPE is required for which area of the ED. In particular, individual departments will need to decide if aerosol generating procedures are likely to take place in any given location within the ED and the necessary mitigation for these procedures. In the case of the resuscitation room it is essential that there is a local policy outlining the steps needed to ensure paramedics are not 'accidentally' exposed to aerosol generating procedures and that they are not asked to don additional higher level PPE just to enter a higher risk area.<br>• EDs should be capable of cohorting patients who present with suspected infectious diseases in a separate area. This applies to both adults and paediatric patients. Staff working within the ED e.g. radiographers, porters, must be aware of the cohort areas and the appropriate level of PPE required.<br>• EDs should map patient journeys both within and outside of the ED, e.g. to the intensive care unit, to determine likelihood of cross contamination and any need for additional precautions, e.g. face mask for patients attending a radiology department which is shared with the rest of the hospital. Ensure practical measures are in place to control people's movement within the ED (patients, visiting team etc.). Where able, try to ensure that patients |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | with and without infections, visitors and suppliers take different routes, stay in different areas, use different elevators, etc.<br>• EDs should consider whether they have enough space and infrastructure to implement infection prevention and control guidance regarding isolation rooms, anterooms, showers for healthcare workers, as well as sufficient cubicle space to allow for cleaning and preparation time when patient turnover is high.<br>• Outbreaks are commonly linked to non-clinical areas, communal non-clinical spaces should implement social distancing, mitigate risk by strict no PPE zones, increased frequency of cleaning and staggering of breaks.<br>Process<br>• All patients should be screened on arrival for the symptoms of COVID-19 (and other infectious diseases which need isolation) and after being given a face mask cohort in an appropriate area (unless unable to tolerate, including under five years). There should be a staff member in sufficient PPE able to provide immediate care to a person before their infectious status is known.<br>• All patients should be screened for those conditions considered to make them extremely vulnerable (and who will have been shielding themselves at home), and these patients should be isolated in a side-room as soon as possible. Pre-hospital alerts for such patients are to be encouraged to allow departments to prepare and minimise risk for any given patient. Alternative pathways need to be developed for shielding patients who develop unpredictable urgent health problems, these pathways should avoid the ED for all but the most seriously injured or ill patient.<br>• Triage should be undertaken wearing appropriate PPE and time spent with potential cases minimised. Patients who are identified as potentially infectious must not be placed in a nonclinical area (e.g. waiting rooms or corridor) following triage.<br>• Diagnostic requests, such as pathology and radiology, from the ED should make it clear if a patient is potentially infectious.<br>• Patients from the ED who require admission to another area within in the hospital and whose COVID-19 status is not known should be moved to an appropriate cohort ward or assessment space outside of the department until |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | the COVID-19 test result is back. It is not acceptable for patients to be waiting more than 30 minutes in an ED whilst awaiting a test result.<br>• There should be an aim to minimise the number of clinical interactions that a patient is exposed to. Multiple, repeated clinical assessments should be avoided unless strictly necessary. Careful thought should be given to minimising the need for specialty teams to visit the ED, particularly for those patients who require admission.<br>• ED should be regularly cleaned. There should be sufficient cleaning capacity so that clinical spaces can be rapidly returned to use. Keeping the ED clean is a collective responsibility of all staff working there. Initiatives that increase staff engagement should be encouraged.<br>• It should be acknowledged that the need for consistent application of infection prevention and control principles and specific requirements during the COVID-19 pandemic (e.g. cohort areas) will slow staff down.<br>PPE and other supplies<br>• Staff must have good access to running water, sinks and soap, or to hand sanitisers in spaces where water is not available. Sanitiser should be easily available so that staff can decontaminate all surfaces such as phones, desks, doorknobs and lift buttons before and after use.<br>• Advice about PPE has changed frequently during the pandemic. There needs to be a reliable mechanism to identify and disseminate changes in guidance.<br>• There should be adequate supplies of appropriate PPE for all members of staff, including support staff. This should be controlled at a senior level within the department to ensure supply day and night as well as appropriate usage. Staff should be clear with regards what PPE can be re-used (and to decontaminate it) as well as what constitutes misuse. Staff should be aware of any items of PPE which are to be considered for sessional use.<br>• EDs should ensure that the PPE issued is of appropriate quality and where appropriate, masks have been formally fit tested. Departments should prioritise the comfort of PPE as a means of ensuring it is worn appropriately, e.g. a PPE champion on duty during each shift. |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | • EDs should share guidance to their staff regarding reducing risk of transmitting infection from their work environment to their home environment. Infographics detailing general hygiene measures are particularly helpful. The use of specific ED scrubs or uniforms which are only worn at work (not to and from) is to be encouraged. Staff should be guided as to how to launder these items.<br>Equipment<br>• Patient care equipment should be single-use items if possible. Reusable (communal) non-invasive equipment should be, as far as possible, allocated to the individual patient or cohort of patients.<br>• Reusable (communal) non-invasive equipment must be decontaminated:<br>  ○ between each patient and after patient use<br>  ○ after blood and body fluid contamination<br>  ○ at regular intervals as part of equipment cleaning.<br>• An increased frequency of decontamination should be considered for reusable non-invasive care equipment when used in isolation cohort areas.<br>• Appropriate storage location for equipment should be considered as well as its decontamination, e.g. relocating an ultrasound machine out of a high-risk area such as a resuscitation room to an area where it is less likely to get contaminated but is still rapidly available.<br>• Some equipment (e.g. nerve block trolley or packs, ear, nose and throat trolleys, gynaecology trolleys, etc.) will need to be duplicated in different areas of the department.<br>Table 1. Checklist for EDs |

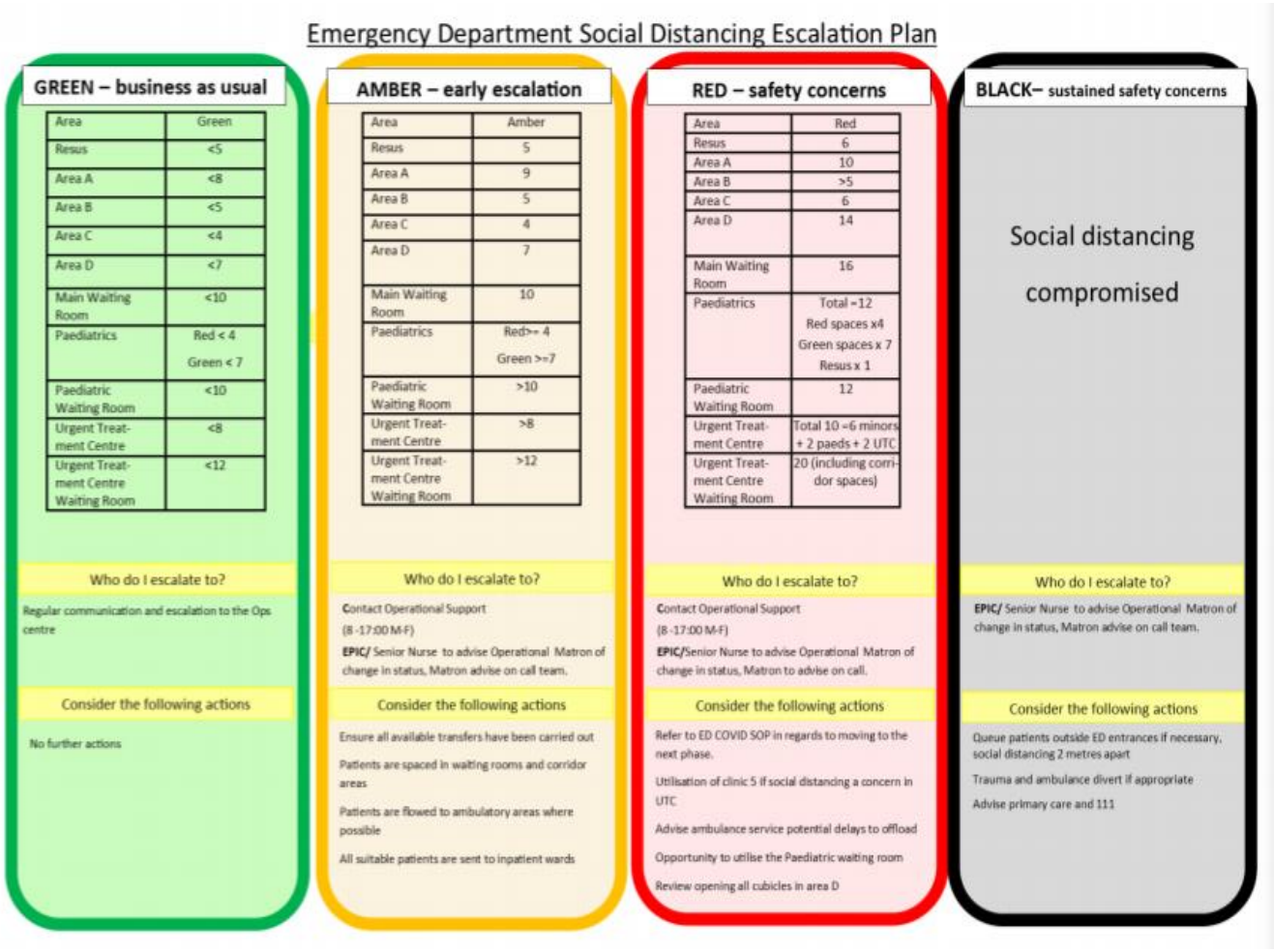
| Structure | Yes | No |
|---|---|---|
| Is there an area of the ED where potentially infectious cases can be cohorted? | | |
| Has the maximum occupancy of each clinical area been defined? | | |

| Source | Summary |
|---|---|
| **Grey literature** | |

| | | |
|---|---|---|
| Has the maximum occupancy of each non-clinical area been defined? | | |
| Is there social distancing, ensuring patients do not wait less than 2m away from other patients, in the waiting room? | | |
| Are staff able to wash their hands in every area of the ED? | | |
| Are patients able to wash their hands in every area of the ED? | | |
| Are reception staff protected by screens? | | |
| Is it clear to staff where infectious patients are looked after? | | |
| Are there clear reminders for staff to use the correct level of PPE in clinical areas? | | |
| Are aerosol generating procedures only performed in cubicles that do not allow spread by staff wearing appropriate PPE. | | |
| Is there adequate social distancing for staff having breaks? | | |
| Process | | |
| Is one member of staff always in high level PPE available to provide aerosol generating procedures on a seriously ill patient who arrives without warning? | | |
| Is the need for isolation for people with potentially infectious diseases routinely identified at triage? | | |
| Is the need for isolation for people who vulnerable to infectious diseases routinely identified at triage? | | |
| Is there an escalation process when maximum occupancy of an area is exceeded? | | |
| Are diagnostic samples from people with potentially infectious diseases handled so that laboratory staff are not exposed to avoidable risk? | | |
| Are imaging staff routinely made aware of whether a patient has a potentially infectious disease? | | |
| Are bed managers made aware early of the suspected status of a patient so that patients are admitted to the right sort of bed? | | |
| Education and training | | |

| Source | Summary |
|---|---|
| **Grey literature** | |
| | Are there effective ways of sharing PPE guidance? \| \| <br> Are new staff trained in how to use PPE? \| \| <br> Are new staff trained in infection prevention and control? \| \| <br> Are staff regularly audited on infection prevention and control? \| \| <br> Is there a record of which staff are trained on infection prevention and control and PPE use? \| \| |

| Source | Summary |
|---|---|
| **Grey literature** | |



| Source | Summary |
|---|---|
| **Grey literature** | |
| COVID-19: inpatient instructions for use and conservation of PPE<br>*Updated 20 August 2020*<br>Emory University School of Medicine (49) | • Webpage outlines configurations of PPE for EDs.<br>• It is optimal to use PPE only once and then discard whenever possible.<br>• Reuse of PPE, that is depicted in some recommendations, is based on current supply shortages.<br>• Universal masking of hospital staff, which is now recommended by Centers for Disease Control and Prevention, is incorporated into these donning and doffing flyers. |
| **Canada** | |
| COVID-19 pandemic guidance for the health care sector<br>*Published 22 April 2020*<br>Government of Canada 2020 (47) | Emergency departments<br>• ED staff will need considerable support because of heavy workloads, potential ethical decisions around admission, and the need for prolonged use of PPE, which can be challenging.<br>Key preparedness points for EDs<br>• Plan to create extra space, e.g. in areas adjacent to the ED or considering other innovative approaches such as free-standing mobile units.<br>• Plan strategies to improve patient flow in the ED while maintaining infection prevention and control measures, e.g. by rapidly screening, separating and isolating patients with suspected COVID-19.<br>• Plan measures to enhance capacity, including use of standardised admission and discharge criteria, pre-printed discharge instructions, development of protocols for non-medical volunteers, and having simple and efficient reporting systems.<br>• Use standard clinical approaches and protocols for screening, treatment and admission decisions. In general, clinical decision support systems like triage protocols perform better and more consistently than clinical judgment alone in pandemic situations. |

| Source | Summary |
|---|---|
| **Grey literature** | |
| **United States** | |
| Standard operating procedure (SOP) for triage of suspected COVID-19 patients in non-US healthcare settings: early identification and prevention of transmission during triage<br>*Published 11 September 2020*<br>Centres for Disease Control and Prevention (43) | • General healthcare setting guidelines, including emergency settings.<br>• Set up and equip triage.<br>• Limit the point of entry to the health facility.<br>• Have clear signs at the entrance of the facility directing patients with COVID-19 symptoms to immediately report to the registration desk in the ED or at the unit they are seeking care.<br>• Facilities should consider having a separate registration desk for patients coming in with COVID-19 symptoms, especially at the EDs, and clear signs at the entrance directing patients to the designated registration desk. |
| Hospital and emergency care during COVID-19<br>*Updated 2 October 2020*<br>Johns Hopkins Medicine (44) | • The hospital is implementing the following safety measures in hospitals and EDs<br>  ○ screening and as appropriate testing<br>  ○ universal masking and appropriate PPE<br>  ○ keeping facilities clean<br>  ○ minimising number of people at the facility and practicing physical distancing. |
| National strategic plan for emergency department | • Capabilities for ED response to a severe COVID-19 outbreak such as: trained emergency manager, seamless connectivity with different levels of government and support organisations, emergency operations plans, staff surging plan, incident management systems, hospital command centre, training and exercise program, |

| Source | Summary |
|---|---|
| **Grey literature** | |
| management of outbreaks of COVID-19<br>American College of Emergency Physicians (45) | appropriate PPE, screening capability, security and crowd management, administrative and legal support, communications, configuring ED waiting rooms as necessary and protocols for visitors. |
| Getting safe emergency care during the COVID-19 pandemic<br>*Published 16 July 2020*<br>Mayo Clinic (46) | • Emergency rooms and hospitals follow strict guidelines, including:<br>  ○ universal masking<br>  ○ screening at all entrances<br>  ○ separate waiting areas for people who have, or may have, COVID-19<br>  ○ frequent cleaning and disinfecting<br>  ○ social distancing. |
| **New Zealand** | |
| Personal protective equipment use in health and disability care settings<br>*Published 7 October 2020*<br>NZ Ministry of Health (50) | • Not specific to the ED. Refers to alert levels of PPE use which has three alert levels<br>  ○ Alert level 1 – community transmission is low<br>  ○ Alert level 2 – community transmission is low<br>  ○ Alert level 3 – community transmission is high<br>• Flowcharts provided for each alert level on how to assess risk to determine PPE use for people with unknown COVID-19 status. Depending on risk of the patient, it advises if the patient and/or healthcare workers should wear a mask, and is related to whether or not it is possible to physically distance. |

# Appendix 1

## PubMed search terms

### Search 1

((((patient safety[MeSH Terms]) OR (infection control[MeSH Terms])) OR (risk management[MeSH Terms])) AND ("emergency medical services"[MeSH Terms] OR "emergency medical services"[All Fields] OR "emergency service"[Title/Abstract] OR "emergency medical services"[Title/Abstract] OR "emergency medicine"[Title/Abstract] OR "emergency department*"[Title/Abstract] OR "emergency hospital"[Title/Abstract] OR "emergency hospitals"[Title/Abstract] OR "emergency medical service"[Title/Abstract] OR "emergency medicine"[Title/Abstract] OR "emergency service, hospital"[MeSH Terms] OR ED[Title/Abstract] OR "urgent care"[Title/Abstract] OR ambulatory care[MeSH Terms] OR ambulatory care facilities[MeSH Terms]) AND ((2019-nCoV[title/abstract] or nCoV*[title/abstract] or covid-19[title/abstract] or covid19[title/abstract] OR "covid 19"[title/abstract] OR "coronavirus"[MeSH Terms] OR "coronavirus"[title/abstract] OR sarscov-2[title/abstract] OR "severe acute respiratory syndrome coronavirus 2"[Supplementary Concept]) AND (2019:2021[pdat])) AND (2020/01/01:3000/12/31[Date - Publication])

355 results

### Search 2

("personal protective equipment"[MeSH Terms] OR "personal protective equipment"[title/abstract] OR "PPE"[title/abstract] OR "mask"[title/abstract]) AND ("emergency medical services"[MeSH Terms] OR "emergency medical services"[All Fields] OR "emergency service"[Title/Abstract] OR "emergency medical services"[Title/Abstract] OR "emergency medicine"[Title/Abstract] OR "emergency department*"[Title/Abstract] OR "emergency hospital"[Title/Abstract] OR "emergency hospitals"[Title/Abstract] OR "emergency medical service"[Title/Abstract] OR "emergency medicine"[Title/Abstract] OR "emergency service, hospital"[MeSH Terms] OR ED[Title/Abstract] OR "urgent care"[Title/Abstract] OR ambulatory care[MeSH Terms] OR ambulatory care facilities[MeSH Terms])) AND ((2019-nCoV[title/abstract] or nCoV*[title/abstract] or covid-19[title/abstract] or covid19[title/abstract] OR "covid 19"[title/abstract] OR "coronavirus"[MeSH Terms] OR "coronavirus"[title/abstract] OR sarscov-2[title/abstract] OR "severe acute respiratory syndrome coronavirus 2"[Supplementary Concept]) AND (2019:2021[pdat])) AND (2020/01/01:3000/12/31[Date - Publication])

243 results

Conducted on 9 October 2020

Search 1 + Search 2 = 87 duplicates, 512 unique references

## Google and Twitter search terms

- COVID-19 infection control emergency department
- ED/emergency department COVID-19 guideline “country”
- ED/emergency department infection control COVID-19 “country”
- COVID-19 guidelines emergency department “country”

Country included Australia, UK, USA, Singapore, Canada and New Zealand

### Inclusion and exclusion criteria

| Inclusion | Exclusion |
|---|---|
| Peer-reviewed articles<br>• Articles about infection control measures in the ED settings<br><br>Grey literature<br>• Different jurisdictions policy documents on infection control measures in the emergency department | Peer-reviewed articles<br>• Not relevant to ED<br>• Not relevant to infection control<br>• Not peer-reviewed<br>• Infection control measures during patient transfer<br>• About telemedicine without mentioning the implications of infection control<br>• About COVID-19 diagnostic protocols in the ED<br>• Trauma or procedural protocols in time of COVID-19 in ED without broader implications of infection control<br><br>Grey literature<br>• Not about infection control measures<br>• Does not mention implications for ED or acute care |

## References


1. Schreyer KE, Del Portal DA, King LJL, Blome A, DeAngelis M, Stauffer K, et al. Emergency department management of the COVID-19 pandemic. The Journal of emergency medicine. 2020.
2. Wee LE, Fua TP, Chua YY, Ho AFW, Sim XYJ, Conceicao EP, et al. Containing COVID-19 in the emergency department: the role of improved case detection and segregation of suspect cases. Academic emergency medicine : official journal of the Society for Academic Emergency Medicine. 2020;27(5):379-87.
3. Adamson J, Bird C, Edgworth K, Hartshorn S, Jamalapuram K, Kanani A, et al. Not just little adults: preparing a children's emergency department for COVID-19. Emergency medicine journal : EMJ. 2020;37(8):460-2.
4. Bressan S, Buonsenso D, Farrugia R, Parri N, Oostenbrink R, Titomanlio L, et al. Preparedness and response to pediatric COVID-19 in European emergency departments: a survey of the REPEM and PERUKI networks. Annals of emergency medicine. 2020.
5. Cattelan AM, Sasset L, Di Meco E, Cocchio S, Barbaro F, Cavinato S, et al. An integrated strategy for the prevention of SARS-CoV-2 Infection in healthcare workers: a prospective observational study. International journal of environmental research and public health. 2020;17(16).
6. Leiker B, Wise K. COVID - 19 case study in emergency medicine preparedness and response: from personal protective equipment to delivery of care. Disease-a-month : DM. 2020:101060.
7. Lin CH, Tseng WP, Wu JL, Tay J, Cheng MT, Ong HN, et al. A double triage and telemedicine protocol to optimize infection control in an emergency department in Taiwan during the COVID-19 pandemic: retrospective feasibility study. Journal of medical Internet research. 2020;22(6):e20586.

8. Miller GA, Buck CR, Kang CS, Aviles JM, Younggren BN, Osborn S, et al. COVID-19 in Seattle-early lessons learned. Journal of the American College of Emergency Physicians open. 2020;1(2):85-91.
9. Nicastro E, Mazza A, Gervasoni A, Di Giorgio A, D'Antiga L. A pediatric emergency department protocol to avoid intrahospital spread of SARS-CoV-2 during the outbreak in Bergamo, Italy. The Journal of pediatrics. 2020;222:231-5.
10. Quah LJJ, Tan BKK, Fua TP, Wee CPJ, Lim CS, Nadarajan G, et al. Reorganising the emergency department to manage the COVID-19 outbreak. International journal of emergency medicine. 2020;13(1):32.
11. Noble J, Degesys NF, Kwan E, Grom E, Brown C, Fahimi J, et al. Emergency department preparation for COVID-19: accelerated care units. Emergency medicine journal : EMJ. 2020;37(7):402-6.
12. Chen SC, Chang K, Kuo CH. Emergency department infection control strategies in response to COVID-19. The Kaohsiung journal of medical sciences. 2020;36(7):568-9.
13. Jiang H, Liu JW, Ren N, He R, Li MQ, Dong QC. Emergency management in fever clinic during the outbreak of COVID-19: an experience from Zhuhai. Epidemiology and infection. 2020;148:e174.
14. Kang J, Jang YY, Kim J, Han SH, Lee KR, Kim M, et al. South Korea's responses to stop the COVID-19 pandemic. American journal of infection control. 2020;48(9):1080-6.
15. Lien WC, Wu JL, Tseng WP, Chow-In Ko P, Chen SY, Tsai MS, et al. Fight COVID-19 beyond the borders: emergency department patient diversion in Taiwan. Annals of emergency medicine. 2020;75(6):785-7.
16. Wallace DW, Burleson SL, Heimann MA, Crosby JC, Swanson J, Gibson CB, et al. An adapted emergency department triage algorithm for the COVID-19 pandemic. Journal of the American College of Emergency Physicians open. 2020.
17. Wang X, Chen Y, Li Z, Wang D, Wang Y. Providing uninterrupted care during COVID-19 pandemic: experience from Beijing Tiantan Hospital. Stroke and vascular neurology. 2020;5(2):180-4.
18. Whiteside T, Kane E, Aljohani B, Alsamman M, Pourmand A. Redesigning emergency department operations amidst a viral pandemic. The American journal of emergency medicine. 2020;38(7):1448-53.
19. Garcia-Castrillo L, Petrino R, Leach R, Dodt C, Behringer W, Khoury A, et al. European Society For Emergency Medicine position paper on emergency medical systems' response to COVID-19. European journal of emergency medicine : official journal of the European Society for Emergency Medicine. 2020;27(3):174-7.
20. Tan YQ, Lu J, Chiong E. Re: Kristian D. Stensland, Todd M. Morgan, Alireza Moinzadeh, et al. Considerations in the triage of urologic surgeries during the COVID-19 pandemic. Eur Urol 2020;77:663-6: The forgotten urological patient during the COVID-19 pandemic: patient safety safeguards. European urology. 2020;78(3):e135-e6.
21. Augustin M, Schommers P, Suárez I, Koehler P, Gruell H, Klein F, et al. Rapid response infrastructure for pandemic preparedness in a tertiary care hospital: lessons learned from the COVID-19 outbreak in Cologne, Germany, February to March 2020. Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin. 2020;25(21).
22. Chang K, Chen HC, Chen SC, Kuo CH. Infection control strategies of patient diversion in response to COVID-19. The Kaohsiung journal of medical sciences. 2020;36(9):765-7.
23. Chen TY, Lai HW, Hou IL, Lin CH, Chen MK, Chou CC, et al. Buffer areas in emergency department to handle potential COVID-19 community infection in Taiwan. Travel medicine and infectious disease. 2020;36:101635.
24. Chong CF. Dividing the emergency department into red, yellow, and green zones to control COVID-19 infection; a letter to editor. Archives of academic emergency medicine. 2020;8(1):e60.

25. Levy Y, Frenkel Nir Y, Ironi A, Englard H, Regev-Yochay G, Rahav G, et al. Emergency department triage in the era of COVID-19: The Sheba Medical Center Experience. The Israel Medical Association journal : IMAJ. 2020;8(22):404-9.
26. Tan RMR, Ong GY, Chong SL, Ganapathy S, Tyebally A, Lee KP. Dynamic adaptation to COVID-19 in a Singapore paediatric emergency department. Emergency medicine journal : EMJ. 2020;37(5):252-4.
27. Russi CS, Heaton HA, Demaerschalk BM. Emergency medicine telehealth for COVID-19: minimize front-line provider exposure and conserve personal protective equipment. Mayo Clinic proceedings. 2020;95(10):2065-8.
28. Sangal RB, Scofi JE, Parwani V, Pickens AT, Ulrich A, Venkatesh AK. Less social emergency departments: implementation of workplace contact reduction during COVID-19. Emergency medicine journal : EMJ. 2020;37(8):463-6.
29. Turer RW, Jones I, Rosenbloom ST, Slovis C, Ward MJ. Electronic personal protective equipment: A strategy to protect emergency department providers in the age of COVID-19. Journal of the American Medical Informatics Association : JAMIA. 2020;27(6):967-71.
30. Bains J, Greenwald PW, Mulcare MR, Leyden D, Kim J, Shemesh AJ, et al. Utilizing telemedicine in a novel approach to COVID-19 management and patient experience in the emergency department. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2020.
31. Lin CH, Hsieh CC, Chi CH. Hospital emergency management of emerging infectious disease using instant communication technology. Prehospital and disaster medicine. 2020;35(4):465-6.
32. Lin CF, Wu KH, Chiu IM. Cross-infection control of coronavirus disease 2019 at the emergency department in Taiwan. Journal of medical systems. 2020;44(9):147.
33. Kang E, Lee SY, Jung H, Kim MS, Cho B, Kim YS. Operating protocols of a community treatment center for isolation of patients with coronavirus disease, South Korea. Emerging infectious diseases. 2020;26(10):2329-37.
34. Clinical Excellence Commission. COVID-19 infection prevention and control response and escalation framework, version 1.0. Sydney: CEC; 2020 July.
35. Australian Government Department of Health. COVID-19 Guidance on the use of personal protective equipment by health care workers in areas with significant community transmission, version 2. Canberra, ACT: Australian Government; 2020.
36. Queensland Health. Interim infection prevention and control guidelines for the management of COVID-19 in healthcare settings, version 1.14. Brisbane, QLD: Queensland Government; 2020.
37. SA Health. Infection prevention and control COVID-19 personal protective equipment (PPE) decision matrix, version 2.2. Adelaide, SA: Government of South Australia; 2020.
38. Victoria State Government Department of Health and Human Services. Coronavirus (COVID-19) – A guide to the conventional use of PPE. Melbourne, VIC: Victoria State Government; 2020.
39. Victoria State Government Department of Health and Human Services. Coronavirus disease 2019 (COVID-19) Infection prevention and control guideline, version 4.1. Melbourne, VIC: Victoria State Government; 2020.
40. Government of Western Australia Department of Health. Coronavirus disease - 2019 (COVID-19) infection prevention and control in Western Australian healthcare facilities, version 8. Perth, WA: Government of Western Australia; 2020.
41. Australian Government Department of Health. Guidance on the use of personal protective equipment (PPE) in hospitals during the COVID-19 outbreak, version 4. Canberra, ACT: Australian Government; 2020.
42. Australasian College for Emergency Medicine. Clinical Guidelines for the management of COVID-19 in Australasian emergency departments, version 4.3. ACEM; 2020 September 4.
43. Centers for Disease Control and Prevention. Standard operating procedure (SOP) for triage of suspected COVID-19 patients in non-US healthcare settings: early identification and prevention of transmission during triage: Centers for Disease Control and Prevention; 2020 [Available from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/sop-triage-prevent-transmission.html.

44. Johns Hopkins Medicine. Hospital and emergency care during COVID-19: Johns Hopkins Medicine; 2020 [Available from: https://www.hopkinsmedicine.org/coronavirus/hospital-care.html.
45. American College of Emergency Physicians. National Strategic plan for emergency department management of outbreaks of COVID-19: American College of Emergency Physicians; 2020 [Available from: https://www.acep.org/globalassets/sites/acep/media/by-medical-focus/covid-19-national-strategic-plan_0320.pdf.
46. Mayo Clinic. Getting safe emergency care during the COVID-19 pandemic: Mayo Clinic; 2020 [Available from: https://www.mayoclinic.org/diseases-conditions/coronavirus/in-depth/safe-emergency-care-during-covid-19/art-20487829.
47. Government of Canada. COVID-19 pandemic guidance for the health care sector 2020 [Available from: https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/covid-19-pandemic-guidance-health-care-sector.html#a323.
48. The Royal College of Emergency Medicine. Best practice guideline. emergency department infection prevention and control (IPC) during the coronavirus pandemic: The Royal College of Emergency Medicine; 2020 [Available from: https://www.rcem.ac.uk/docs/RCEM%20Guidance/RCEM_BPC_Guideline_COVID_IPC_090620.pdf.
49. Emory University School of Medicine. . COVID-19: emergency department PPE: Emory University School of Medicine; 2020 [Available from: https://med.emory.edu/departments/medicine/divisions/infectious-diseases/serious-communicable-diseases-program/covid-19-resources/emergency-dept-ppe.html.
50. Ministry of Health New Zealand. Personal protective equipment use in health and disability care settings. 2020 [Available from: https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-information-specific-audiences/covid-19-personal-protective-equipment-workers/personal-protective-equipment-use-health-and-disability-care-settings.
51. Boyle AA, Henderson K. COVID-19: resetting ED care. Emergency medicine journal : EMJ. 2020;37(8):458-9.
52. Lin PT, Ni TY, Chen TY, Su CP, Sun HF, Chen MK, et al. Reducing the consumption of personal protective equipment by setting up a multifunctional sampling station in the emergency department to screen for COVID-19 infection in Taiwan. Environmental health and preventive medicine. 2020;25(1):34.
53. Clinical Excellence Commission. Emergency department – PPE quick reference guide, version 4.1. Sydney, NSW; 2020 September 14.
54. Queensland Government Queensland Health. Pandemic response guidance: personal protective equipment in healthcare delivery, version 1.1. Brisbane, QLD: Queensland Government; 2020.
55. Victoria State Government Department of Health and Human Services. Assessment and streaming in emergency departments and urgent care centres Coronavirus (COVID-19). Melbourne, VIC: Victoria State Government; 2020.
56. Victoria State Government Department of Health and Human Services. Fact sheet for visitors to hospital Coronavirus (COVID-19) update. Melbourne, VIC: Victoria State Government; 2020.
57. Victoria State Government Department of Health and Human Services. Physical distancing in emergency departments and urgent care centres Coronavirus (COVID-19) update. Melbourne, VIC: Victoria State Government; 2020.


SHPN (ACI) 200727 | ISBN 978-1-76081-517-2