

## Commentary

# COVID-19 Outbreak in Italy: Protecting Worker Health and the Response of the Italian Industrial Hygienists Association

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## Abstract

The number of people infected with severe acute respiratory syndrome—coronavirus 2 (SARS-CoV-2), i.e. the virus causing coronavirus disease (COVID-19), is dramatically increasing worldwide to the size of a pandemic. At the time of writing Italy is ranking first among countries both in terms of number of COVID-19 confirmed cases and in terms of number of deaths. Such a wide spread of COVID-19 has led to concern among workers who are facing the risk of becoming infected during the execution of their duties. We believe it is useful to remark on the need for professional expertise in the field of Occupational Hygiene in this emergency context, in which the indications provided by national and international bodies, the available scientific literature and the legal provisions are constantly and rapidly evolving. It is of fundamental importance that there is an effective analysis of expert inputs, to provide essential guidance to Health, Safety and Environmental managers and other prevention managers in workplaces. In this regard, not only a constant update of the regulatory framework is needed, but also a development and circulation of operational guidance to all the stakeholders to translate general indications into clear operating procedures and implementation tools to be adopted in the workplaces. We believe that the scientific associations in the field of Occupational Hygiene play a crucial role in guiding and assisting prevention professionals. There is considerable expertise in the occupational hygiene and exposure science communities that can help employers and workers to contain and delay the spread of COVID-19. For this reason, the Italian Association of Industrial Hygienists (AIDII—Associazione Italiana degli Igienisti Industriali) published documents containing operational guidelines to provide correct and constantly updated information for: (i) workers employed in essential activities (with low and medium risk of contagion), (ii) health workers and other workers at high or very high risk of contagion, and (iii) for the correct use and handling of personal protective equipment for workers and for the population in general. It is worth pointing out that the documents produced are not intended to replace those produced by authoritative bodies, but to comply with and complete them by

reporting an effective summary and further indications about the measures that should be taken in practice under the light of the Italian legislation. At present, the challenge is to produce scientifically sound knowledge, appropriate tools, and effective methodologies, by coordinating the initiatives of different scientific associations, with the final aim to effectively transfer them to employers and workers.

**Keywords:** COVID-19; occupational health; occupational hygiene; SARS-CoV-2; workers' health

The number of people infected with severe acute respiratory syndrome—coronavirus 2 (SARS-CoV-2), i.e. the virus causing coronavirus disease (COVID-19), is dramatically increasing worldwide since it was first identified and described in China on 31 December 2019 (WHO, 2020a), reaching therefore the size of a Public Health Emergency of International Concern (WHO, 2020b) and then of a pandemic (WHO, 2020c). At the time of writing (29 March 2020), the total global number of COVID-19 cases has surpassed 570 000 (>26 000 deaths). Italy ranks first both in terms of number of COVID-19 cases (86 498) and number of deaths (9136) (WHO, 2020d). [At the time of reviewing the manuscript (7 April 2020) the total global number of COVID-19 cases has surpassed 1 200 000 (>67 000 deaths) and Italy ranks third in terms of number of COVID-19 cases (128 948) and first for number of deaths (15 889) (WHO, 2020e).] In Italy, the first person-to-person transmission was reported on 21 February 2020; since then, legal measures regarding the COVID-19 emergency have been issued by the Italian Government, Civil Protection Department, Health Minister, the 'Istituto Superiore di Sanità' (National Institute of Health) other Ministries and Regional Governments. The list of these legal measures is continuously updated and is available at [Presidenza del Consiglio dei Ministri—Dipartimento della Protezione Civile \(2020a\)](#) and the chronology of the main steps and actions taken by the Italian Government for the containment of the COVID-19 epidemiological emergency is available at [Presidenza del Consiglio dei Ministri—Dipartimento della Protezione Civile \(2020b\)](#). These extraordinary measures initially concerned the interruption of air traffic to and from China, the organization of repatriation flights, quarantines for Italian travellers returning from China, and strict controls at international airports' arrival terminals. Later, more stringent measures have been applied (including limitation of the mobility of residents, suspension of school activities and public events, closure of commercial and non-essential production activities), initially only in the areas of the first outbreaks, and then progressively to the whole national territory. [Spina et al. \(2020\)](#) already documented the response to the COVID-19 outbreak of the Emergency Medical System of the of the area where

the outbreak occurred (i.e. metropolitan area of Milan, Lombardy Region, Italy); similar measures have been then extended to the whole national territory.

As highlighted by [Semple and Cherrie \(2020\)](#), such a wide spread of COVID-19 has led to anxiety and concern among workers who worry about becoming infected during their work, and/or infecting co-workers, customers and family members as a result. In this regard, despite the many uncertainties about how transmission of respiratory infections like COVID-19 occur within workplace settings, to date it is assumed that contagion during work activities can be lower or higher depending on several factors: e.g. the work sector; the need for close contact—less than 1 m—of people known to be or suspected of being infected; or the need for repeated or extended contact with persons known to be or suspected of being infected. Of course, the risk of infection at work adds to the risk of being infected outside the occupational context. Thus, (i) very high exposure risk jobs are those with high potential for exposure to known or suspected sources of COVID-19 during specific medical, post-mortem, or laboratory procedures (e.g. healthcare, laboratory and morgue workers performing aerosol-generating procedures); (ii) high exposure risk jobs are those with high potential for exposure to known or suspected sources of COVID-19 (i.e. healthcare delivery and support staff, medical transport and mortuary workers exposed to known or suspected COVID-19 patients); (iii) medium exposure risk jobs include those that require frequent contact with other co-workers, the general public and/or close contact with people who may be infected with SARS-CoV-2, but who are not known or suspected COVID-19 patients (e.g. schools, high-population-density work, environments, some high-volume retail settings); (iv) lower exposure risk jobs do not require contact with other co-workers, the general public, and/or frequent close contact with people known to be, or suspected of being, infected with SARS-CoV-2 ([OSHA, 2020](#)).

Thus, for work sectors in which a low or medium risk of contagion is defined, all the prevention and protection provisions established with national and regional rules and directives, valid for the general population for the purpose of limiting the spread of the virus (i.e. social

distancing, proper hands hygiene, respiratory hygiene, etc.) (WHO, 2020f) should be applied. Further, regular housekeeping practices, including routine cleaning and disinfecting of surfaces, equipment, and other elements of the work environment should be adopted. Regular cleaning with neutral detergent, followed by disinfection is recommended, using hospital disinfectants active against viruses, 0.1% sodium hypochlorite solution or a 70% ethanol solution (ECDC, 2020). For working conditions that foresee a medium risk of contagion (and in particular in cases where the practice of social distancing is not strictly applicable), the use of personal protective equipment (PPE) for the protection of the respiratory tract [such as medical–surgical masks or filter masks at least as protective as a US National Institute for Occupational Safety and Health (NIOSH)-certified N95, European Union (EU) standard FFP2, or equivalent] must also be considered.

For jobs where an occupational biological risk exists *a priori*, due to deliberate use of biological agents and/or because of the presence of biological risk inherent in the type of activity carried out (i.e. those jobs that were classified as of very high or high risk of exposure), it is advisable that the employers—with the support of professionals in the field of occupational hygiene and risk assessment—check whether in their risk assessment procedure, the prevention and protection measures already adopted are sufficiently adequate for the purpose of controlling exposure to SARS-CoV-2 and its transmission. For these types of work, further control measures are envisaged, which follow the classic hierarchy of containment/isolation of the risk factor, use of engineering measures to favour the proper ventilation of the rooms, the definition of procedural and organizational measures and the use of suitable PPE (e.g. disposable gowns and gloves, eye protection, and respiratory protection) (ECDC, 2020; Istituto Superiore di Sanità, 2020; OSHA, 2020; WHO, 2020g,h).

Concerning the use of respiratory PPE, several references invite a rational use of these resources, also considering their limited availability and the possibility for structures in need of such equipment to be in conditions of shortage and lack of supplies: thus, PPE such as FFP2 or N95 masks (or other analogous PPE with equivalent classification, such as reported in CDC, 2020a) should be used specifically and primarily by healthcare workers involved in aerosol-generating procedures (such as tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy), which, as told have been associated with an increased risk of transmission of coronavirus (ECDC, 2020; Istituto Superiore di Sanità,

2020; OSHA, 2020; WHO, 2020g,h). Regarding the use of this equipment by other categories of workers or by the general population (not occupationally exposed), the general guidelines distributed by authoritative bodies on the behaviour to be followed during the virus emergency should be primarily considered (WHO, 2020g). The utmost attention in the use and management of medical–surgical masks and respiratory PPE is recommended, also to compensate for any supply problems. In this sense, various indications have been provided for the rational use of these resources in workplaces to meet the needs of masks and PPE in conditions of limited availability, generally by suggesting priority criteria for the allocation of available resources, according to the activities to be carried out, but also suggesting the limited re-use and the extended use of PPE in certain circumstances and ensuring compliance with some rules of good practice (CDC, 2020a,b; ECDC, 2020; WHO, 2020h). Based on the information currently available, we are not aware of recognized efficacy methods that have been adequately studied to safely disinfect or sterilize disposable PPE with a facial filter. Numerous studies have been conducted showing that some efficient disinfection methods are able to make infectious agents non-viable for some models of respirators (Viscusi *et al.*, 2009, 2011; Bergman *et al.*, 2010; Fisher *et al.*, 2010, 2011; Fisher and Shaffer, 2011; Heimbuch *et al.*, 2011, 2014; Lindsley *et al.*, 2015; Mills *et al.*, 2018), although the effect of these methods on the level of degradation of the materials that constitute the PPE (and in particular on the filter itself is not known) (Bailar *et al.*, 2006) have not been determined. Individual PPE manufacturers may provide reliable recommendations on this particular issue. Disinfection methods can lead to PPE alterations which can affect the level of protection. These changes may relate to performance (e.g. filtration efficiency) or adaptability (e.g. degradation of laces, nose strap material, strap accessories) or a combination of these (e.g. metal components which, when heated, damage the filter material around to them). Finally, it should be noted that recently pilot studies have been carried out to identify treatment methods for FFP2 masks which do not damage the masks' structure, and which make it possible to re-use them under certain conditions. At present, these methodologies have not been sufficiently tested—in particular for COVID-19—and the results, although interesting, do not lead to generalizable conclusions on a large scale (RIVM, 2020).

In Italy, concerning the current shortage of medical masks and respiratory protective devices, Legislative Decree no. 9/2020 (art. 34, paragraph 3), disposes that 'in relation to the COVID-19 emergency, in accordance

with the guidelines of the World Health Organization and in accordance with current scientific evidence, it is allowed to resort to surgical masks, as a suitable device to protect health workers; masks without the CE marking can also be used after evaluation by the Istituto Superiore di Sanità'. Further, Law n. 18 (17 March 2020) also disposes the extraordinary and derogation validation of the PPE; in particular article 15 of this decree dictates extraordinary provisions for the management of the COVID-19 emergency and attributes to INAIL (the National Institute for Insurance against Accidents at Work) the function of extraordinary validation and in derogation of the PPE (the PPE affected by the provision are only those functional to mitigate the risks connected to the current COVID-19) ([Presidenza del Consiglio dei Ministri—Dipartimento della Protezione Civile, 2020a,b](#)).

However, the decision to adopt procedural measures for the rational use of PPE, involving for example prolonged use or limited re-use of PPE for the respiratory tract, should be made on a case-by-case basis by professionals managing the institution's prevention and protection programme (in accordance with the indications provided by the competent authorities), taking into account the known characteristics of the SARS-CoV-2 and some specific conditions (e.g. number of devices available, rate of use, etc.) of the considered scenario. In any case, all deviations from the standard and consolidated regulatory practice must be taken only as temporary emergency measures.

For what has been said, in addition to the scientific research topics already suggested by [Semple and Cherrie \(2020\)](#) concerning (i) the relevant importance of inhaled exposure compared with surface contamination and hand-to-peri-oral routes in the transmission of COVID-19; (ii) the efficiency of different types of PPE in reducing both inhaled and surface transmission; (iii) simple structural and behavioural changes in the workplace to be encouraged to reduce the risk of transmission, we believe it is useful to address the need for professional expertise in the field of occupational hygiene. This is urgently needed, in particular in this emergency context, since the available evidence, as well as the indications that are provided by numerous international bodies, by research groups and by the scientific literature, as well as the legal provisions are constantly and rapidly evolving, it is of fundamental importance to be able to effectively analyse and rationalize all these inputs, to provide very precise and focussed indications to Health, Safety and Environmental managers and prevention operators in workplaces, that would struggle to manage a constantly changing situation. In this regard, not only a constant

update of the regulatory situation is needed, but also the formulation and effective distribution to all the stakeholders of operational guidance, to translate general indications into actual operating procedures and implementation tools to be adopted in workplaces, in choosing the most correct protection measures to be adopted to prevent the exposure to the risk of contagion and to protect the health of the workers. The professional expertise of Occupational Hygienists will also be fundamental in the phase following the current emergency phase, once the limitations in force today will be gradually revoked and commercial and non-essential production activities will start again: at this stage it will still be necessary to guarantee adequate conditions health and safety for workers and the whole public to avoid a new spread of infections.

We believe it useful to underline the fundamental role of scientific associations in the field of occupational hygiene and prevention, which must play this fundamental role of guide for prevention professionals. For this reason, the Italian Association of Industrial Hygienists (AIDII—Associazione Italiana degli Igienisti Industriali) published documents containing operational guidelines to provide correct and constantly updated information for: (i) workers employed in essential activities (with low and medium risk of contagion), (ii) health workers and other workers at high or very high risk contagion, and (iii) for the correct use and management of PPE for workers and for the population in general. These documents are based on the systematic review of the scientific literature, but also on national and international regulations, guidelines, technical reports on the practices to be implemented to contain the risk of COVID-19 in occupational environments and healthcare facilities. These documents are regularly updated and freely accessible on the website ([www.aidii.it](http://www.aidii.it)) and the social networks of the Association and have been distributed to all its members. It is necessary to point out that the documents produced are not intended to replace those produced by authoritative bodies but intend to support them by reporting an effective summary and enhancing them. They recommend measures that are to be taken in light of the Italian legislation on the subject to prevent and protect workers' health and provide instructions for specific aspects (such as detailed procedures for correctly wearing and handling PPE). We agree with [Semple and Cherrie \(2020\)](#) that there is considerable expertise in the occupational hygiene and exposure science and professional communities that can contribute helping employers and workers to contain and delay the spread of COVID-19: the challenge is to produce appropriate knowledge, tools, and methodologies, possibly by

coordinating the initiatives of different scientific associations, and to effectively transfer them to employers and workers.

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## Conflict of interest

The authors declare they have no potential conflicts of interest in relation to this commentary.

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