

**First aid during Covid-19. Protecting both the rescuer and
rescuer.**

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First aid during Covid-19. Protecting both the rescuer and rescuee.

Workers spend more than one third of their lifetime in the workplace [1], but non-workers also spend a significant amount of their free time in workplaces. Consequently, acute health events requiring urgent intervention may occur in that environment. A significant percentage (0.3–4.7%) of all sudden out-of-hospital cardiac arrests [2] (a leading cause of death globally with an incidence of 55 per 100,000 adults per annum [3]) occur in the workplace. Other emergencies resulting from traumatic events involving workers, customers, and the general public, require effective cardiopulmonary resuscitation (CPR). Drowning, which is responsible for 7% of all deaths related to traumatic events and therefore the third leading global cause of death from accidents, is a significant risk in swimming pools and spas. Globally, the annual estimate of deaths due to drowning is 372,000, but this figure may underestimate the extent of the phenomenon [4]. This public health issue would certainly be much greater without effective first aid which is not only a moral duty for every worker, but also has practical implications for occupational stakeholders and society at large. In compliance with Article 16 (1) of Directive 89/391/EEC, employers must appoint trained first aiders to ensure first aid intervention, firefighting, and the evacuation of workers. The resumption of activities after lockdown calls for a revision of effective workplace first aid.

Although first aid in workplaces is well organized throughout Europe, it has become more challenging due to the ongoing COVID-19 pandemic, since the virus poses a serious risk of infection to both rescuee and rescuer. During first aid, rescuer and rescuee come into close contact many times, especially during CPR. Mouth-to-mouth resuscitation undoubtedly poses the greatest risk of infection. However, performing chest compressions also generates aerosols by passive ventilation [5]. The protection provided by facial shields/visors and Laerdal-type pocket masks with one-way filtered valve does not effectively guarantee the safety of both the rescuer and the rescuee.

The Covid-19 outbreak has made it necessary to review risk assessments and to reconfigure occupational first aid services. Since regional difficulties and emergency situations may lead to a shortage of protective equipment and trained operators, staff must be properly trained and ready to deal with the challenges posed by the pandemic. During teaching sessions, social distancing must be maintained between a limited number

of participants; students must have appropriate personal protective equipment (PPE); hand-sanitizers and sanitizing products for the cleansing and disinfection of surfaces must be available as well as low-cost dedicated manikins that can be sanitized before and after use by each student. Automated External Defibrillator (AED) training devices must also be sanitized. Careful resource management can overcome these problems, but it is more difficult to implement effective safety procedures designed to eliminate the biological risk for the rescuee and the rescuer. The risk posed by mouth-to-mouth resuscitation and uncertainty over effective control could lead some workers to refuse to perform CPR or, should the latter be infected, to blame their employers for failing to adequately control the risk. The guidelines for first aid and CPR should therefore be modified to include additional risk control measures and recommendations.

Avoiding transmission of infectious diseases during mouth-to-mouth resuscitation is a problem that was addressed prior to the current pandemic: if the victim was infected by HIV, tuberculosis, hepatitis B or SARS, the 2015 European Resuscitation Council (ERC) guidelines recommended rescuers to use a Laerdal-type disposable face shield with a low-resistance filter one-way filtered valve. However, the Covid-19 pandemic has prompted international and national organizations to update their guidelines.

If victims are suspected of having contracted Covid-19, the updated American Heart Association (AHA) guidelines recommend lay rescuers to perform only chest compression with possible defibrillation in adults, and to carry out full traditional CPR procedure only in children who are at high risk of respiratory failure. Whichever procedure is chosen, the AHA recommends both the lay rescuer and the rescuee to wear a surgical mask or a strip of cloth, covering the nose and the mouth [6]. Visor eye protection is not taken into consideration.

The Australian and New Zealand Committee on Resuscitation (ANZCOR) recommendations released on April 3, 2020 suggest that during the current Covid-19 pandemic, lay rescuers practise only chest compressions and public-access defibrillation. However, lay rescuers who are willing and highly skilled can provide rescue breathing to infants and children in addition to chest compressions after adhering to standard precautions and safety procedures for hand washing, cleansing, and decontamination [7].

The guidelines of the International Liaison Committee on Resuscitation (ILCOR), updated on April 10th, 2020, recommend mouth-to-nose-and-mouth ventilation for children (<8 years) if the rescuer is sufficiently skilled and willing to accept the risk [5].

On April 24, 2020, the European Resuscitation Council (ERC) published specific recommendations on this issue (ERC, 2020), which were then followed by national guidelines released by the UK and Italian Resuscitation Councils.

The ERC guidelines set out a highly detailed CPR procedure for lay rescuers in the case of suspected or confirmed COVID-19 adult victims. Resuscitation is to be carried out by rescuers wearing filtering face masks (FFP2 or FFP3) and disposable gloves via chest compressions only and without performing breathing manoeuvres. The rescuer is to cover the nose and mouth of the victim with a surgical mask (or a strip of cloth), before performing chest compression.

During the pandemic, the ERC suggests treating every victim as if he/she were potentially infected by Covid-19. Therefore, if the casualty is responsive and able to provide selfcare, the ERC suggests providing first aid advice from a safe social distance (2m). Moreover, appropriate PPE (i.e., gloves, FFP2 or FFP3 mask and visor eye protection) should be worn and the casualty should wear a surgical mask. The rescuer should call for specialist healthcare assistance and wear his/her own PPE. Direct assistance should be provided only if absolutely necessary (e.g., in case of haemorrhage, applying a dressing, use of an adrenaline auto-injector, assessing for responsiveness and positioning of a victim), in order to limit the exposure time of rescuers and casualties.

In Italy, the IRC has adopted the ERC pandemic protocol and has suggested that in some workplaces, such as swimming pools, professional rescuers (bathing assistants) wear PPE (e.g., facial masks, goggles, gloves), remove all unprotected bystanders, and use the mask-ball with high-efficiency filter placed between the mask and the ball [9].

Employers must provide biosafety training for rescuers and supply the necessary PPE, i.e. a first aid kit that includes disposable gloves (in compliance with EN ISO 374-5 standard), hydroalcoholic hand cleaning gel and filter masks. FFP masks must be made of filter material, cover the nose and mouth, and possibly also the chin (semi-mask). The European FFP2 approved masks are able to filter at least 94% of the particles suspended in

the air, whereas FFP3 masks have a filtering capacity of at least 99%. They roughly correspond to the USA approved N95 and N99 masks. However, in the US, as in Europe, the approval criteria for these masks do not refer specifically to protection against biological agents. Since the 'minimal infective dose' of the virus responsible for COVID-19 is unknown, in cases of SARS-CoV-2 infection we suggest adopting a 'precautionary principle' approach and using FFP2 or FFP3 masks.

The choice of the type of mask, and therefore of the level of protection, might nevertheless be less important than the ability to use the masks correctly. The protection offered by FFPs is greater when the subject has passed fit testing. To be effective, masks must be worn and removed correctly, but the risk of infection can never be eliminated. Experience with SARS has shown that for biological diseases in which a highly limited number of particles may be sufficient for infection, all types of mask may be inadequate and some workers may therefore become infected even if they use the respirators properly [10]. The best strategy to limit infection is to give clear instructions and guidance and ensure their enforcement. Educational efforts should focus on proper training, reinforcing hand hygiene, implementing the fit testing and seal checking of respirators, and the safe removal of PPE.

In conclusion, since SARS-CoV-2 is a highly transmissible virus, and adherence to the international and European recommendations reduces the risk for rescuer and rescuee but does not eliminate it completely, prevention must reduce this risk to the lowest level reasonably achievable. The first aider must be informed of all potential hazards, must be aware of the risk of virus transmission and must receive PPE. These protective measures are mandatory for all employers. The first aider must however accept the residual risk. In the Gospel, the Good Samaritan stops to give assistance to a stranger in a place infested with criminals. Two thousand years later, rescue remains an altruistic and intrinsically risky gesture for both the rescuer and rescuee.

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