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Società Italiana di
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ISUOG Safety Committee Position Statement on use of personal protective equipment and hazard mitigation in relation to SARS-CoV-2 for practitioners undertaking obstetric and gynecological ultrasound

In view of the challenges of the current coronavirus (SARS-CoV-2) pandemic, the International Society of Ultrasound in Obstetrics and Gynecology (ISUOG) has compiled the following expert-opinion-based guidance on safe use of personal protective equipment (PPE) and how to reduce the hazard of SARS-CoV-2 infection for clinicians undertaking ultrasound examinations (physicians, sonographers and allied professionals). The European Centre for Disease Prevention and Control (ECDC) has released a technical report for wearing and removing PPE in healthcare settings managing patients with suspected or confirmed COVID-19 infection¹, as have the Centres for Disease Control and Prevention (CDC)², World Health Organization (WHO)³ and, in the UK, Public Health England (PHE)⁴. At the time of writing, none of these recommendations has addressed the safe use of PPE when performing ultrasound examinations specifically. As guidance in relation to PPE differs from country to country and region to region, we recommend that local guidance is followed when this is available; if no guidance specific to ultrasound examinations exists, this document may be referenced.

This guidance describes steps that may be taken to minimize the risk of SARS-CoV-2 transmission between the patient and the practitioner during ultrasound examinations. It is important to note that many of the measures discussed in this document are supported by limited research-based evidence. This may explain why advice varies widely between different parts of the world (Appendix 1). Nevertheless, the authors, several of whom work in some of the areas first affected

by the virus, including China (Appendix 2), Singapore, Hong Kong and Italy, have been able to synthesize what are believed to be the most effective interventions for reducing the transmission of SARS-CoV-2 between patients and healthcare providers.

BACKGROUND: RISK OF INFECTION DURING ULTRASOUND ASSESSMENT:

An ultrasound examination has several unique attributes that are likely to increase the risk of transmission between patients and ultrasound operators (and potentially vice versa). These include, but are not limited to, the following:

- Physical proximity to the patient is less than 2 meters or 6 feet, and may be as little as 30–50 cm;
- The ultrasound room or enclosed area is typically small;
- The ultrasound rooms often have restricted ventilation as the air conditioning systems are in some cases closed loop and/or there are no windows;
- The examination time may last between 10 and 60 min;
- Invasive or transvaginal procedures may need to be carried out;
- The woman may be asked to inhale or exhale deeply, and hold her breath;
- Therapeutic and interventional procedures may increase the risk of exposure to bodily fluids;
- There is a risk of the patient coughing, sneezing or exhaling heavily;
- The surfaces of the ultrasound machine, especially the keyboard, touch screen and trackball, are touched frequently.

These attributes have not been formally studied in relation to the risk of transmission of viral infection during ultrasound examination. A recent study on the ability of an exhaled turbulent gas cloud to carry respiratory pathogens a long distance, suggests that appropriate PPE should be considered for all healthcare workers, even if they remain further than 2 meters away from a symptomatic patient⁵.

NON-PPE RISK MITIGATION

Given the attributes inherent to ultrasound examinations that prevent distancing and require that a doctor or sonographer remains in close contact with a patient for a long period of time, mitigation measures should be considered to reduce the risk of SARS-CoV-2 transmission.

Triage ultrasound scans

During the COVID-19 pandemic, depending on local disease prevalence and staff shortage, high-risk patients should be prioritized for ultrasound assessment, while prioritization by type of scan should be considered, with the second-trimester anatomical scan taking precedence over the first-trimester scan and growth scans performed based on coexisting and emerging comorbidities. Further details are provided in the ISUOG Consensus Statement on organization

of routine and specialist obstetric ultrasound services in the context of COVID-19⁶.

Ventilation of ultrasound room

Very few studies have assessed environmental contamination as a route of transmission of SARS-CoV-2 in the healthcare setting⁷. Infection control advice is based on the reasonable assumption that the transmission characteristics of COVID-19 are similar to those of the 2003 SARS-CoV outbreak.

Adequate ventilation is the main way to reduce air environmental contamination and exposure to COVID-19 infection. The WHO divides environmental ventilation methods into three types: mechanical, natural and mixed-mode⁸. Good ventilation of rooms to clear aerosols is recommended by several organizations^{9–11}. Although most guidelines refer to conditions in which aerosol generating procedures (AGP) are performed, AGPs are rare in routine ultrasound practice. The rate of clearance of aerosols in an enclosed space depends on the number of air changes per hour. A single air change is estimated to remove 63% of airborne contaminants and after five air changes less than 1% of airborne contamination is thought to remain⁹. After an AGP, a minimum of 20 min of ventilation is considered pragmatic, which can be reduced to 5 min if ultraclean ventilation is used (e.g. in some operating theaters). This situation is very unlikely to pertain to obstetric and gynecological ultrasound.

Air-conditioning systems equipped with high-efficiency particulate air (HEPA) filters provide adequate protection especially if combined with the use of PPE and face masks. Most hospital systems are not equipped with HEPA filters, hence, turning off air conditioning and, where there are windows, opening them for good ventilation if an independent air supply is not feasible, has been recommended by WHO for rooms hosting patients with suspected SARS infection¹². As every ultrasound environment is different and there are no consistent regulations or advice regarding ventilation, we recommend that consideration is given to ventilation in ultrasound rooms in individual workplaces.

ADVICE TO PATIENTS

First point of contact: should temperature be taken and history of travel, occupation, contact and cluster (TOCC) be asked before or on arrival at the ultrasound department?

According to the Royal College of Obstetricians and Gynaecologists, maternity departments with direct entry for patients and the public should put in place a system for identification of potential cases of COVID-19 as soon as possible, to prevent potential transmission to other patients and staff. This system should be set up at the first point of contact (either near the entrance or at reception) to ensure early recognition and infection control. This should be employed before a patient sits in the maternity waiting area¹³.

From an epidemiological point of view, the SARS-CoV-2 virus first emerged in the Hubei province

in China. Therefore, in the early phase of the epidemic, history of travel to the Hubei province, as well contact with people known to have been infected by SARS-CoV-2, obtained via TOCC assessment was advocated as the first measure to identify potential carriers of the SARS-CoV-2 virus^{14,15}. Nonetheless, the rapid spread of the disease across countries and continents, as well as the evidence of existence of asymptomatic carriers¹⁶, has led to circumstances in which all patients are to be considered at risk of infection and hence potential carriers of the SARS-CoV-2 virus.

On this basis, and following the available recommendations^{2,9,15}, in the most affected areas, such as northern Italy, several maternity units have implemented strict protocols for the triage of women accessing the unit. Such measures include the arrangement of 'check point' triage areas in which dedicated medical personnel equipped with PPE take the temperature and assess the medical history, in terms of symptoms and contact, of the women attending the maternity units and the ultrasound departments.

Women should be advised that triage of their symptoms and contact represents the first-line assessment in order to allow the identification of contacts should they develop symptoms at a later stage. According to ISUOG's Interim Guidance, patients identified to be at risk for SARS-CoV-2 infection should delay their antenatal visit and routine ultrasound assessment by 14 days¹⁵. We recommend that this advice is considered on a local basis after taking into account the potential implications of a delayed ultrasound examination in the context of local/national regulations. This advice applies only to routine ultrasound examinations; clearly, pregnancies requiring time-critical examinations should be considered on a case-by-case basis.

Should the patient wear a mask?

Surgical masks, also referred to as medical masks, face masks or simply masks, provide only a barrier protection against droplets, including large respiratory particles, while they do not effectively filter small particles from the air and do not prevent leakage around the edge of the mask when the user inhales². The rationale for the use of surgical masks is two-fold: to protect the wearer from sources of infection, such as splashing or spraying of blood, hand-to-face contact and large droplets and sprays, and to protect others from the wearer in case they are a source of infection¹⁷. If no mask is used, the mucosal surfaces of the nose and mouth are exposed, providing an easy route of entry to the body for pathogenic microorganisms. There is no standard definition of a surgical mask, and there is a wide variation in the design and quality of the masks currently in use. In terms of the design, it is recommended that masks should fully cover the nose and mouth of the wearer. Two randomized controlled trials support the use of surgical masks in a community setting^{18,19} and the use of masks is recommended in cases of suspected or confirmed SARS-CoV-2 carriers in order to prevent spread of the infection^{1-3,20}.

N95 and FFP2 respirators filter out particles, including bacteria and viruses². Statements from leading health organizations (ECDC, WHO and CDC)¹⁻³ provide different recommendations for the

use of respirators in a healthcare setting. However, respirators are recommended for use only by healthcare professionals requiring protection from both airborne and fluid hazards (e.g. splashes, sprays), while no indication exists outside of the healthcare setting². There is little or no evidence supporting the use of N95 or FFP2 masks by patients.

The rapid increase of the epidemic curve of the SARS-CoV-2 virus, together with the evidence that carriers of the disease can be asymptomatic¹⁶ has led to a situation in which all individuals, including the medical staff and patients, represent potential carriers of the infection. On this basis, and despite the lack of evidence as to whether asymptomatic carriers contribute to the spread of the SARS-CoV-2 virus, in certain countries both the healthcare staff and patients, as well as other hospital attendants, have been advised to don surgical masks in a healthcare setting in order to minimize the dispersal of respiratory secretions and reduce environmental contamination.

We consider that, currently, there is too little evidence to recommend the routine use of patient masks by asymptomatic low-risk patients. We do, however, recommend that local protocols should advise that patients with symptoms of COVID-19 infection should wear a surgical mask when undergoing imaging or other ultrasound investigations.

PERSONAL PROTECTIVE EQUIPMENT

The SARS-CoV-2 virus is spread mainly by close contact and respiratory droplets, with airborne transmission being likely in specific circumstances²¹. In general, respirators, as opposed to surgical masks, are recommended for healthcare personnel who come in contact with patients with strongly suspected or confirmed COVID-19 infection, however, surgical masks are an acceptable substitute when supply of respirators is limited²². [A detailed description of available surgical masks and respirators is provided in Appendix 3.](#)

Staff age and comorbidities

- Ultrasound providers of advanced age or with health conditions that predispose them to infection and severe disease should avoid scanning patients with suspected or confirmed COVID-19 disease, and should consider wearing appropriate PPE when working in a region affected by the COVID-19 pandemic, even if they are examining an asymptomatic and TOCC-negative patient.
- Individuals at highest risk for severe COVID-19 disease and death include those aged over 60 years and those with underlying conditions, such as hypertension, diabetes, cardiovascular disease, chronic respiratory disease and cancer.
- Individuals who have a comorbidity should ensure that their occupational health departments are aware of their underlying condition, age and area of deployment.

General considerations

- Attention should be paid to train ultrasound providers on safe donning, doffing and disposal of PPE^{23,24}.
- Proper functioning of respirators requires that an effective seal is created between the mask and the face of the wearer. Variation in face size and shape, and availability of different respirator designs, mean that a proper fit is only possible for a minority of healthcare workers for any particular mask. All healthcare workers should therefore undergo a fitting test for respirators and should continue to wear the type of respirator for which they have been fit-tested.
- Hand hygiene should be performed before and after patient contact, contact with potentially infectious material, and before putting on and after removing PPE, including gloves. Hand hygiene after removing PPE is particularly important to remove pathogens that might have been transferred to bare hands during the removal process. Hand hygiene should include use of 60–95% alcohol or washing hands with soap and water for at least 20 sec.

When managing patients with confirmed or suspected COVID-19 infection, or if there is widespread community transmission²²

- To avoid infection through respiratory droplets, practitioners should don appropriate PPE, including a surgical mask, upon entering the ultrasound room.
- To avoid infection through contact, all patients with suspected or confirmed COVID-19 disease should preferably be scanned in a single dedicated room; the practitioner should don appropriate PPE, including gloves and gown, upon entering the ultrasound room, and use of disposable equipment should be preferred, where possible.
- To avoid airborne transmission, the patient should be asked to wear a surgical mask if they are symptomatic or have confirmed COVID-19 infection. The healthcare worker should wear appropriate PPE, including a fit-test approved respirator or surgical mask, depending on the level of infection risk, gloves, gown, face and eye protection, upon entering the room. High-risk healthcare workers should be restricted from entering the ultrasound room and disposable equipment should be used where possible.

PPE in obstetric, gynecological and early-pregnancy scans (Appendices 4 and 5)

Guidance is provided in Table 1 according to patient symptoms and infection status, considering three groups of patients:

1. Asymptomatic and TOCC-negative patients in a region in which there is no widespread community transmission.
2. Asymptomatic and TOCC-positive patients in a region in which there is no widespread community transmission.
3. Patients with suspected/probable/confirmed COVID-19 disease or in a region in which there is widespread community transmission.

There is little difference between gynecological, early-pregnancy and obstetric scans from the standpoint of infection, so precautionary measures are applicable to all three fields.

Transvaginal ultrasound probes should undergo high-level disinfection⁶ as condoms and commercial covers may break²⁵. Tracing and record keeping for high-level disinfection is essential. Detailed guidance regarding ultrasound equipment and transducer cleaning in the context of COVID-19 has been provided in a separate document⁶.

Table 1: PPE recommended for use by ultrasound providers based on risk assessment of the patient

	Asymptomatic and TOCC negative	Asymptomatic and TOCC positive	Suspected[§]/probable/confirmed COVID-19 or where there is widespread community transmission
Clothes	Dedicated work clothes	Dedicated work clothes	Dedicated work clothes
Hand hygiene	Y	Y	Y
Surgical facemask	Y *	Y *	Respirator (N95, FFP2/3) **
Respirator	N	N	
Isolation gown	N	N	Disposable fluid-resistant and impermeable protective gowns (e.g. AAMI level 3)
Disposable gloves	Y	Y	Y (2 pairs)
Eye protection	N	N	Goggles / face shield
Hair cover	N	N	Y
Additional consideration for transvaginal scan or invasive procedures	Standard condom or commercial transducer cover***	Standard condom or commercial transducer cover***	Standard condom or commercial transducer cover. Cover for cable if available***
Staffing/environment			Ideally scan 'by the bedside' rather than in a clinic. Minimize the number of staff in the room and ensure the most senior person is undertaking the scan
Disinfection/cleaning	Low-level disinfection for external probes. High-level disinfection for internal probes. Additional low-level disinfection for ultrasound machine and cables. ⁶		

[§]symptomatic +/- TOCC Where there is widespread community spread

*Extended use of surgical facemasks is the practice of wearing the same surgical facemask for repeated close contact encounters with several different patients, without removing the facemask between patients. In most cases one face mask can be safely used for a typical clinic of 3-4 hours. The surgical facemask should be removed and discarded if soiled, damaged, or hard to breathe through. Healthcare workers should take care not to touch their surgical facemask. If they touch or adjust their surgical facemask they should immediately perform hand hygiene. Healthcare workers should leave the patient care area if they need to remove the surgical facemask. Re-use should be implemented according to CDC guidance available at <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/face-masks.html>

**All healthcare workers should have training on appropriate use of and fit testing for respirators. Alternatives to respirators: filtering facepiece respirators, elastomeric half-mask and full facepiece air purifying respirators (PAPRs) where feasible. All of these alternatives will provide equivalent or higher protection than N95 respirators when properly worn. Extended use refers to the practice of wearing the same N95 respirator for repeated close contact

encounters with several different patients, without removing the respirator between patient encounters. Extended use of respirators is well suited to situations in which multiple patients with COVID-19, whose care requires use of a respirator, are cohorted (e.g., housed on the same hospital unit). Limited re-use of N95 respirators when caring for patients with COVID-19 might become necessary. However, it is unknown what the potential contribution of contact transmission is for SARS-CoV-2, and caution should be used. Re-use should be implemented according to CDC guidance available at <https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/contingency-capacity-strategies.html>²⁶ **Recommendation:** When putting on a new mask/respirator, even if it is a type of size and shape that fitted last time, recheck "sealability" not only in a neutral head position, but also in positions that you would take when actually scanning a patient, for example, by turning your head to the side or tilting your chin up to face the monitor, or during use of two hands to hold a transducer or other devices.

***Basseal JM, Westerway SC, Hyett JA. Analysis of the integrity of ultrasound probe covers used for transvaginal examinations. *Infect Dis Health*. 2019 Dec 17. pii: S2468-0451(19)30102-6. doi: 10.1016/j.idh.2019.11.003.²⁵

APPENDICES

APPENDIX 1: SNAPSHOT OF HAZARD REDUCTION GLOBALLY

(based on feedback from a number of units in each territory but not intended as a comprehensive guide)

	Europe (UK, Italy)	Scandinavia (Sweden, Norway)	Southeast Asia (Singapore, Hong Kong)	Australia/New Zealand	North America
Before the scan	Screen patients using standardized checklists for symptoms and risk factors. If patients have symptoms we postpone a non essential examination	Screen patients using standardized checklists for symptoms and risk factors. If patients have symptoms we postpone a non essential examination	Screen patients using standardized checklists for symptoms and risk factors. If patients have symptoms we postpone a non essential examination	Screen patients using standardized checklists for symptoms and risk factors. If patients have symptoms we postpone a non essential examination	Prioritize examinations (emergency versus routine or essential versus non-essential). Patients are interviewed on the phone before arrival
Risk reduction in the scan	Accompanying persons limited to one or no persons are allowed	no accompanying persons are allowed	No accompanying persons are allowed or the accompanying person undergoes the same screening procedure as described above	One accompanying person in Singapore – the accompanying person subjected to the same screening criteria as patients In other territories, no accompanying persons are allowed	There should be no visitors in the room with the patient during the ultrasound examination unless they are essential to patient care (mobility, language). During the pandemic, it is also reasonable not to allow trainees or students to participate.

<p>PPE</p>	<p>for screen negative women masks and/or gloves are not used during ultrasound examinations</p> <p>Appropriate PPE as for suspected or confirmed COVID-19 infection</p>	<p>for screen negative women masks and/or gloves are not used during ultrasound examinations</p> <p>Appropriate PPE as for suspected or confirmed COVID-19 infection</p>	<p>For screen negative women surgical facemasks and/or gloves are used during ultrasound examinations</p> <p>Appropriate PPE as for suspected or confirmed COVID-19 infection</p>	<p>For screen negative women surgical facemasks and gloves are used during ultrasound examination</p> <p>Appropriate PPE as for suspected or confirmed COVID-19 infection</p>	<p>Surgical facemasks are essential to offer protection. These must be put on before entry into the patient room or care area. When available, N95 (or higher level) should be used instead of a facemask when performing or present for an aerosol generating procedure (AGP), particularly in the intensive care unit.</p>
<p>Other measures</p>		<p>In many Scandinavian countries there is shortage of PPE, especially P3 and P2 masks, and we are advised to save PPE for the large wave of expected COVID 19 patients to arrive.</p>	<p>Surgical facemask, respirators, eye protection (extended use)</p> <p>Gloves and gowns (single use)</p>	<p>Surgical facemask, respirators, eye protection (extended use)</p> <p>Gloves and gowns (single use)</p>	

APPENDIX 2 ULTRASOUND: THE EXPERIENCE FROM WUHAN

In China, a medical specialty exists of ‘Ultrasound Doctor’. These doctors see many patients per day and perform only ultrasound. The comparison to practice outside China is transferable to the extent that the findings might apply to any doctor or imaging practitioner – for example sonographers or midwives – whose work is largely ultrasound based.

Based on a study by Xie and his team at the epicenter in Wuhan, the ultrasound staff infection rate is approximately 3.4%, which appears considerably higher than an estimated overall infection rate of 2.2% among Wuhan healthcare workers regardless their specialties (see table below).

The Wuhan overall numbers are subject to further verification. This is because no official update on staff infection figures is currently available and because the total healthcare workers’ number on Wuhan Health Commission official website was last updated in 2017. There were also certain specialties [e.g., rehabilitation] who might be considerably less active than certain other teams [e.g., respiratory, cardiovascular, radiology including ultrasound departments] during the lockdown.

The reported zero infection rate among such a large rescue team in the very frontline emphasizes the importance of sufficient PPE provision and donning-doffing training. However, the nurse that suffered a cardiac arrest and its critical consequence highlights PPE’s possible though rare adverse impact on well-being, and a time limit for how long someone should stay inside while doing how intensive work should be carefully considered.

Table: Preliminary comparison of COVID-19 infection rate between ultrasound staff and other groups

Staff Groups	Wuhan ultrasound workforce*	Wuhan overall medics†	Rescue medics from the rest of China‡
Infection rate % (No. of infected / No. of total staff)	3.4% (43 / 1252)	2.2% (3,000 / 136,300)	0.0% (0 / 42,600)
<p>*Wang J, Zhang W, Chen QC, You MJ, Yang YL, Lü Q, Zhang L, Xie MX. [Ultrasound staff infections in Wuhan during the COVID-19 epidemic (in Chinese)]. Chinese Journal of Ultrasonography [accepted for publication in 2020;29].</p> <p>† estimates as no detailed figures have been released</p> <p>‡ although zero reported staff COVID-19 infection, one of the medics suffered a cardiac arrest believed to be caused by wearing 3rd degree PPE for too long. The nurse is still on external cardiopulmonary support at the time of writing</p>			

APPENDIX 3: COMPARISON OF MASKS AND RESPIRATORS

	Surgical mask	FFP2 or N95 respirator	FFP3 or N99 respirator	Powered Air Purifier Respirator (PAPR)
Testing and approval	Cleared by FDA	NIOSH as per requirements stated in 42 CFR Part 84 or European Standard EN 149	NIOSH as per requirements stated in 42 CFR Part 84 or European Standard EN 149	NIOSH as per requirements stated in 42 CFR Part 84
Intended use and purpose	Fluid resistant and provides wearer protection against large droplets, splashes or sprays of bodily or other hazardous fluids. Protects others from the wearer’s respiratory emissions	Reduces wearer’s exposure to particles including small particle aerosols and large droplets (only non-oil aerosols)	Reduces wearer’s exposure to particles including small particle aerosols and large droplets (only non-oil aerosols)	Used to protect against gases, vapors, or particles, if equipped with the appropriate cartridge, canister or filter
Face seal fit	Loose fitting	Tight fitting	Tight fitting	Loose- and tight-fitting options available
Fit testing requirement	No	Yes	Yes	Loose fitting PAPR does not require fit testing and can be used with facial hair Tight fitting PAPR requires fit testing
User seal check requirement	No	Yes. Required each time the respirator is donned	Yes. Required each time the respirator is donned	Yes. Required each time the respirator is donned
Filtration	Does not provide the wearer with reliable level of protection from inhaling smaller airborne particles and is not considered respiratory protection	Filters out at least 95% of airborne particles including large and small particles	Filters out at least 99% of airborne particles including large and small particles	PAPRs equipped with high efficiency particulate air (HEPA) filters provide 99.9% filtration of airborne particles
Assigned protection factor (APF)	NA	10	20	25
Leakage	Leakage occurs around the edge of the mask when user inhales	When properly fitted and donned, minimal leakage occurs around the edges of the respirator when user inhales	When properly fitted and donned, minimal leakage occurs around the edges of the respirator when user inhales	When properly fitted and donned, minimal leakage occurs around the edges of the respirator when user inhales

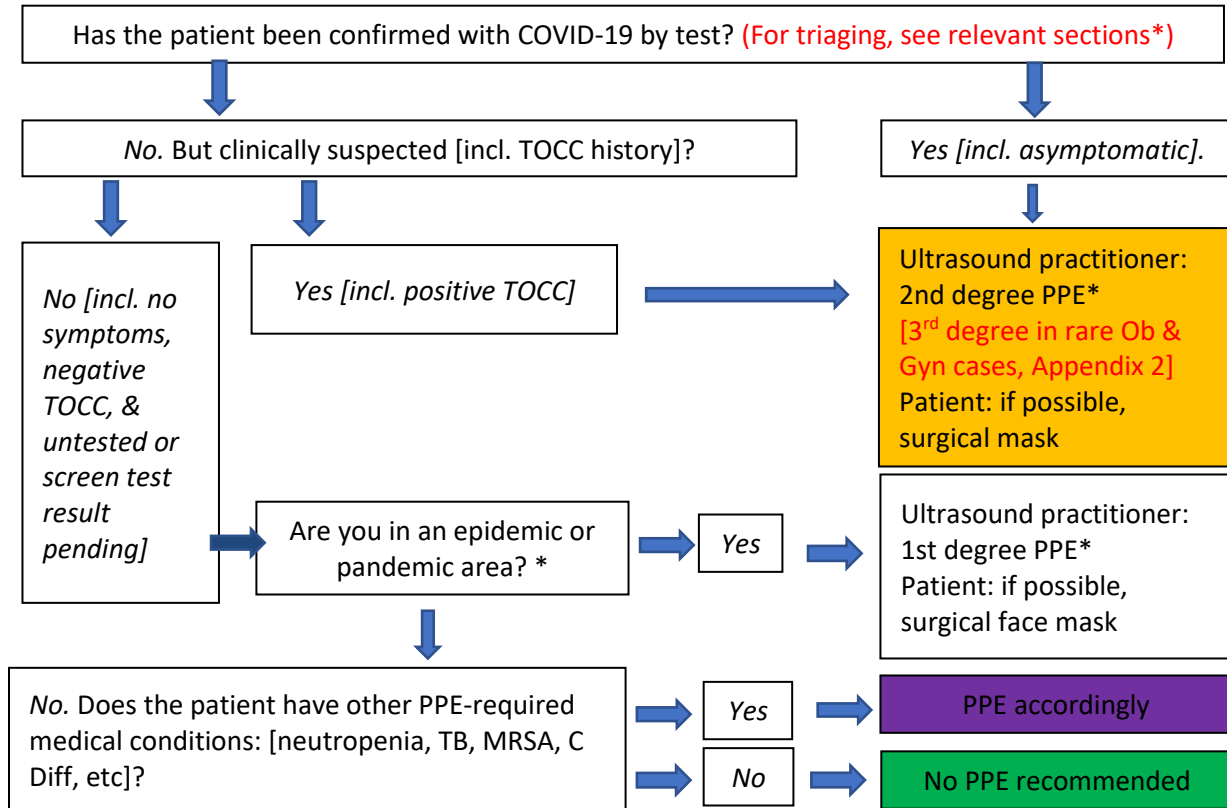
Use limitations	Disposable. Discard after each patient encounter	Ideally, should be discarded after each patient encounter and after aerosol-generating procedures. It should also be discarded when it becomes damaged or deformed, no longer forms an effective seal to the face, becomes wet or visibly dirty, breathing becomes difficult, or if it becomes contaminated with bodily fluids. Can be used up to 8 hours, continuously or limited reuse.	Ideally, should be discarded after each patient encounter and after aerosol-generating procedures. It should also be discarded when it becomes damaged or deformed, no longer forms an effective seal to the face, becomes wet or visibly dirty, breathing becomes difficult, or if it becomes contaminated with bodily fluids. Can be used up to 8 hours, continuously or limited reuse.	Reusable and must be cleaned/ disinfected and stored between each patient interaction. Dispose of filters/ cartridges after service life has expired. Some head pieces
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References:

<https://www.cdc.gov/niosh/npptl/Respiratory-Protection-Week-2019.html>

APPENDIX 4: PPE REFERENCE CHART

A quick guide to PPE selection before starting or during booking an ultrasound scan



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- Refer to local, national, and/or WHO declaration to determine if you are in an epidemic or pandemic area.
- See **Appendix Error! Reference source not found.2** for 1st, 2nd and 3rd degrees of protection. During a pandemic/epidemic facing potential PPE depletion, lower grade PPE may be used as a substitute at local authorities' or operators' own discretion.
- Valve [or exhalation valve, also called vent] on some face masks/respirators helps the user to exhale. Hence, a person [medic or patient] with confirmed or suspected COVID-19- [or any airborne infection] should only wear face masks WITHOUT any valve. In areas with a highly likelihood of SARS-CoV-2 contamination, such as on a COVID-19 ward /hospital, even a healthy person should NOT wear a face mask with

APPENDIX 5: Categorization of PPE protection

Degree	Comments	PPE
1 st	<i>'default' for most ultrasound patients during epidemic</i>	Fluid-resistant plastic apron and surgical mask*, one layer of surgical gloves
2 nd	<i>For suspected and confirmed cases</i>	Fluid-resistant full isolation gown and cap, apron beneath gown, eye shields or face visors, N95 or FFP2 respirator†, two layers of surgical gloves,
3 rd	<i>Very rare in obstetric and gynaecological practice</i>	Coverall‡, full-face visors, N95 / FFP2 respirator†, two layers of surgical gloves. When performing AGP, upgrade <ul style="list-style-type: none"> • coverall to anti-jet type, such as Type 3B or at least Type 4B [anti-spray]; • face visors to tight-fit, anti-splash Goggles without vent; • respirators to N99† / FFP3†

* EU: EN14683, China: YY0469-2010/2011 certified or equivalent or higher grades. The fluid-resistant surgical mask cannot filter airborne SARS-CoV-2 themselves, but certain droplets [which may contain the virus].

† EU: EN149, USA: NIOSH, China: KN95 GB19083-2010 certified or equivalent or higher grades. Lower grades are insufficient to filter viruses.

‡ EU: EN14126, USA: ASTM F1671-97a, China: GB19082-2009 certified or equivalent or higher Coverall Type 3[B], 4[B], 5[B] or 6[B]. "B" stands for anti-bio-agents. Types without "B" are only for anti-chemical agents.

N.B.: Lower grade PPE should only be used at your local hospital or clinics' or your own discretion when no alternative supply available [often experienced during a pandemic/epidemic]. Ultrasound providers at higher risk for developing severe COVID-19 should be excluded from the procedure.

References:

<https://www.cdc.gov/niosh/npptl/topics/protectiveclothing/>

https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/default.html

https://www.cdc.gov/niosh/npptl/pdfs/QUADCharts/93905MG_Portnoff_L_ViralPenetration_FY17QC-508.pdf

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