



V2.3 Guidance on COVID-19

Use of PPE to support Infection Prevention and Control Practice when performing aerosol generating procedures on Confirmed or Clinically Suspected Cases of COVID-19

06.07.2021

Version	Date	Changes from previous version	Drafted by
2.3	06.07.2021	Change in terminology and definitions on vaccine protection	AMRIC
2.2	31.05.2021	Updating of tables of procedures Increased emphasis on the critical importance of vaccination Updated to reflect the requirement that FFP2 masks be available for use by healthcare workers for all care delivered to patients with COVID-19	AMRIC
2.1	26.05.2020	Updated to reflect Decision by NPHET dated 22nd April 2020 in relation to use of surgical masks in healthcare settings; <ul style="list-style-type: none">▪ Surgical masks should be worn by healthcare workers when they are providing care to people and are within 2m of a person, regardless of the COVID-19 status of the person▪ Surgical masks should be worn by all healthcare workers for all encounters , of 15 minutes or more, with other healthcare workers in the workplace where a distance of 2m cannot be maintained Addition of a FAQ section	HPSC

Note: If you have any queries on this guidance please contact the AMRIC team at hcai.amrteam@hse.ie

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Transmission of infection

The transmission of COVID-19 occurs mainly through liquid respiratory particles. The larger particles can be considered as droplets (larger) and the smaller as aerosols (smaller). The particle sizes form a continuum rather than two discrete categories. Transmission by the airborne route (longer range transmission) has been acknowledged since the start of the pandemic in particular in the context of certain medical procedures referred to as aerosol generating procedures associated with an increased risk of infection (AGPs). More recently, particularly in the context of the emergence and spread of more infectious virus variants such as B.1.1.7, concern regarding the risk of airborne spread in other contexts has increased. There are a number of accounts that support airborne transmission in the absence of aerosol generating procedures in particular in poorly ventilated indoor areas where groups of people are present for extended periods. Recent experience also highlights particular concerns regarding spread of infection from patients supported by high flow oxygen devices in particular in multi-bed areas.

Aerosol Generating Procedures

Aerosol generating procedures (AGPs) are defined as medical and patient care procedures that result in the production of airborne particles $\leq 5 \mu\text{m}$ in size, which can remain suspended in the air and travel over a distance. If they contain infectious microorganisms they may cause infection if they are inhaled. AGPs create the potential for airborne transmission of infections that may normally be transmissible primarily by the droplet route.

When an effective vaccine exists, for example SARS-CoV-2, by far the most important measure to reduce the risk of airborne infection in the context of performing an AGP is vaccination. Healthcare workers who are required to perform AGPs should be vaccinated against relevant vaccine preventable infections. Other measures including ventilation and use of PPE cannot be expected to substitute fully for the protective effect of vaccination. However, as vaccination does not result in complete protection in all recipients vaccinated healthcare workers should follow good infection prevention and control practice including use of appropriate PPE and environment when performing AGPs on patients with confirmed or suspected infection with relevant pathogens.

A list of AGPs and recommended PPE is provided in the tables below.

1. Where an AGP that is consistently recognised or accepted by many as associated with an increased risk of infection (Tables 1 and 2) is necessary on a patient with suspect or confirmed COVID-19, it should ideally be undertaken in a negative-pressure or neutral pressure room, using recommended airborne precautions.

2. If a negative/neutral pressure room is not available, an AGP that is consistently recognised or accepted by many as associated with an increased risk of infection should be undertaken using a process and environment that minimises the exposure risk for HCWs, ensuring that patients, visitors, and others in the healthcare setting are not exposed. For example, in a single room, with ventilation to the greatest degree practical and the door kept closed, away from other patients and staff.
3. The risk associated with performing procedures categorised in Table 3 as “Plausible hypothesis- no evidence” outside of a negative pressure or neutral pressure room is low if performed by vaccinated staff with appropriate infection control precautions including use of appropriate PPE.
4. Essential personnel only should be present in a room/area where an AGP associated with increased risk of infection is being performed and those personnel should have vaccine protection.
5. HCW and visitors should leave the patient’s room during an AGP, unless it is necessary for them to remain to undertake the AGP or to assist with the patient’s care during the AGP. Those present in the room during the AGP should be vaccinated and must wear the recommended PPE for an AGP situation for the duration of the procedure and for 20 minutes afterwards in rooms with mechanical ventilation and for up to one hour in a room with natural ventilation.
6. In critical care settings, where there is additional risk that an unanticipated AGP (e.g., due to accidental extubation or requirement for suctioning) may need to be performed urgently, it may be appropriate for all HCW present in the area to wear an FFP2 mask particularly if they do not have vaccine protection.

A number of authoritative national bodies have produced lists of Aerosol Generating Procedures/Aerosol Generating Medical Procedures.

There are some variations between the lists but the following generally feature consistently:

1. Endotracheal intubation and extubation
2. Cardio-pulmonary resuscitation (AGP risk is associated with airway management)
3. Open airway suctioning
4. Bronchoscopy (Diagnostic or Therapeutic)
5. Autopsy
6. Sputum induction (Diagnostic or Therapeutic)

Some procedures are cited by some agencies but are not cited by other agencies for example:

1. Non-invasive positive pressure ventilation for acute respiratory failure (CPAP, BiPAP)
2. High flow oxygen therapy

One agency, the European Centre for Disease Control, has taken the view that swabbing the oropharynx and nasopharynx is an AGP but this view is not supported by evidence or a clear rationale and is inconsistent with guidance from the WHO ([March 2020](#)) and many other national agencies. A number of other procedures have been identified which can generate small droplet particles mainly through the induction of coughing.

For guidance on donning and doffing PPE see www.hpsc.ie

Patient Placement for AGPs

For infections known to be transmitted by the airborne route including Measles/Chickenpox and TB, airborne isolation in a negative pressure isolation room is recommended while the patient is infectious.

For infections that are spread primarily by droplet and contact transmission negative pressure isolation rooms are not required for most patient care.

Where high-risk procedures are done that are likely to generate aerosols associated with an increased risk of transmission of respiratory virus such as COVID-19, negative pressure isolation rooms are preferred if available. Where a negative pressure isolation room is not available, these procedures should be carried out in a single room with the door closed.

In a pandemic situation, if COVID-19 patients are cohorted together in one area, including those patients that require AGPs, the requirement for negative pressure isolation is less significant.

All staff working in an area where AGPs are being performed should be vaccinated and must follow good IPC practice including wearing appropriate PPE. The minimum number of personnel necessary should be present. Avoiding risk is always preferable to reliance on PPE.

Risk Assessment

As part of standard precautions it is the responsibility of every healthcare worker (HCW) to undertake a risk assessment **PRIOR** to performing a clinical care task as this will inform the level of infection prevention and control precautions needed including the choice of appropriate PPE for those who need to be present. If more than one task is anticipated with differing risks, the higher level of

precautions should be taken for all of the tasks e.g. a HCW taking a temperature then proceeding to tracheostomy suctioning should take precautions appropriate for an Aerosol Generating Procedure.

Personal Protective Equipment

1. National Public Health Emergency Team (NPHE) has recommended extension of the use of surgical masks in healthcare settings to the following;
 - a. Surgical masks should be worn by healthcare workers when they are providing care to people and are within 2m of a person
 - b. Surgical masks should be worn by all healthcare workers for all encounters, of 15 minutes or more, with other healthcare workers in the workplace where a distance of 2m cannot be maintained.
2. For the purpose of this guidance healthcare workers should don a mask if they anticipate being within 2 m or more with other healthcare workers for a continuous period of 15 minutes or longer. It is not intended that healthcare workers should attempt to estimate in the morning the total duration of a sequence of very brief encounters that may occur during the day.
3. Since early 2021, it has been recommended that healthcare workers should have access to respirator masks (FFP2) for all care of patients with confirmed or suspected COVID-19 or their contacts.

COVID-19 Safe PPE

Care of patients with respiratory symptoms/suspected/confirmed COVID-19

Always wear a fit tested FFP2/FFP3 respirator mask for AGPs.
Fit check your respirator mask every single time.

HAND HYGIENE FIRST IN ALL CASES

Coronavirus COVID-19 Public Health Advice

Low Contact
Eye protection*
Surgical or FFP2 facemask
Disposable Plastic Apron
Gloves

High Contact
Eye protection*
Surgical or FFP2 facemask
Long Sleeved Disposable Gown
Gloves

Aerosol Generating Procedures
Eye protection
FFP2 respirator mask
Long Sleeved Disposable Gown
Gloves

*Eye protection to be worn on risk assessment

Unlikely to provide opportunities for the transfer of virus/other pathogens to the hands and clothing.

Increased risk for transfer of virus and other pathogens to the hands and clothing.

Also if there is a risk of an unplanned aerosol generating procedure.

With thanks to Samantha Weston and James Fox, Creative & Midlands Partnership, NHS Foundation Trust.

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Infographic from: <https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/guidance/infectionpreventionandcontrolguidance/pe/COVID%20safe%20PPE%20Graphic.%20February%202021.pdf>

Table 1: Aerosol generating procedures, which have been associated with, increased risk of transmission of respiratory infection

Procedures	AGP Related Increased Risk of Pathogen Transmission	PPE for those with CONFIRMED OR SUSPECTED COVID-19 infection
Intubation	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
Front of neck airway procedures – Insertion of tracheostomy, cricothyroidotomy	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
Tracheal Extubation	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
Bronchoscopy	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
Positive pressure ventilation with inadequate seal*	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
CPR (pre intubation due to manual ventilation)	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
High Frequency Oscillatory Ventilation (HFOV)	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
Manual Ventilation	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
Open Suctioning-procedure where a single-use catheter	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK

Procedures	AGP Related Increased Risk of Pathogen Transmission	PPE for those with CONFIRMED OR SUSPECTED COVID-19 infection
inserted into the ETT either by disconnecting the ventilator tubing or via a swivel connector		Eye Protection Gloves Long Sleeved Gown
Induction of Sputum	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
High Flow Nasal Oxygen (HFNO) including AIRVO	Accepted by many	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
Non-invasive ventilation – CPAP/BiPAP	Accepted by many	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown

Table 2: Potential Aerosol Generating Procedures due to use of High Speed Devices

Procedure	AGP Related Increased Risk of Pathogen Transmission	PPE for CONFIRMED OR SUSPECTED COVID-19 infection
Instruments used in Autopsy Procedures	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
Instruments used in Dental Procedures e.g. the use of a high-speed hand piece or ultrasonic instruments aerosolise patient's respiratory secretions, saliva	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown
Instruments used in surgical procedures e.g. Neurosurgery & major maxillary facial ENT procedures	Consistently recognised	Hand Hygiene FFP2 RESPIRATOR MASK Full Face Visor Gloves Long Sleeved Gown Hood

Table 3: Procedures, which may be associated with increased risk due to levels of droplet dispersion, proximity to airway, duration of procedure +/- where installation of fluid or suctioning may be part of the procedure

Procedures	AGP Related Increased Risk of Pathogen Transmission Infection Risk	PPE COVID-19 CONFIRMED OR SUSPECTED
Laryngoscopy	Plausible hypothesis- no evidence	Hand hygiene FFP2 RESPIRATOR MASK Eye Protection Gloves Long Sleeved Gown Eye Protection
Laryngeal Mask Airway (placement and removal)	Plausible hypothesis- no evidence	Hand Hygiene FFP2 RESPIRATOR MASK Eye protection Gloves Long-sleeved gown
Upper GI endoscopy	Plausible hypothesis- no evidence	Hand Hygiene FFP2 RESPIRATOR MASK Gloves Eye Protection Gown/Plastic Apron
Transoesophageal Echocardiogram	Plausible hypothesis- no evidence	Hand Hygiene FFP2 RESPIRATOR MASK Gloves Eye Protection Gown/Plastic Apron
Fibreoptic endoscopic evaluation of swallowing (FEES).	Plausible hypothesis- no evidence	Hand Hygiene FFP2 RESPIRATOR MASK Gloves Eye Protection Gown/Plastic Apron

Table 4: Procedures which are unlikely to be of increased risk, as there are low levels of droplet dispersion, the health care worker is not very close to the airway, duration of procedure is short and where installation of fluid or suctioning is not part of the procedure. Note also paper of Radanovich (2019) conducted in a setting where many of these procedures are commonly performed.

Procedures	AGP Related Increased Risk of Pathogen Transmission Infection Risk	PPE for those with CONFIRMED OR SUSPECTED COVID-19 infection
Collecting a nasopharyngeal swab	Not supported by evidence or plausible	Hand Hygiene

Procedures	AGP Related Increased Risk of Pathogen Transmission Infection Risk	PPE for those with CONFIRMED OR SUSPECTED COVID-19 infection
	hypothesis and not recognised by most national bodies.	Surgical Face Mask/FFP2 RESPIRATOR MASK ^{NOTE} Gloves Gown OR Plastic Apron* Risk Assessment Re: Eye Protection
Delivery of nebulised medications via simple face mask	Not supported by evidence or plausible hypothesis and not recognised by most national bodies.	Hand Hygiene Surgical Face Mask/ FFP2 RESPIRATOR MASK ^{NOTE} Gloves Gown OR Plastic Apron* Risk Assessment Re: Eye Protection
Closed suction systems (CSS) enable patients to be suctioned by a suction catheter enclosed within a plastic sleeve, without the need for ventilator disconnection	Not supported by evidence or plausible hypothesis and not recognised by most national bodies.	Hand Hygiene Surgical Face Mask/ FFP2 RESPIRATOR MASK ^{NOTE} Gloves Gown OR Plastic Apron* Risk Assessment Re: Eye Protection
Chest Physiotherapy in absence of other AGP's	Not supported by evidence or plausible hypothesis and not recognised by most national agencies.	Hand Hygiene Surgical Face Mask/ FFP2 RESPIRATOR MASK ^{NOTE} Gloves Gown OR Plastic Apron* Risk Assessment Re: Eye Protection
Clinical dysphagia examinations- this examination includes orofacial assessment and administration of food and/or fluids to evaluate swallowing ability	Not supported by evidence or plausible hypothesis and not recognised by most national agencies.	Hand Hygiene Surgical Face Mask/ FFP2 RESPIRATOR MASK ^{NOTE} Gloves Gown OR Plastic Apron* Risk Assessment Re: Eye Protection
Insertion of a nasogastric tube	Not supported by evidence or plausible hypothesis and not recognised by most national agencies.	Hand Hygiene Surgical Face Mask// FFP2 RESPIRATOR MASK ^{NOTE} Gloves Gown OR Plastic Apron* Risk Assessment Re: Eye Protection
Oropharyngeal suctioning (i.e. not suctioning beyond the oropharynx)	Not supported by evidence or plausible hypothesis and not recognised by most national agencies.	Hand Hygiene Surgical Face Mask// FFP2 RESPIRATOR MASK ^{NOTE} Gloves Gown OR Plastic Apron* Risk Assessment Re: Eye Protection

*Refer to National Guidelines on PPE

Note. In these circumstances use of a surgical mask is generally appropriate however an FFP2 mask should be available to a healthcare worker as required.

Table 5: Lower GI Procedures

Procedure	AGP Related Increased Risk of Pathogen Transmission Infection Risk	PPE for those with CONFIRMED OR SUSPECTED COVID-19 infection
Lower GI endoscopy	<p>Not supported by evidence or plausible hypothesis and not recognised by most national agencies</p> <p>Note. RNA detected in Faeces but no cases of COVID-19 transmission by this route have been reported</p>	<p>Gloves Apron</p> <p>Risk Assessment: Eye Protection Surgical Face Mask// FFP2 RESPIRATOR MASK^{NOTE}</p>

Note. In these circumstances use of a surgical mask is generally appropriate however an FFP2 mask should be available to a healthcare worker as required.

Questions and Answers

Q. Is ear syringing an AGP?

A. Ear syringing involves irrigation of the external auditory meatus which is lined with squamous epithelium. It involves the use of low pressure irrigation so there is no reason to expect it to generate aerosols, furthermore SARS-CoV-2 virus does not replicate in squamous epithelium. Ear syringing is not an aerosol generating procedure associated with an increased risk of infection. Some patients may cough however this does not make this an AGP

Q. Is examination of the pharynx with or without the use of a tongue depressor an AGP?

A. Examination of the pharynx with or without the use of a tongue depressor is not an aerosol generating procedure associated with an increased risk of infection. It is now essentially universally accepted that even swabbing the nasopharynx for diagnostic purposes is not an aerosol generating procedure associated with an increased risk of infection.

ENDS