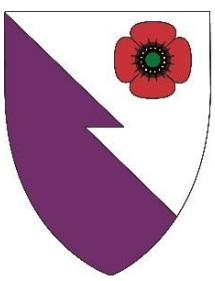
The Royal College of Emergency Medicine

Best Practice Guideline

Emergency Department Infection Prevention and Control (IPC) during the Coronavirus Pandemic



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Context

The COVID-19 pandemic has made us radically rethink how we deliver emergency care. While there are complex changes occurring, there are some well-established principles from previous infectious disease outbreaks that we must adopt to keep our patients and our staff safe. This Best Practice Guideline has been developed quickly to reinforce and disseminate these principles. Emergency departments are unlike any other part of the healthcare system. People of all ages and acuities present unpredictably and frequently little is known about them before they arrive. This means that there is need to increase the level of protection offered to our patients.

Scope

This document describes best infection prevention and control (IPC) in Emergency Departments. This document is for health and management professionals who work in emergency departments or have responsibility for running and regulating emergency departments.

Reason for development

Emergency Departments (ED) are required to keep patients and staff safe and limit nosocomial infection during the endemic period of COVID-19. The overall aims of this document are to; prevent spread of infectious diseases between patients, prevent patients acquiring infection from clinical staff and prevent staff acquiring infection in their workplace. While this is currently a priority issue related to Covid-19, we have the same responsibilities to patients and staff to protect them from any infection in an ED and the principles are the same.

Introduction

The transmission of COVID-19 occurs mainly through respiratory droplets generated by coughing and sneezing, and through contact with contaminated surfaces. The predominant modes of transmission are assumed to be droplet and contact [1]. The maximum distance for cross transmission from droplets has not been definitively determined, although a distance of approximately 2 metres (6 feet) around the infected individual has frequently been reported in the medical literature as the area of risk.

During Aerosol Generating Procedures (AGPs) there is an increased risk of aerosol spread of infectious agents irrespective of the mode of transmission (contact, droplet, or airborne), and airborne precautions must be implemented when performing aerosol generating procedure (AGPs), including those carried out on a suspected or confirmed case of COVID-19.

Box 1. Examples of Emergency Department interventions that should be considered Aerosol Generating Procedures

- Cardiopulmonary resuscitation with chest compressions [2]
- Non-invasive ventilation (NIV); Bi-level Positive Airway Pressure Ventilation (BiPAP) and Continuous Positive Airway Pressure Ventilation (CPAP)
- High flow nasal oxygen (HFNO)
- Intubation, extubation, insertion of a supraglottic airway and related procedures, for example, bag valve ventilation and open suctioning of the respiratory tract (including the upper respiratory tract)
- Procedural sedation
- Tracheotomy or tracheostomy procedures (insertion or open suctioning or removal)
- Thoracostomy and intercostal drain insertion

The guideline development group considered whether procedural sedation should be considered an AGP. There is little published information to help make a recommendation, but there is the potential for bag valve mask ventilation, suction of the oropharynx, vomiting and prolonged contact with a patient. Wherever possible, safe and comfortable alternatives should be offered to procedural sedation.

The guideline development group also considered whether nasogastric tube insertion should be considered as an AGP, recognising that this is an area of controversy. We were unable to make a firm recommendation and suggest that clinicians take sensible PPE precautions and minimise the amount of time that a staff member spends with a patient while performing this procedure.

Initial research has identified the presence of COVID-19 virus in the stools, semen and conjunctival secretions of confirmed cases. All secretions (except sweat) and excretions, including diarrhoeal stools from patients with known or possible COVID-19, should be regarded as potentially infectious.

The incubation period is from 1 to 14 days (median 5 days). In most cases, individuals are usually considered infectious while they have symptoms; how infectious individuals are, depends on the severity of their symptoms and stage of their illness. However, there are clearly asymptomatic spreaders.

The median time from symptom onset to clinical recovery for mild cases is approximately 2 weeks and is 3 to 6 weeks for severe or critical cases. There have been case reports that suggest possible infectivity prior to the onset of symptoms, with detection of SARS-CoV-2 RNA in some individuals before the onset of symptoms. From international data, the balance of evidence is that most people will have sufficiently reduced infectivity 7 days after the onset of symptoms.

Human coronaviruses can survive on inanimate objects and can remain viable for up to 5 days at temperatures of 22 to 25°C and relative humidity of 40 to 50% (which is typical of air-conditioned indoor environments). An experimental study using a SARS-CoV-2 strain reported viability on plastic for up to 72 hours, for 48 hours on stainless steel and up to 8 hours on copper. Extensive environmental contamination may occur following an AGP. It is well described in previous infectious disease outbreaks that more hospital acquired infections occur in general and 'clean' clinical areas than designated 'infectious' areas. The inevitable conclusion is that good IPC practices need to occur throughout the hospital.

The rate of clearance of aerosols in an enclosed space is dependent on the extent of any mechanical or natural ventilation – the greater the number of air changes per hour (ventilation rate), the sooner any aerosol will be cleared. The time required for clearance of aerosols, and thus the time after which the room can be entered without a filtering face piece (class 3) (FFP3) respirator, is a minimum of 20 minutes (that is 2 air changes).

Recommendations [3]

Physical Environment

ED waiting rooms should implement social distancing (2m). It is unlikely that all EDs will be able to expand their waiting rooms sufficiently and other options may be necessary e.g. multiple separate waiting areas, utilising additional space outside of the ED, staggered arrivals e.g. wait in car, appointment-based approach for some conditions. For some patient groups, e.g. children this may be challenging. All waiting areas should have access to facilities for hand hygiene for patients.

Emergency departments 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.

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.

All patients not well enough to be waiting in the waiting room should be in ED cubicles, it is unacceptable for patients to be kept in non-clinical spaces such as corridors.

For those ED cubicles which do not have doors, consideration should be given to alteration to give an enhanced level of protection by the addition of floor to ceiling enclosures. For those areas which do not have physical separation between bays e.g. ambulance assessment areas, consideration should be given to implementing temporary or permanent floor to ceiling walls.

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 (AGP) 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 AGPs and that they are not asked to don additional higher level PPE just to enter a higher risk area. (See Appendix 1, regarding minimising risk from airway related procedures)

Emergency Departments should be capable of cohorting patients who present with suspected infectious diseases in a separate area [4]. 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.

Emergency departments should 'map' patient journeys both within and outside of the ED (e.g. to ICU) to determine likelihood of cross contamination and any need for additional precautions 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 with and without infections, visitors and suppliers take different routes, stay in
different areas, use different elevators etc.

Emergency departments should consider whether they have enough space and infrastructure to implement IPC 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.

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. Consider sensible precautions in communal spaces such as mask wearing if not eating or drinking.

Process

All patients should be screened on arrival for COVID-19 status, contacts and symptoms (Appendix 2) as well as other infectious diseases which need isolation. All patients should be given a face mask (unless unable to tolerate, including under 5 years) and cohorted in an appropriate area. There should be a staff member in sufficient PPE able to provide immediate care to a person before their infectious status is known.

All patients should be screened for those conditions considered to make them extremely vulnerable (and who will have been shielding themselves at home), see appendix 2 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 Emergency Department for all but the most seriously injured or ill patient.

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 non-clinical area (e.g. waiting rooms or corridor) following triage.

Diagnostic requests (pathology, radiology) from the ED should make it clear if a patient is potentially infectious.

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 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.

The use of rapid testing protocols is encouraged for those patients likely to require AGPs or when determining immediate disposition from the ED. The sensitivity and accuracy of any rapid test used should be understood, particularly the likelihood of a false negatives in any given patient population and this risk managed by the whole hospital [5].

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.

The emergency department should be regularly cleaned. There should be sufficient cleaning capacity so that clinical spaces can be rapidly returned to use. Keeping the emergency department clean is a collective responsibility of all staff working there. Initiatives that increase staff engagement should be encouraged, e.g. 'Clinell o'clock'

It should be acknowledged that the need for consistent application of IPC principles and specific requirements during the COVID-19 pandemic (e.g. cohort areas) will slow staff down.

Paediatric considerations

Children attend emergency departments in a seasonal pattern with Respiratory illnesses which may coexist, or be clinically indistinguishable, from Covid-19. This should be considered when planning for autumn. Children are much more likely to present to ED with non-specific fever than adults. This makes partitioning of the ED much less effective in children. Due to difference in presentation in children, and the above, 'infection risk screening' is less reliable.

Children who are very sick or in extremis are more likely arrive by car than ambulance than adults- children must be visually assessed by a trained member of staff, on arrival, and this should not cause a queue. Because there are fewer Paediatric Intensive Care Units than adult units AGPs are often performed in the ED pending retrieval team arrival, so patients stay longer.

Examination of children requires greater proximity than in adults, when examining the ears and throat. This is an examination performed far more frequently in children than adults; this combined with crying (especially during assessment) may increase transmission of virus.

Children are tactile, wander more, and may not tolerate masks, especially when younger. This makes cohorting in waiting rooms with social distancing difficult. Carers may have care responsibility for other children, hence increasing the number of those attending with patient. Toys and other resources are used often in waiting rooms, and for distraction.

Additional strategies:

1. Having separate waiting areas for different age children (e.g. under 5s, and older children-to reduce risk to older children who are more likely to be compliant), and for those at different clinical pathway stages (e.g. triage, awaiting results)
2. Cleaning all toys after each use, keeping toys for individual use
3. Aim for rapid turnover from waiting areas-e.g. use of CDU
4. Reduce equipment in resuscitation rooms to ease cleaning (e.g. store resuscitaire outside room)
5. Not examining the throat unless essential (i.e. will it make a difference to management?)
6. Use of photos on PPE revealing the true appearance clinical staff under the PPE !
7. Sensitive explanation of limiting one parent with one child and not having siblings present (although clearly being open to possibility of need to accommodate multiple family members)

Communicating with Patients and their Families

Emergency departments need to restrict access to visitors so that safe social distancing can be maintained. Exceptions may be considered on a case-by-case basis for those who are critically ill, dying or considered socially vulnerable, or children who will need at least one competent adult. The use of technology (e.g. tablets with built in cameras) should be considered to facilitate communication between relatives and patients, but this should not rely upon staff members using their own mobile devices.

Staff should consider strategies that reduce the risk of patients feeling stigmatised or frightened as a result of PPE. This is especially important in the Paediatric area and with vulnerable patients. Use of clear communication, explaining PPE, in a variety of formats (posters, information leaflets etc.) is advised.

Staff should be readily identifiable whilst wearing all levels of PPE; this includes both the role and name of the member of staff.

Communicating the ED IPC Guidance

IPC guidance should be tailored to the ED environment so that it is reasonable and consistently implemented for all staff groups (clinical and non-clinical) within the ED. The guidance should be in a format that is clear, unambiguous, brief and easy to follow for all members of staff. It should be readily available and highly visible for staff e.g. laminates within donning packs.

The communication strategy should allow for significant changes which require immediate implementation by using multiple modes of dissemination e.g. staff meetings, secure social media applications.

Personal Protective Equipment (PPE) and Staff Safety

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.

Advice about PPE has changed frequently during the pandemic. There needs to be a reliable mechanism to identify and disseminate changes in guidance.

There should be adequate supplies of appropriate PPE for all members of staff, including agency and 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.

Emergency departments 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.

There is evidence that ethnic minorities have a higher risk of mortality for deaths involving coronavirus [6,7]. All **Black, Asian and minority ethnic (BAME) staff** should have risk assessments carried out along with other staff members who are potentially at greater risk to allow appropriate arrangements to put in place [8,9].

A survey of RCEM's members has highlighted considerable concern over the adequacy of the risk assessments and the lack of consideration of ethnicity in risk assessments as well as

concerns around differences in fit testing failure and access to PPE [10]. It is recommended that ethnicity is included as an independent risk factor and risk assessments are developed appropriately for BAME colleagues, taking into account concerns over fit testing and clinical contact with COVID-19 patients.

Evidence regarding the risk of COVID-19 to **pregnant staff** is conflicting, with some studies suggesting no additional risk and other suggesting an increased risk and need for ICU support [11].Government guidance classifies pregnant individuals as *clinically vulnerable* to COVID 19.

Pregnant members of staff should have a risk assessment performed using the Management of Health and Safety at Work Regulations as a frame-work [12] as well as up to date guidance from the NHS and RCOG/RCM[13].

The experience of pregnancy for an EM practitioner is unique to them and can carry a level of anxiety that can be influenced by their past experiences (e.g., previous loss of pregnancies, difficult conception, assisted conception etc). Therefore, any decisions about the employee's working practice during COVID 19 should be made in collaboration with them and the impact that it could have on their mental well-being. Options available include stopping face to face patient contact and flexible working from home or suspension on full pay if they cannot guarantee a safe working environment.

Emergency departments should share guidance with their staff regarding reducing risk of transmitting infection from their work environment to their home environment. Infographics detailing general hygiene measures are particularly helpful [14]. 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 [1].

Vaccination

Vaccination is central to the prevention of disease spread; emergency departments should ensure all staff have had the opportunity to be vaccinated.

An unfortunate consequence of inequality in healthcare is **vaccine hesitancy** amongst some staff groups. It is important to note the difference between those who are anti-vax and those who are vaccine hesitant. Vaccine hesitancy is not necessarily irrational – it is nervousness, anxiety, and reasonable doubt that in some cases stems from a historic and well-evidenced reality that some ethnic groups experience poorer outcomes when accessing healthcare.

It is important to monitor vaccine uptake to identify any disparities eg. related to race or seniority. In-addition, this issue must be approached with sensitivity and caution must be

taken to avoid a narrative of blame against any particular staff groups. It is important to engage with staff members who may be hesitant in order to acknowledge and address their concerns.

Although the available data do not indicate any harm to pregnancy, there is insufficient evidence to recommend routine use of COVID-19 vaccines during pregnancy [11]. **Pregnant** members of staff considering vaccination should be encouraged to discuss any concerns with their midwife / obstetrician. Staff should be offered vaccination as soon as possible after pregnancy. There are no known risks of giving non-live vaccines (eg. Astra-Zeneca, Pfizer-BioNTech COVID-19 vaccines) to those who are **breastfeeding** [11]

Equipment

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.

Reusable (communal) non-invasive equipment must be decontaminated:

- between each patient and after patient use
- after blood and body fluid contamination
- at regular intervals as part of equipment cleaning

An increased frequency of decontamination should be considered for reusable non-invasive care equipment when used in isolation/cohort areas.

Appropriate storage location for equipment should be considered as well as its decontamination e.g. relocating and 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.

Some equipment (e.g. nerve block trolley/packs, ENT trolleys, Gynaecology trolleys etc.) will need to be duplicated in different areas of the department.

Training and education

All staff should receive mandatory training in IPC, the training model should be sustainable, given the availability and responsibilities of different healthcare workers. There should be regular training in how to use PPE optimally.

Systems should be in place to encourage, monitor and support adherence to IPC guidance and that senior leaders actively acknowledge the efforts of staff in adhering to guidance.

A survey of RCEM members has shown that a higher percentage of BAME colleagues have not received any PPE training. Emergency departments should ensure all staff members have clear information regarding access to appropriate PPE. Responsibility for PPE must be clear, so staff know who to raise concerns to.

Ensure that staff know how to safely and accurately perform lateral flow tests on themselves as a means of keeping themselves, colleagues and patients safe.

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Review

Usually within three years or sooner if important information becomes available.

Conflicts of Interest

None.

Disclaimers

RCEM recognises that patients, their situations, Emergency Departments and staff all vary. This guideline cannot cover all possible scenarios. The ultimate responsibility for the interpretation and application of this guideline, the use of current information and a patient's overall care and wellbeing resides with the treating clinician.

Research Recommendations

Placement of patients safely depends on rapid turnaround of results. There is a need for a COVID-19 test with a very rapid turnaround time, less than one hour.

Audit standards

There should be a documentation and audit system in place within a system of clinical governance.

Key words for search

COVID-19, coronavirus, emergency department, infection control, infection prevention, IPC.

Methodology

Where possible, appropriate evidence has been sought and appraised using standard appraisal methods. High quality evidence is not always available to inform recommendations. Best Practice Guidelines rely heavily on the consensus of senior emergency physicians and invited experts.

Appendix 1: RCEM Safety Alerts Regarding Airway Matter [15]

Airway management and ventilation can generate aerosols, putting staff at risk of exposure.

To minimise the risk:

• Use *FULL PPE* for airway management (Full gown, FFP3 mask, gloves & eye protection) [1]

• Mask ventilation carries the highest risk to rescuer – Use 2-person technique [6]

• To protect the rescuers, priority should be given to inserting a *supraglottic airway (SGA)(better)* or *cuffed endotracheal tube (ETT) (best)*

• Place an *appropriate filter which incorporates viral filtration* between the airway (SGA or ETT) and the ventilation device (self-inflating bag or anaesthetic circuit)

• Not all Heat & Moisture Exchange (HME) filters have **adequate viral filtration efficiency** *but could look similar.* Check product labelling to confirm.

Peak flow meters and nebulisation

The Public Health England's current position is that nebulisation is NOT an aerosol generating procedure. The mist seen around the nebulisation mask is a mist of the nebulised drug solution, considered to be sterile.

• Do not record a peak expiratory flow rate (PEFR) until after salbutamol treatment is completed and **only if** you are considering discharging the patient home. The peak flow meter cannot be used for other patients as it carries a potential infection risk. The use of a peak flow meter is not an aerosol generating procedure.

• Consider the use of MDI and spacer for patients with mild and moderate asthma, nebulisation should ideally be reserved for acute severe and life-threatening asthma and severe exacerbation of COPD.

• Use the minimum flow rate of oxygen to achieve nebulisation, this is normally around 6 litres / min (or as indicated by the mask manufacturer). For COPD patients, where available, use air driven nebulisation.

Appendix 2: Examples of Triage Resources

Potential symptoms of COVID

- Fever
- Cough
- Shortness of Breath
- Sore Throat
- Hoarse Voice
- Loss of Smell / Taste
- Influenza like illness / Bodyaches
- 'Cold' symptoms – runny nose, sneezing , headache

Example of triage questions for COVID-19 [1]

	Yes	No
1. Do you or any member of your household/ family have a confirmed diagnosis of COVID-19?		
2. Are you or any member of your household/family waiting for a COVID-19 test result?		
3. Have you travelled internationally in the last 14 days? If yes, confirm where and if this is a country that has been agreed as safe for travel by the government.		
4. Have you had contact with someone with a confirmed diagnosis of COVID-19, or been in isolation with a suspected case in the last 14 days?		
5. Do you have any of the following symptoms? • high temperature or fever • new, continuous cough • a loss or alteration to taste or smell		

Extremely Vulnerable Patient Groups [16]

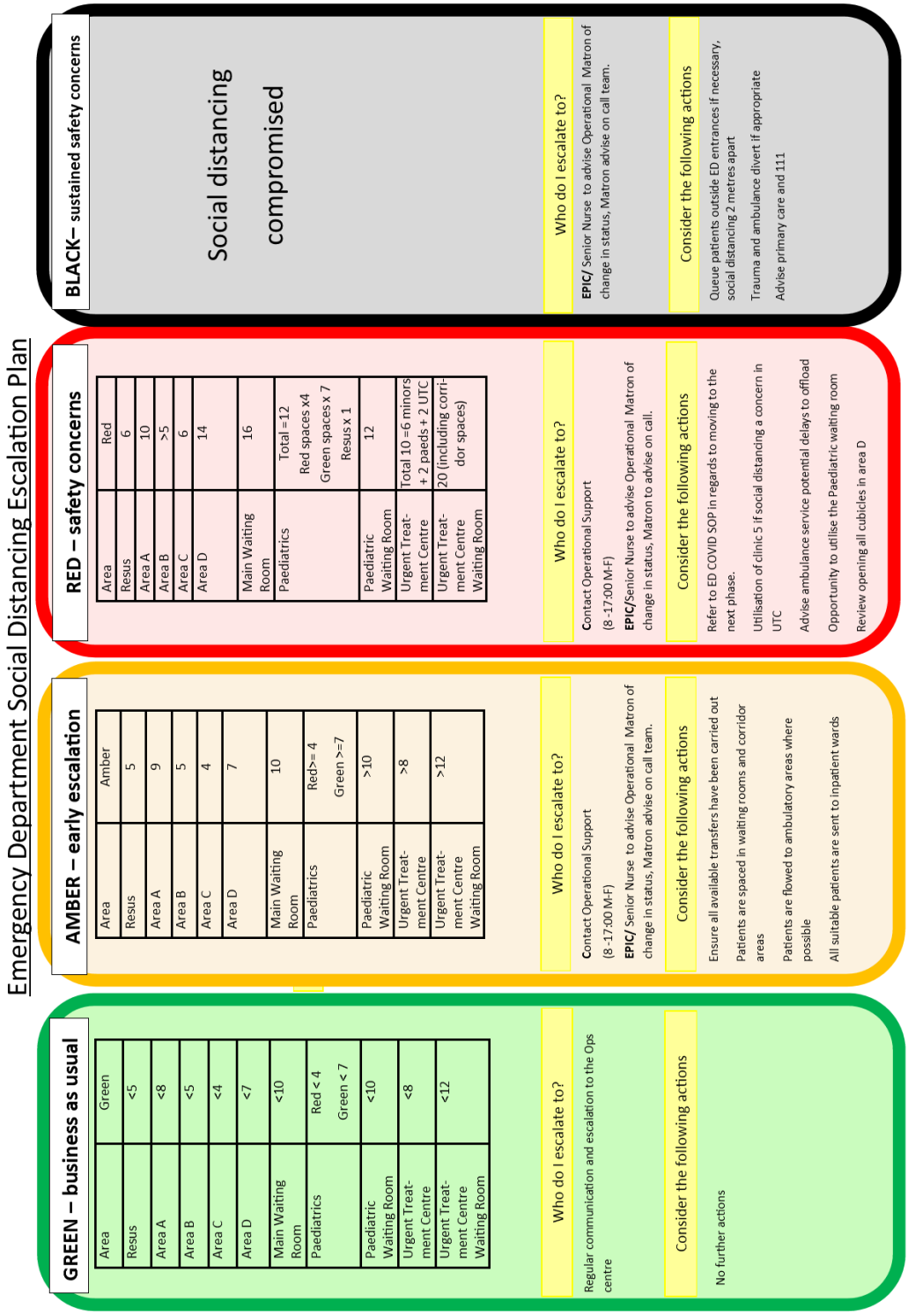
Clinically extremely vulnerable people may include the following people. Disease severity, history or treatment levels will also affect who is in the group.

1. solid organ transplant recipients
2. people with specific cancers:
    - people with cancer who are undergoing active chemotherapy
    - people with lung cancer who are undergoing radical radiotherapy
    - people with cancers of the blood or bone marrow such as leukaemia, lymphoma or myeloma who are at any stage of treatment
    - people having immunotherapy or other continuing antibody treatments for cancer
    - people having other targeted cancer treatments that can affect the immune system, such as protein kinase inhibitors or PARP inhibitors
    - people who have had bone marrow or stem cell transplants in the last 6 months or who are still taking immunosuppression drugs
3. people with severe respiratory conditions including all cystic fibrosis, severe asthma and severe chronic obstructive pulmonary disease (COPD)
4. people with rare diseases that significantly increase the risk of infections (such as severe combined immunodeficiency (SCID), homozygous sickle cell disease)
5. people on immunosuppression therapies sufficient to significantly increase risk of infection
6. problems with your spleen, for example splenectomy (having your spleen removed)
7. adults with Down's syndrome
8. adults on dialysis or with chronic kidney disease (stage 5)
9. women who are pregnant with significant heart disease, congenital or acquired
10. Other people who have also been classed as clinically extremely vulnerable, based on clinical judgement and an assessment of their needs. GPs and hospital clinicians have been provided with guidance to support these decisions

Appendix 3: Checklist for Emergency Departments

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 ?		
Has the maximum occupancy of each non-clinical area been defined ?		
Is there social distancing, ensuring patients do not wait less than 2 metres 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 AGPs 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 AGPs 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 & Training		
Are there effective ways of sharing PPE guidance ?		
Are new staff trained in how to use PPE ?		
Are new staff trained in IPC ?		
Are staff regularly audited on IPC ?		
Is there a record of which staff are trained on IPC and PPE use ?		
Is there a record of which staff have been risk assessed which takes into account ethnicity ?		
Is there a record of which staff are self-testing and their compliance ?		
Is there a record of which staff have been vaccinated ?		

Appendix 4: Example of an Escalation plan



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