COVID-19

RECOMMENDATIONS FOR THE ENTITIES THAT ARE PART OF THE INTEGRATED RURAL FIRE MANAGEMENT SYSTEM (SGIFR) REGARDING THE PREVENTION AND MITIGATION OF THE IMPACTS OF COVID-19 ON PREVENTION, SURVEILLANCE AND SUPPRESSION ACTIVITIES

AGIF
AGÊNCIA PARA A GESTÃO INTEGRADA DE FOGOS RURAIS

Front Matter

Document prepared based on recommendations from the following organisations:

- American Heart Association (AHA)
- Centers for Disease Control and Prevention (CDC)
- Portuguese Directorate-General for Health (DGS – Direção-Geral da Saúde)
- National Wildfire Coordinating Group (NWCG)
- World Health Organization (WHO)
- U.S. Fire Administration (USFA – FEMA)
- Contributions gathered at the end of April from ANEPC, GNR, ICNF and FFAA
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ACRONYMS AND GLOSSARY OF TECHNICAL TERMS

ABHS: Alcohol-based Hand Sanitizer

AF: Air Force

AFOCELCA: An incorporated joint venture of The Navigator Company and the ALTRI Group

AGIF: Agency for Integrated Rural Fire Management (Agência para a Gestão Integrada de Fogos Rurais)

AHA: American Heart Association

BSF: Forester-Firefighter Brigade (Brigadas de Sapadores Florestais)

CDC: Centers for Disease Control and Prevention

CNAF: Portuguese National Forest Agents Corps (Corpo Nacional de Agentes Florestais)

COVID-19: Disease caused by Coronavirus 2019

DGS: Portuguese Directorate-General for Health (Direção-Geral da Saúde)

EGIFR: Integrated Rural Fire Management Crews

EPRU: Portuguese Republican Guard's Emergency Preparedness and Response Unit

eSF: Forester-Firefighter Crews

FEPC: Special Civil Protection Unit of the National Emergency and Civil Protection Authority

FFAA: Armed Forces

FFP1: Disposable masks or filters that offer protection against dust and larger particles (filter at least 80% of particles up to 0.3microns), with Europe certification.

FFP2: Disposable masks or filters that offer moderate protection against dust, smaller particles, droplets, some aerosols and some microorganisms (filter at least 94% of particles up to 0.3microns), with Europe certification.

OSHA: Occupational Safety and Health Administration

PPE: Personal Protective Equipment

SARS-COV-2: Severe Acute Respiratory Syndrome Coronavirus 2

SGIFR: Integrated Rural Fire Management System

TO: Theatre of Operations

WHO: World Health Organization

EXECUTIVE SUMMARY

In the context of the ongoing COVID-19 pandemic, the organisations that are responsible for preventing and suppressing rural fires must ensure the safety of their responders and operational personnel and prevent spread of the virus, while ensuring they fulfil their mission and achieve their goals. To help the entities that are part of the Integrated Rural Fire Management System (SGIFR) implement common rules and principles, a set of recommendations have been put together to reduce the contagion risk and to mitigate possible operational impacts.

Goals

- Prepare a strategic response that is in line with operational adjustments.
- Design leadership strategies for better crew management.
- Share recommendations and good practices for risk mitigation.
- Provide guidelines that minimise operational impacts.
- Provide an operational guide (handbook).

Overview of contents:

- Individual prevention: a set of recommendations to be followed by all responders and operational personnel in their daily lives, both when on the job and at home.
    - Hygiene and respiratory etiquette, maintaining physical distance, managing stress and anxiety, proper eating habits, and body awareness.
- Organisational prevention: a set of recommendations to be followed by all organisations and in addition to their respective internal contingency plans.
    - Limiting access to facilities and maximum capacity, postponing and reorganising events, holding meetings and operational briefings in large spaces or remotely.
    - Routine temperature screening, providing conditions for frequent cleaning and disinfection, placing disinfection equipment on site, purchasing personal protective equipment.
    - Decreasing cross-contamination by scheduling longer shifts and rest time, with mandatory on-site stay during working hours.
    - Making a list of responders and operational personnel who are at higher risk, as identified by the Portuguese Directorate-

General for Health, and implementing strategies to protect those who are most vulnerable.

- Forestry and fuel management: mandatory use of a face mask, reducing the number of personnel assigned to each task, ensuring regular disinfection of vehicles and equipment.
- Surveillance, parking and patrols: regular disinfection, foot patrols, smaller crews, using new technologies (video surveillance, drones, remote detection).
- Theatres of Operation: separating individual crews (keeping them assigned to the same sector):
    - Creating suitable conditions for rest and hygiene: coordination between the Safety Officer and the Logistics Officer to establish rest areas that enable physical distancing, and the disinfection of all surfaces, gear and clothing;
    - Monitoring COVID-19 symptoms, paying particular attention to markers such as extreme fatigue or carbon monoxide poisoning. Screen and record temperatures during operations and ensure the regular disinfection of all gear;
    - Preferably distribute meals in the workplace rather than using canteens. Should such not be possible, adequately manage meal areas to ensure the recommended safety distances are observed.

- Response to suspected cases: adjustment of Orientação DGS [Guideline] 006/2020 to theatres of operation.
- Disinfection: most common disinfectants and methods of application.
- Leadership considerations: active planning, sustained operational capacity, resilience and crisis leadership, and careful operational decision-making.

Strategic adjustments to operations:

- Strategic planning for the worst case scenario that includes isolation of 10% to 25% of responders;
- Maintain a central database and keep it up-to-date by monitoring all crews (DECIR2020) and recording all screening conducted;
- Adjust the initial robust attack against fire danger weather (FWI) and damage potential;
- Increase the use of machinery in suppression operations, thereby reducing the need for ground resources to create containment lines or to monitor burned areas;
- Increase the tactical use of suppressive fire, thereby reducing the potential need for suppression crews;
- Ensure perimeter control of fires by creating a fireline cleared of vegetation, thereby reducing reignition;
- Use retardant foam mixes to reduce the number of crew required to protect population clusters and urban-rural interfaces;
- Try to station resources, particularly aerial resources, at bases reserved exclusively for special rural firefighting resources (DECIR), thereby avoiding concentrated placement and stationing at mixed-use, civil or military centres;
- Consider transporting crews using FAP aerial resources;
- Designate a person to be in charge of monitoring COVID-19 at Theatres of Operation, from level II of the SGO (Portuguese Operations Management System):
    - Identify the flow of information from this local structure to a national structure;
    - Prioritize COVID-19 testing after theatres of operation with a significant number of responders and prior to remobilization;
    - Keep updated national records of suspected and known cases, and their participation in operations;
    - Self-isolation of crews assigned to tasks with greater exposure to COVID-19 (e.g., evacuation of nursing homes).
- Identify geographical areas with greater exposure to COVID-19 and adjust resident evacuation and isolation strategies to the contagion risk.
    - Adapt "Safe Village, Safe People" protocols to reduce the risk of virus transmission as a result of the use of community shelters;

- Create protocols for the activation and integration of resources to reduce community transmission of the virus between operational crews from different parts of the country:
    - Consider the risk level, in particular that of voluntary firefighters, who might provide pre-hospital emergency services the day before being assigned to a complex TO and adapt/adjust such mobilization;
    - Define procedures for interaction at transit points, stationing and circulation in staging areas.
- Prioritize the protection of exposed persons, critical communities and infrastructures whenever perimeter control is not possible;
- Mobilize healthcare groups from the armed forces and the Portuguese Republican Guard (GNR), and private entities with technical capacity for large-scale disinfection at the theatre of operations;
- Ensure that all DECIR responders are familiar with the operational recommendations for preventing and mitigating exposure to COVID-19 set forth in this guide.

BACKGROUND

This guide summarises best practices to help prevent and mitigate the spread of the SARS-COV-2 virus and the COVID-19 disease for crews operating in rural environments and the urban-rural interface, and follows the recommendations of international biological health and safety authorities and the international best practices of entities and crews who carry out similar activities.

This guide is for Forester-Firefighter Brigades (BSF), Forester-Firefighter Crews (ESF), the Portuguese National Forest Agents Corps (CNAF), crews that perform fuel or rural fire management, such as the Portuguese Republican Guard's Emergency Preparedness and Response Unit (EPRU), guards hired by the Portuguese Republican Guard, ANEPC's Special Civil Protection Unit (FEPC), AGIF's Integrated Rural Fire Management Crews (EGIFR) and professional, volunteer and private fire brigades. This guide may also be integrated, wholly or in part, into internal COVID-19 prevention regulations to complement the existing contingency plans of each entity by other units that are part of the theatres of operation of rural fires, such as the armed forces (FFAA), voluntary civil protection organisations, AFOCELCA, and other entities.

According to the risk pyramid created by the Occupational Safety Health Administration (OSHA), personnel who have direct contact with suspected or known COVID-19 patients are at high risk of exposure. This group includes firefighters because they accumulate the provision of emergency medical services with their participation in fire suppression activities. Other SGIFR personnel fall under the medium exposure risk group, which comprises jobs that require close contact with people and frequent travel, (Occupational Safety and Health Administration, 2020).

These operational personnel, although theoretically not on the front lines (unlike, for example, healthcare professionals or diagnostic technicians), are at higher risk of community transmission than other occupations (National Wildfire Coordinating Group, 2020). Social distancing (or physical distancing, according to the WHO), therefore, is something difficult to maintain when travelling, carrying out forestry activities and fuel management or fire suppression operations. From the presence of five firefighters in an off-road vehicle to hundreds of firefighters in a theatre of operations, a single individual with SARS-COV-2 can be a link in the transmission chain that

significantly disrupts operational capabilities. These activities also have additional factors that increase the transmission of infectious diseases, such as the inability to regularly and adequately maintain hand hygiene, physical fatigue, the presence of gases and particles that irritate the lungs, the regular use of FFP1 masks to protect against particles (which do not fully protect against the virus and are impossible to wear over an FFP2 mask), among others factors (National Wildfire Coordinating Group, 2020).

The occurrence of fires makes it essential to ensure that those who prevent and fight them are shielded as much as possible from the risks of COVID-19, so as to safeguard, insofar as possible, the response capabilities of fire prevention and suppression crews.

The effects of COVID-19 on fire frequency are, for now, difficult to predict. Physical isolation could result in a marked reduction of human-caused fires, just as it could also lead to an increase in negligent and wilful behaviour to provoke the system or challenge public order.

Thus, extensive knowledge of the nature of the virus, strict hygiene practices and the disinfection of vehicles, gear and uniforms, as well as the adoption of individual self-discipline, must be observed by these crews in order to avoid a reduction in operational capacity.

The guide, or handbook, has five major goals:

- Anticipate and plan.
- Reduce community transmission of SARS-COV-2 in the course of activities undertaken by SGIFR operational crews.
- Help prepare the appropriate response of crews and entities in the event of suspected or known cases of COVID-19.
- Provide guidelines to help minimise operational impacts.

The recommendations in this guide complement the procedures defined in the contingency plans of each entity or facility, and do not replace them.

INTRODUCTION

COVID-19 is a respiratory disease caused by the SARS-COV-2 coronavirus, which is highly contagious and is rapidly transmitted from person to person (Direção-Geral da Saúde, 2020)[1].

The most common form of transmission is through droplets and aerosols from breathing, although some particles can remain in the air. The virus is spread when an infected person coughs, sneezes or blows their nose. These droplets can land on other people, clothing, objects or surfaces around them (WHO, 2020). The virus only enters the body through contact with mucous membranes, namely the mouth and nose. Touching contaminated objects or surfaces with your hands and then touching your mouth, nose or eyes can lead to infection[2].

Symptoms vary and are flu-like. COVID-19 affects people in different ways, with some people being completely asymptomatic and some appearing to have the flu, while others have severe sudden onset symptoms (Direção-Geral da Saúde, 2020). There are reports of patients with COVID-19 whose only symptom was a slight change in the sense of smell[3]. However, as a general rule, fever (which doesn't respond to conventional antipyretics), a dry and persistent cough, trouble breathing, fatigue and body aches are all symptoms of the virus. Sneezing, a runny nose and a sore throat are rare manifestations of COVID-19, but should not be considered a factor for excluding a potential suspected case (SNS24, 2020).

The most severe cases of COVID-19 include pneumonia, severe acute respiratory syndrome (SARS), respiratory failure, and associated non-respiratory complications such as renal failure, shock, arrhythmia and acute cardiac lesions. People who have recovered, but who experienced severe symptoms, have shown up to 30% loss of lung capacity (as a result of pulmonary fibrosis, or lung scarring, which is irreversible) (Wang, et al., 2020).

[1] Watch the demo video on the source and nature of the novel coronavirus at: The Novel Coronavirus (YouTube DGS).
[2] Watch the demo video at: Avoid spreading the virus (YouTube DGS).
[3] Post-viral anosmia: One of the most reported symptoms in patients with mild or moderate manifestations, affecting 30% of those infected in South Korea and 60% of those infected in Germany. There are a growing number of positive cases that report anosmia or hyposmia as the only symptom. (Hopkins & Kumar, 2020)

It should be noted that patients with underlying respiratory conditions (such as asthma or chronic obstructive pulmonary disease), cardiovascular diseases (such as hypertension) or diabetes are particularly vulnerable to the most severe manifestations, with a higher mortality rate, and are, therefore, considered a risk group (American Heart Association, 2020). Personnel with these illnesses should be especially protected and, for their safety, be granted leave or asked to self-isolate.

PROCEDURES

- Individual Prevention

One of the reasons why SARS-COV-2 is so dangerous, as opposed to other viruses, is that we have no immunity to it. Not only is it a novel virus, against which our immune system is unprepared to react, but there is no vaccine (Direção-Geral da Saúde, 2020).

The only way to prevent infection is, therefore, to avoid exposure by decontaminating the environment and surfaces, maintaining a safe distance from other people and washing our hands[4].

The procedures explained below are summarised in a handbook and in the Pocket Guide for Operational Personnel that will be distributed by each entity.

Hand Washing

Wash your hands vigorously using running water and soap for at least 20 seconds, scrubbing all surfaces of your hands (Direção-Geral da Saúde, 2020). The use of an alcohol-based hand sanitizer (ABHS) is also recommended if soap and water are not readily available. However, it should be noted that an ABHS only kills the virus superficially and does not eliminate it from your hands like soap does, which effectively separates the virus from the skin (and destroys the cell and lipid layer that makes up the virus) and the running water that removes it.

This is especially true when your hands are covered in dust, soil or grease, where the use of an ABHS is ineffective. In operational situations, when running water and soap are unavailable, you must try to reduce the amount of dirt on your hands before using an ABHS (Centers for Disease Control and Prevention, 2020).

This hand washing technique must be strictly observed to ensure that all surfaces of your hands are property washed[5].

[4] Watch the demo video at: General Recommendations (YouTube DGS).
[5] Watch the demo video at: Hand Washing Technique (YouTube DGS).

Physical Distancing

Avoid unnecessary physical contact by imposing self-disciplined physical isolation during free time. If you are unable to avoid physical contact at work, try to at least keep as much distance as you can from co-workers to reduce the likelihood of the virus spreading among a crew (U.S. Fire Administration , 2013).

Managing Stress and Anxiety

The psychological reaction of each individual to the pandemic is different, depending greatly on their emotional disposition, personality and community support. At a time when emotions such as confusion, ignorance, fear and anxiety are running high, mental well-being is of utmost importance for maintaining operational capabilities and teamwork. In the specific case of emergency responders, personnel are at increased risk of developing secondary traumatic stress[6] (Centers for Disease Control and Prevention, 2020).

In order to maintain emotional well-being, responders and operational personnel must ensure they get proper sleep and stick to daily routines, avoiding excessive exposure to social media and news (particularly unofficial sources) and instead, maintaining regular and open communication with friends, family and teammates. Individual exercise, the productive use of free time, breathing exercises and strategies for reducing aggressiveness should also be encouraged (American Heart Association, 2017). Note that not all of these suggestions will be effective in managing stress for all personnel[7].

Personnel should be taught to recognise symptoms of anxiety disorders, such as emotional fatigue, feelings of guilt, burnout[8], or a desire for isolation. If possible, access to psychological support and emotional guidance should be assured (Centers for Disease Control and Prevention, 2020).

[6] **Secondary traumatic stress,** also referred to as compassion fatigue, is a particular stress disorder in caregivers, emergency responders and environmental protection personnel resulting from empathy, experiencing the suffering of others or being faced with the inability to help, rather than from direct trauma (Greinacher, 2010).

[7] Looking after the mental health of personnel 1, Looking after the mental health of personnel 2, Looking after the mental health of personnel 3 (YouTube DGS).

[8] *Burnout*: Occupational phenomenon resulting from repeated or chronic exposure to workplace stress or anxiety that has not been successfully managed. It creates a feeling of exhaustion, mental distancing and feelings of negativism related to one's job and reduced professional efficacy (Organização Mundial de Saúde, 2019).

Eating Habits

In addition to optimal stress and rest management, maintaining healthy eating and hydration is essential during the pandemic. However, there are some obstacles to making the right food choices. Not being able to leave the house, self-isolation during free time and possible emotional stress all encourage unhealthy eating habits (Direção-Geral da Saúde, 2020).

To date, there is no scientific evidence proving the correlation between the consumption of certain foods or supplements (such as "superfoods" or "naturopathic supplements") and boosting the immune system to protect against potential infections. However, the immune system only works properly with balanced nutrition, which includes macro-nutrients (carbohydrates, proteins and lipids), water and vitamins and minerals (vitamin A, B6, B9, copper, iron and zinc, among other minerals) (Direção-Geral da Saúde, 2020).

Thus, calorie intake and nutritional recommendations made by the Portuguese Directorate-General for Health in its Integrated Strategy for the Promotion of Healthy Eating should be followed[9]. This guide includes recommendations for preparing a 14-day Isolation Food Kit, which personnel may prepare in advance in the event of self-isolation or quarantine.

The DGS also published a guide and recipe book[10] with suggestions on how to incorporate tinned food as a balanced nutritional alternative, in the event fresh food is unavailable.

Tinned food offers good nutritional quality and has a long shelf life, reducing the number of visits to supermarkets without sacrificing the quality and variety of food. Given today's processing and manufacturing methods, tinned food has lower salt content, selected fats and quality ingredients (Direção-Geral da Saúde, 2020).

Tinned fish is high in protein (which helps maintain muscle composition), essential amino acids, some vitamins and minerals, and a good polyunsaturated fatty acid profile, in particular long chain omega 3 fatty acids, which benefit cardiovascular health.

Legumes, which can be bought in tins, dried or frozen, are also recommended and are a good source of slow fibre and carbohydrates. As they also offer a good protein profile, legumes are an alternative to meat and

[9] *Nutritional Guidelines (DGS, 2020)*
[10] *Tinned food recipes, a healthy diet in isolation based on tinned fish and legumes (DGS, 2020)*

fish, both for vegans and as an alternative in the event of a shortage of fresh produce.

Eggs are a good option due to their high nutritional value and shelf life (even without refrigeration) and can be used in many different ways.

Oleaginous fruits (cashew nuts, peanuts, walnuts) are also recommended. They are great as a snack due to their extended shelf life and high nutritional density. Eating too many oleaginous fruits may lead to a higher calorie intake than desirable, but they are a good alternative to other energy-intensive snacks of low nutritional value (such as chocolates, biscuits, fried food, etc.). The only nutrient that might be lacking in your diet when following the DGS food wheel and recommendations is Vitamin D. To make up for Vitamin D deficiency, when in isolation, you must get at least twenty minutes of sun exposure every day, particularly on your face and forearms (Direção-Geral da Saúde, 2020).

It is important to note that the emergency food kits ("fighting rations") distributed to the operational entities were designed and adapted to meet the nutritional, energy and water needs of firefighters, and are a safe and suitable alternative in the first 24 hours of intervention in a theatre of operations. The responders who are given these meals should eat all the food in the kits, as the quantities are designed to meet their metabolic needs.

Body Awareness

One of the most difficult things to do is control how many times we touch our face, mouth, nose and eyes, because these actions are instinctive and reflective. This is one of the reasons why using protective equipment without proper training is ineffective, as it leads to a false sense of security instead of promoting body awareness of the surfaces we touch.

Always try to be aware of what you do with your hands. After opening a car door, for example, make sure that you don't scratch your face or touch your hair. If you wear glasses, try not to adjust them all the time. Avoid using jewellery, watches or any other accessories that might cause you to touch your hands, neck and hair (Centers for Disease Control and Prevention, 2020).

Always practise good respiratory etiquette, covering your mouth and nose when coughing or sneezing. Any tissues should be disposed of properly and immediately after use. If possible, you should also wash your hands immediately after

sneezing or coughing to prevent contamination of other surfaces (Direção-Geral da Saúde, 2020).

Given the symptoms of COVID-19, it is also important that everyone be able to recognise any variations or physical changes they may be experiencing. Feeling unwell or changes in physical health should be a warning sign to personnel, who should take more care in their behaviours and the associated risk of transmission. If you develop flu-like symptoms, even those associated with a "common cold", you must alert your supervisor, call the SNS24 healthcare helpline and follow established internal procedures.

As previously mentioned, the signs and symptoms of COVID-19 vary greatly, so self-awareness for self-diagnosis is essential to active and preventive monitoring (U.S. Fire Administration , 2013).

- Organisational Prevention

Crews must have procedures in place to prevent, mitigate and identify potential suspected cases. A single infected worker could infect all other responders and operational personnel or, at best, lead to the suspension of activities and self-isolation for fourteen days.

Because it is still unclear whether SARS-COV-2 is spread through contact with contaminated surfaces, commanders and those in charge should ensure that the appropriate risk mitigation measures are implemented (Occupational Safety and Health Administration, 2020). This video demonstrates some of the personal and organisational measures that can be implemented for crews in operational facilities[11].

Failure to follow any of these procedures will result in the responder being relieved of duty and being barred from coming to work, for public health reasons and to ensure the operational capability of the unit or crew of which they are a part (U.S. Fire Administration , 2013).

Temperature Screening

Before returning to the workplace, all personnel must check their temperature at home. If your temperature is 38 ºC or higher, you should stay at home, call the SNS24 healthcare helpline (808 24 24 24 24) and notify your superior or your organisation's occupational health officer (as per internal guidelines).

Performing random checks is also recommended during the day, with the necessary conditions being provided to do so at command centres or onsite, preferably using (non-contact) laser/infrared or ear thermometers and ensuring that the temperature measuring devices are completely cleaned between readings. Temperature readings must be taken by personnel trained to do so (to ensure reliability of the results).

The manufacturer's manual must be consulted to confirm the different reference values for each model (e.g., forehead thermometers have lower readings than ear thermometers for the same body temperature) (Healthwise, 2019). Temperature screening procedures are as follows:

[11] COVID-19 Preventive Measures (Exército Português - Portuguese Army Facebook Page)

- One person in charge of monitoring temperatures. Note that when not within the scope of occupational safety, recording temperatures is not permitted by the Portuguese Data Protection Authority (CNPD). The person in charge must wear a surgical face mask;
- Before the reading, the manufacturer's reference values for the model being used must be confirmed for the body area chosen and the instructions on how to use the device properly followed. Particular care should be taken regarding the measurement distance for forehead thermometers;
- Personnel must be called one-by-one, with the measurement taking place as far as possible, while ensuring an accurate reading is taken;
- The thermometer, even when not in direct contact or fitted with disposable sleeves, must be disinfected between each reading;
- Any reading of 38 ºC or higher stops the measurement process, which resumes only after the appropriate isolation measures of the suspected case have been taken.

Temperatures must be monitored in theatres of operation and work in rural areas, ideally during rest or meal breaks so as not to disturb operational activities and because it is the best time to measure temperatures. A thermometer should be provided for each vehicle/crew, along with protective equipment and disinfectant.
It should be noted that exposure to high temperatures and dehydration during forestry activities, in particular fire suppression operations, can easily disguise a rapid onset of fever. It is, therefore, essential to implement procedures to monitor the temperature and physical health of responders and operational personnel. Self-monitoring of symptoms is also vital.

Events

Events such as external training, simulations, festivities and parades should be postponed. Instruction, in-house training and operational training can continue, provided it is restructured so as to ensure that appropriate physical distancing is observed. Group sports should be replaced by individual physical activities and entities that have shared fitness facilities, such as gyms, must draw up a schedule that enables use of the facilities with the appropriate physical distancing, and ensure that equipment is disinfected by the users themselves and cleaning crews for that specific purpose.

Biometric devices requiring direct contact, whether finger printing, facial recognition or retinal scans should be eliminated.

For those who follow military standards, formations must be avoided or, at the very least, must ensure physical distancing between personnel (2 metres)[12].

Meetings and Operational Briefings

Where possible, meetings should be held via video conference, telephone or similar services, determining the need for face-to-face meetings and the subsequent limitation of attendees when they are unavoidable (European Centre For Disease Prevention and Control, 2020).

Operational briefings need to be adapted as they are usually held with people in close proximity.

Operational command posts should preferably be set up in infrastructures that offer wide open spaces that ensure physical distancing between responders, such as schools, auditoriums or pavilions, always taking into account the venue's availability and the size and complexity of the operations. Pay particular attention to conditions for establishing operational command capabilities, such as network coverage.

For operational command posts set up in vehicles, such as command and communications vehicles, a maximum capacity must be stipulated, barring entry to non-essential personnel, with all briefings and relaying of information being conducted outside the vehicle. In this case, it may be necessary to establish a wider perimeter to ensure privacy and keep information confidential (prevent access by the public, media outlets, and responders). Bear in mind that more than one briefing may be needed to account for physical distancing[13].

Clocking in and Clocking out

All personnel must undergo additional temperature screening when arriving onsite and before leaving. Uniforms may not be taken home. Change into and out of your uniform at work, washing your hands before and after touching it. If possible, take a shower when clocking out, before putting on civilian

[12] See example photos: Formation 10th Deployed Regiment (Exército Português - Portuguese Army Facebook Page) and NRP Figueira da Foz (Marinha Portuguesa - Portuguese Navy Facebook Page).

[13] Photos of the type of briefings that should be avoided during the pandemic (closed spaces and/or mass gatherings): Operation Pope 2017 (Twitter MAI), Great Smoky Mountains (National Park Service).

clothing. Ideally, a separate entry and exit corridor should be created, so that shift workers do not circulate in the same space.

The use of public transport for daily commuting is permitted, provided DGS recommendations are followed. However, it is advisable to provide transport for personnel, which, while not entirely adequate, is nonetheless a safer solution than sharing public transportation with dozens or hundreds of people. The use of private vehicles should be encouraged, or the clocking in and clocking out of rotating shifts limited, with 24-hour shifts followed by additional rest time.

For entities that have facilities that can be used for overnight stays, mechanisms should be put in place to meet the needs of personnel, in particular for those whose spouses are healthcare professionals or care for vulnerable people at home, thereby reducing the number of trips and potential cross-contagion.

Presence in Facilities and Work Areas

All personnel must, to the extent possible, remain on the premises, in operating areas or the work area. Visits to any other off-site facilities during working hours and especially when in uniform should be completely avoided. If needed, for example to purchase fuel or food supplies, one person should be designated to carry out such activities and will be responsible for supplies brought in, taking special care, wearing personal protective equipment and ensuring proper disinfection.

When stopping at commercial establishments in operational situations, only the designated person may leave the vehicle, to reduce cross-contamination, wearing the necessary personal protective equipment required for such purpose.

When using outdoor accommodation, in particular in overnight stays in theatres of operation, conditions for hygiene maintenance must be provided. The movement of crew members must also be monitored, ensuring the cleaning and disinfection of surfaces, especially in common areas. These procedures should be coordinated with the Safety Officer in close collaboration with the Logistics Officer, local civil protection services and other entities, such as the FFAA, who have large-scale disinfection capabilities.

Personal Protection Kits

All responders and operational personnel must be provided with individual kits for protection against COVID-19. The kits should be those recommended by the DGS, in accordance with the contingency and mitigation plans of the respective entities. At the very least, kits must contain gloves (latex or nitrile), face masks and an ABHS or other hand sanitizer. Other PPE such as gowns, protective eyewear, shoe covers and long-sleeve gloves may be included in suspected case response kits. Access to collective protection kits must also be provided (e.g., ABHS available in vehicles).

Reading and awareness-raising material should be provided on the correct use of the kits, with demonstrations of the proper procedures and an indication of when to use them, in addition to the locations for the proper disposal of PPE after use.

Uniforms and Gear

Uniforms and gear should be used according to the internal standards of each entity. However, special reference must be made to the use of face masks.

Given that masks and particle filters already form part of the personal protective equipment for natural environments (Autoridade Nacional de Protecção Nacional, 2014), albeit without mandatory certification (dust and particle filtration), these will have to be adapted to protect against COVID-19. FFP1 masks/filters are usually used for fire or forestry-related operations, as they effectively filter larger particles and have a valve that allows the exit of exhaled air for more comfort and to enable better air renewal inside the mask. Taking into account that masks with higher filtration efficiency (FFP2 or higher) imply greater breathing exertion by the operational personnel, and can quickly become intolerable in situations involving intense physical activity, they are simply not recommended to be used as filters in the PPE particle filter masks used in natural environments.

It should be noted that in low physical exertion operational activities surgical face masks always provide a higher level of protection against infectious agents and should, therefore, be preferred, where possible, in particular when dealing with suspected cases of COVID-19.

Where possible, arrangements should be made to sanitize uniforms at the workplace. If such is not possible, all the individual gear components and

uniform should be placed in a closed bag, making sure that it does not come into contact with the personal vehicle. Finally, uniforms and gear should be placed into the washing machine using disposable gloves (or washing hands immediately after handling them), following the washing instructions of the uniform and gear manufacturer. The combination of running water and soap/detergent is enough to eliminate the virus, and aggressive chemicals or excessive temperatures are not necessary, as they may even damage the uniform and gear.

Care should be taken to sanitize and dry the gear according to the manufacturer's instruction, in particular plastics and fire-retardant fabrics. Where possible, for example, general uniform components that have no special drying properties (such as t-shirts, underwear, caps, hand tools, backpacks), the gear should be dried in the open-air and in direct sunlight, to take advantage of the susceptibility of the virus to environmental conditions and ultraviolet radiation, and minimising the chance of it remaining on cold surfaces (cold temperatures supposedly help the virus survive longer, much like other coronaviruses) (Wolff, Sattar, Adegbunrin, & Tetro, 2005).

Another important recommendation is to not shake the dust off any garment or gear before cleaning and disinfecting it, preventing infectious particles from potentially spreading to other surfaces. This is particularly important when removing personal protective equipment, both natural environment PPE and biosafety PPE.

With respect to natural environment PPE, they should be removed in places where they can be sanitized afterwards. In the case of entities with changing rooms, the entire surrounding area where the PPE was removed must be disinfected. If the responder has to take the PPE home, it should be removed as close as possible to the front door (so as not to contaminate more surfaces), and be immediately placed in a closed watertight bag or in the washing machine, and all surfaces close to where the responder passed must be disinfected. If the equipment so permits, it should be washed at more than 60 ºC.

Full-body biosafety PPE hazmat suits may be put on and removed as shown in this video[14]. The equipment must be adapted according to what is available in each vehicle/entity kit, but the basic principles can be replicated.

All personal items accompanying the responder in their daily activity must also be disinfected (watch, mobile phone, among others)[15].

[14] Source: Intensive Treatment Unit, Pedro Hispano Hospital

Common Areas

Establish procedures to minimise contact between professionals using common areas.

When meals are taken in canteens, the area must be disinfected before and after meals, as well as cutlery, trays or other equipment.

If several crews and companies are present at the same place, each group must sit at separate tables, ensuring physical distancing between each person. Meals should also be scheduled in order to avoid mass gatherings. If meals are taken outdoors, everyone must wash their hands before and after lunch bags/boxes are distributed and handled. Where possible, preference should be given to packed lunches, avoiding lunch breaks during meetings, and meal left-overs must always be disposed of safely.

In the case of facilities with dormitories or rest rooms, sofas, chairs and beds should be placed 2 to 3 metres away from the walls to ensure continuous ventilation throughout the space. Furniture protective covers should be made of plastic to make regular disinfection easier.

Attention should also be drawn to the need to keep the number of people in a room to a minimum, and ensure that reduced capacity is respected. In support facilities or infrastructures, practicable distinct areas should be designated in order to minimise the risk of spread: a "dirty" zone, where people circulate using all operational gear and working clothes, and a "clean" zone, for e.g., dormitories and rest rooms, where people must only use clean clothing and clean shoes.

Disinfection measures in toilets must be increased, especially as regards door knobs or handles. If possible, additional continuous ventilation must be ensured (mechanical or natural), and air conditioning equipment must not operate in air circulation mode. As regards the theatre of operations, responders must have access to ABHS (Alcohol-based Hand Sanitizer) for washing their hands after touching toilet fixtures or to sanitize outdoor areas for the same purpose.

Disposable containers must be available in all common areas, including vehicles, for the disposal of used personal protective equipment. Ideally, all materials must be considered as equivalent to Group III of hospital waste (Direção-Geral da Saúde, 2014), that is, contaminated waste or suspected of being

▫ How to clean a mobile phone (YouTube DGS).

contaminated, which must be autoclaved, chemically disinfected, microwaved or incinerated, and afterwards can be disposed of as common waste. Assuming that any glove or mask can potentially be contaminated, the use of heavy duty plastic bags for these receptacles is recommended, as well as the abundant use of a sodium hypochlorite solution (bleach) at 1% on discarded equipment before sealing the bags.

Entities who have already contracted hospital waste management operators (e.g., fire brigades already use these services for biological hazard waste and sharp objects) should ensure that all disposable protective equipment is processed by these operators.

Forestry, Fuel Management and Post-fire Recovery

If available, use more than one vehicle to transport five responders, making sure they sit as far as possible from each other. In crews consisting of three or four responders, they should be distributed as best as possible in the vehicle. The section entitled 'Special Considerations for those in Leadership Positions' addresses the possibility of adjusting the crews, the sustainability of operations, and the mitigation mechanisms. Where more than one vehicle cannot be used to transport the personnel, they can be taken in one single vehicle provided that the use of PPE is ensured (surgical face mask), while ensuring that the vehicle is well ventilated.

Gear should, as far as possible, not be exchanged between personnel and fixed places in the vehicle should be set. In the case of shared gear, such as protection for using handheld equipment, it should be disinfected and cleaned following each use.

The use of a respiratory mask to protect against dust and smoke is also recommended during operational duties, as lesions and irritation of mucous membranes can contribute to susceptibility to the virus.
Preference should be given to FFP1[16] masks or CleanSpace-type[17] filtering devices rather than hoods or masks made of non-certified materials.

As the work is already carried out with extensive distancing due to the type of tools used, the same distancing must be ensured in other situations (such as briefings, map viewing, etc.).

[16] FFP1 masks, Image ©3M
[17] Filtering devices, Image ©CleanSpace Technology

Surveillance, Parking and Patrols

Surveillance or positioning in Strategic Parking Spaces forces responders to remain close to each in these areas for several hours without observing physical distancing (e.g., surveillance from a vehicle). These cases are not easy to solve, but possible precautionary measures should be put in place. Where applicable, more than one vehicle should be used for travels, or otherwise implement rotation within the vehicle when it is stationary in the parking area (e.g., half of the crew remains outside the vehicle, keeping a safe distance between them, changing after 30 minutes). Always ensure the frequent use of ABHS. Where practicable, foot patrols should be preferred, or manage the size of the crew, but without jeopardising operations.

Vehicles must be disinfected after each surveillance operation, as well as the gear and equipment used, such as weather stations, binoculars or maps.

Theatre of Operations

When travelling to Theatres of Operation, ensure, within the limited space available, the implementation of as many preventive measures as possible. ABHS should be available in the vehicle and its mandatory and frequent use must be encouraged; ensure that personal equipment, despite being carried in the same compartment, is somehow separated from each other (e.g., watertight and airtight covers around luggage, backpacks and loose items); avoid keeping personal items in the cabin, especially personal clothing that is not part of the PPE.

Crews must work in their designated sectors/fronts/zones so as to prevent crews from elsewhere from working closely together. Although it is not always practicable or possible to keep crews in a designated work place, it reduces the possibility of spread among crews. In large theatres of operation where crews from various places across the country gather, the chances of community spread is very high.

The rest and hygiene area, located in the Staging Area, must be organised by the Logistics Officer (Ministério da Administração Interna, 2018), so as to comply with the rules previously applicable to the facility's common areas. In this case, it is important to provide adequate toilets and rest areas, with due regard to the responders' hygiene, privacy and physical distancing. The mandatory establishment of decent logistic conditions is, in the midst of a pandemic, more essential than ever. The infrastructures must be appropriate for accommodating the responders during their rest period, with room for beds at the recommended

distances (a safety distance of at least 2 metres[18]). The facilities must be disinfected after being used by a group of responders and, when using them, the responders must only touch their personal items after cleaning themselves and disinfecting their hands, always making sure that their belongings do not encroach on the safety distances of those of their co-workers. All textile materials (such as bed linen or bath towels) must be disinfected in designated areas, and watertight bags must be given to responders to so they can put away personal items and later carry them safely.

Resting, eating and personal hygiene time must be managed so as to avoid mass gatherings of responders in a given space, setting a maximum capacity for each space and ensuring that it is respected. As fatigue may reduce the waking state and, as a result, decrease compliance with the measures for the prevention and control of the transmission of COVID-19, attention should be paid to signs of exhaustion of responders and shifts should be managed by adjusting the exertion and exposure of each crew/group/sector. As with Forestry, all shared materials in the theatres of operation must be disinfected, ensuring that each and every responder has their own equipment (such as helmets, flashlights, water bottles, etc.) to minimise exchanges and contact. As for radio equipment, care should be taken to ensure that, if possible, all responders always use the same equipment. It is also recommended that responders use certified respiratory protection, where possible, in addition to the hood.

Crew leaders should monitor the exposure of responders to environmental conditions. Prolonged exposure to smoke, intense physical exertion, dehydration and the first marker of moderate carbon monoxide poisoning causes symptoms that can disguise the onset of COVID-19 symptoms (National Wildfire Coordinating Group, 2019). Similarly, these conditions can also trigger or enhance more severe respiratory manifestations due to the irritation of mucous membranes. If symptoms persist after hydration and rest in a well ventilated and cool area, they are a potential warning sign that should be reported to the Safety Officer.

When changing crews, disinfection measures or vehicle cleaning should be provided between each time the crews are transported (carried out by the crew itself or personnel assigned to logistics for this purpose, if any). Applying a disinfectant on the inner surfaces will reduce the contagion risk.

[18] Example of a safety cordon at a field hospital (©Global Imagens)

At the end of the incident, in addition to the usual cleaning, ensure that all protection and working equipment is fully disinfected, as well as vehicles (inside and out), paying special attention to the areas touched the most, such as the driver's buttons and knobs and the pump, locks, and latches of storage compartments. Equipment such as radios, maps (which should be handled with a plastic cover to enable disinfection), GPS, or other equipment must not be overlooked.

- Response to Suspected Cases

Although a priority, isolation should always be carried out with respect and dignity for the patient, and discrimination, aggressive behaviours or blaming should not be tolerated when a suspected or positive case is identified within the crew. Isolation is an act of public health that should be followed for the good of the crew, institution and the responder's family circle.

If there is an abnormal temperature reading while the crew member is in the facilities or presents suspicious symptoms, the Contingency Plan of the entity or installation must be observed and Decontamination Procedures must be carried out (if applicable).

The care to be given to personnel in isolation while waiting for help or to be evacuated should be done by only one person equipped with specific personal protective equipment. This protective equipment should consist of at least a face mask and disposable gloves.

In the absence of a specific plan, follow Orientação DGS [Guideline] 006/2020 (Preventive, Control and Monitoring Procedures in Companies) (Direção-Geral da Saúde, 2020), in particular:

- Direct the responder to an isolation room, which should be ventilated, have no rugs or curtains, equipped with a telephone and a resting area, water and non-perishable foods, alcohol-based hand sanitizer or sanitary ethanol, disposable gloves, surgical face masks and thermometer;
- Assist the suspected case using the protective equipment, always at a safe distance of about 2 metres. Avoid unnecessary contact and do not allow excessive rotation of caregivers (one or two at most, preferably with knowledge of first aid);
- Call the SNS24 healthcare helpline, who will advise on the procedures to be followed;
- Sanitize and disinfect the places with which the suspected case came into contact;
- Identify all operational personnel who came into contact with the suspected case and send this list to the Local Health Authority.

If symptoms appear in a remote location or at the TO, implement the adapted recommendations for the isolation of the responder, report the

incident to the Sector/Operational Commander and immediately see to it that the responder is removed from the TO. Even if they turn out not to be positive for COVID-19, responders with respiratory diseases exposed to smoke and particles have a higher probability of severe symptoms and mortality, so they should be protected from additional risks (National Wildfire Coordinating Group, 2020).

Surveillance, Forestry and Fuel Management Operations:

- Isolate the suspected case in a safe place, separated from the rest of the crew, working tools and vehicles;
- If they are using an FFP1 mask or air filtering device, provide a surgical face mask;
- Ensure that the caregiver uses the personal protection kit and avoids being within close reach of the suspected case;
- Interrupt all operational activities in a safe manner (e.g., in a prescribed fire, proceed to fully suppress the flames and deal with the aftermath) in the shortest possible time;
- Contact the operational health officer responsible for the Contingency Plan or, in the absence thereof, the SNS24 healthcare helpline;
- Identify all operational personnel who have been in direct contact with the COVID-19 suspected case (e.g., sharing a vehicle), and send the list to the Local Health Authority;
- Evacuate the suspected case according to the Mitigation Plan;
- Disinfect equipment and vehicles, rendering them inoperable until they are entirely decontaminated – information given in the next sub-section.

At the Theatre of Operations:

- Isolate the suspected case in a safe place, away from any fire hazard and exposure to smoke and particles;
- If they are using an FFP1 mask or air filtering device, provide a surgical face mask;
- Ensure that the caregiver uses the personal protection kit and avoids being within close reach of the suspected case;
- Report the onset of symptoms to the immediate superior, who should inform the Safety Officer;

- Identify all operational personnel who came into contact with the suspected case and send this list to the Local Health Authority;
- Ensure the replacement of operational personnel at work, if necessary, by another crew, ensuring there is no chance of contact or contagion between crews;
- Evacuate the suspected case according to the Mitigation Plan;
- Disinfect equipment and vehicles, wherever possible and appropriate, rendering them inoperable until they are entirely decontaminated – information given in the next sub-section.

- Decontamination and Disinfection

Being a technical component of biosafety and infection prevention, the terms used to describe the cleaning of surfaces and objects are sometimes confused and used with a similar meaning.

Decontamination means cleaning a surface or object to remove contaminants, and may include microorganisms and harmful, radioactive or, in general, unwanted substances in the environment. The simple physical cleaning with a cloth and water is a decontamination technique. Decontamination or cleaning refers to, for example, the cleaning of dirt and mud from a shovel (Centers for Disease Control and Prevention, 2019).

Disinfection is a specific type of decontamination in that its purpose is to destroy microorganisms on objects using chemicals or radiation. When referring to disinfecting the hands or skin, the proper term to use is antisepsis (not to be confused with asepsis, the absence of microorganisms present). At times, sterilization is confused with disinfection, in that the former refers to the total elimination of microorganisms from an object or surface through the use of heat, pressure or ionizing radiation, whilst disinfection uses simpler methods to only reduce most colonies of microorganisms to lower levels. When reference is made to equipment that is not frequently exposed to biological contaminants or do not require the total absence of microorganisms, sterilisation is not necessary (Centers for Disease Control and Prevention, 2019).

Disinfection should be carried out after cleaning, for example, after using water and brushes on a shovel. Apply an alcohol-based solution on the handle and other frequently touched areas so that the next user does not come into contact with the virus.

Types of Disinfectants

There is a wide range of disinfectants to which SARS-COV-2 is susceptible (Kampf, Todt, Pfaender, & Steinmann, 2020), and even exposure to air and the sun can destroy it. However, it is estimated today that it can remain on the surface of some materials for up to nine days.

The disinfectants recommended herein are the most common and least expensive. Nevertheless, the crews must check the composition of other disinfectants (there are some complex mixtures that have at least one of

these components), contact their manufacturers in case of doubt with regard to their efficacy against SARS-COV-2, and consult Orientação DGS [Guideline] 014/2020.

- Sodium hypochlorite (household bleach or chlorine bleach tablets): at 1% for disinfecting objects handled regularly (2% if there are suspected cases or bodily fluids). Dilute it to 0.5% to disinfect large surfaces such as offices, dormitories, canteens or change rooms. In the case of commercial bleach, confirm the concentration on the package. When applying sodium hypochlorite always use respiratory protection as it irritates the skin and mucous membranes. Always ventilate the space after applying the product, especially if higher concentrations are used (World Health Organization, 2014);
- Ethanol (ethyl or sanitary alcohol) at 70%: if only ethanol at 96% is available, dilute it with water (ethanol at 96% evaporates too quickly to ensure disinfection, destroying only the outer lipid layer that makes up the virus and destroying the cells when used in hand disinfection) (World Health Organization, 2014). Isopropyl alcohol is also effective and, today, with the shortage of disinfectants, can be easier to find.

  E.g.: To dilute the product, multiply the final value of the desired volume by 0.729. The result obtained indicates the volume to be removed from the original solution. For example, to prepare 100 ml of ethanol at 70%, by multiplying by 0.729, we would need 72.9 ml of ethanol at 96%, adding water to top it up. To prepare 500 ml ethanol at 70%, multiplying by 0.729, we would need 364 ml of ethanol at 96%, adding water to top it up. The volumes can be rounded up (e.g., 364 ml = 400 ml), if necessary;

- Hydrogen peroxide at 35%, by vapour fumigation: to be applied directly in an ABHS with hydrogen peroxide, at a minimum concentration of 0.5%. (Centers for Disease Control and Prevention, 2019)
- Other ethyl-based (at least 70%) or isopropyl-based (at least 50%) (Centers for Disease Control and Prevention, 2019);
- UVC lights, if emitted by equipment specifically prepared and certified for disinfection and sterilisation (Centers for Disease Control and Prevention, 2019).

In addition to all visible surfaces that are usually cleaned, ensure the disinfection of the following (U.S. Fire Administration , 2013):

- Telephones, radios and mobile phones;
- Forester-firefighter equipment;
- Pump vehicle buttons and knobs;
- Inside vehicles (use alcohol so as not to damage upholstery) and exterior surfaces, such as handles and fuel hatch. Refer to the operator's manual to see which products may damage the interior plastics;
- Vehicle keys and facility keys;
- Any other equipment handled by more than one person.

This equipment should not be directly exposed to alcohol (e.g., spillage or immersion). After cleaning with a detergent, wet a cloth with the disinfectant and wipe all clean surfaces. Pay particular attention to the areas that are most exposed to droplets (radio). Although these are broad suggestions and, in general, safe for use with radios, always refer to the manufacturer's recommendations[19].

Although useful in operational scenarios, antibacterial wipes may not be an effective bactericide and should not be used in routine situations.

The frequency of disinfection should be as often as needed. Where disinfection is necessary three or four times a day, conditions must be arranged to this end. We recommend adapting disinfection to the number of users, as well as to environmental exposure[20].

For crews with training and practice in decontamination (NRBQ or similar), where possible the implementation of procedures for decontaminating equipment, uniforms and other gear is recommended after they have been in contact with people infected with COVID-19 (U.S. Fire Administration , 2013).

Although applied to structural fire PPE, the following video shows a simple equipment decontamination technique (workable in TO) using only water and detergent: On-Scene Gross Decontamination (YouTube Miami Dade Fire Rescue).

An officer must be responsible for checking cleaning frequency and efficacy to ensure that no action is overlooked. One way to ensure compliance with

[19] See examples of the cleaning guide for Sepura radios and Motorola radios (two common SIRESP equipment brands).
[20] Watch the demo video at: Surface cleaning technique (YouTube DGS).

standards is to have a register and check list for the equipment, with the dates on which disinfection was performed and the technique used.

SPECIAL CONSIDERATIONS FOR THOSE IN LEADERSHIP POSITIONS

Given the scarce scientific evidence on SARS-CoV-2 and COVID-19, this pandemic is in itself unprecedented. Protecting essential workers is critical to the safety of communities during the pandemic. In addition to the coordinated response of the health and emergency services, all other entities that are part of the Integrated Rural Fire Management System must be protected as much as possible so that they are able to carry out their assigned tasks.

Therefore, new guidelines and procedures to be adopted by the entities are expected to be issued every day/week, considered to be the "best known practices". It will be crucial to ensure that the behaviour of personnel is in line with the most recent standards, even if the recommendations issued seem to be chaotic or disorganised. Commanders and/or crew leaders must be able to raise the awareness of their operational personnel, promote good conduct and not tolerate sloppiness or downplay the importance of preventing community transmission.

- Resilience and Crisis Leadership

A strong leader in times of pandemics can be one of the driving forces to avoid demotivation, anxiety or panic in the face of uncertainty (Center for Creative Leadership, 2020). Many essential workers might be afraid to infect their families, adopting aggressive or otherwise belittling attitudes when it comes to the virus. Providing access to psychological and emotional support, and finding solutions and answers to their problems, always remaining focused on the importance of the daily tasks, can be the right approach to keeping the organisation running.

When confronted with a crisis, those in leadership positions are forced to think and act in new and sometimes uncomfortable and unfamiliar ways. Maintaining resilience – both personal and organisational[21] – is essential for

[21] **Organisational Resilience** a team's or firm's ability to maintain balance and productivity in unstable, challenging and even disaster conditions, or to quickly recover from a threat or adverse event.. It derives from the concept of physical resilience, in which an object returns to its original condition after impacts or deformations (Lengnick-Hall, 2011).

the performance of duties within the SGIFR. This applies not only to top leaders – such as directors or governing board members –, but also to immediate and intermediate heads of management, as they are in direct contact with the crews, which is important to help operational personnel remain calm.

Those in leadership positions must, therefore, be able to fulfil some general responsibilities in a crisis situation:

a) **Inform**: seek credible, official information and disseminate it to the operational personnel. Transparency is key to reducing anxiety caused by fear of the unknown, showing that the heads/leaders of crews are concerned and informed, and are ensuring tactical guidance for the good of the mission (Center for Creative Leadership, 2020);

b) **Explain**: there will be changes in the entity's or institution's objectives vis-à-vis the pandemic. Adaptations will have to be made, and there will be a period of adjustment to new working methods, new procedures and new equipment. It is essential to explain the reason for these changes so that they may be integrated and learned (Federal Emergency Management Administration, 2020);

c) **Empathise**: recognise the crew members' family and personal needs, offering practical and effective solutions for staying motivated. For example, where possible, and without jeopardising operational duties, allow the use of smartphones and remote communication for visual contact with family, even during working hours. Adjust shifts and schedules to reduce the likelihood of contagion to families, if requested by the operational personnel. Adopt strategies to promote empathy, team spirit and emotional well-being (U.S. Fire Administration, 2020).

d) **Coordinate**: articulate the work with health authorities (local and central) where required, ensuring that well-defined procedures are in place to report suspected cases or to obtain clarifications. Where these links involve the top hierarchy, ensure access to the contact details of the Liaison Officers responsible for managing pandemic events in case it is necessary to respond to complex events (Federal Emergency Management Administration, 2020);

e) **Manage expectations**: a culture of communication should be instilled in those in leadership positions in direct contact with the public so that they can manage the consequences of crew reorganisation and adjustment, explaining the impact (if any) caused by the pandemic on the performance of usual tasks. But the most important thing is to manage the expectations of crew members, helping them stay motivated even in the event of difficulties and changes in routines (e.g., using Forester-Firefighter crews and their resources to disinfect and maintain public health) (Center for Creative Leadership, 2020);

f) **Train**: reorganise operational training and drills, even adapting them to the new procedures, such as the use of protective equipment or including disinfection standards when performing operational tasks (U.S. Fire Administration, 2020);

g) **Do not negotiate**: enforce greater discipline with regard to the sanitization of all equipment, uniforms and working surfaces. Ensure that these actions are closely monitored until a routine sets in. Remind and suggest new measures to personnel, and find the best solutions to mitigate cross-transmission (e.g., showers at the end of the shift) (U.S. Fire Administration, 2020);

h) **Mobilise resources**: for those in leadership positions in charge of human resource management, identify important opportunities and capabilities within the crews, addressing shortfalls or inefficient processes, reducing the burnout effect among essential operational personnel. For example, mobilize operational and technical assistants in local councils to volunteer to disinfect their facilities and equipment (U.S. Fire Administration, 2020).

- Adjusting Operations

When the size, scope and complexity of incidents change, the entire system becomes overloaded and the situation might become critical during a pandemic. Planning during a pandemic must take into account staff availability (isolation, quarantine, illness) when events increase, and can lead to operational capacity bottlenecks and the substantial shrinking of daily crews so as to protect and safeguard personnel (U.S. Fire Administration, 2020). One of the most important measures that crew

leaders can take to protect and safeguard their operational personnel is to implement mitigation strategies. These strategies are not only important for efficiency and operational capacity, but also for the preservation of health and prevention of disease.

- **Plan**: consider the fundamental objectives and understand the crew's limitations. How much can non-essential work be cut? In case of an incident, how many staff can be hired? Is it feasible to use volunteers or to outsource?

- **Prepare**: initiate active preparatory work. Promote discussions with health authority representatives, raise the awareness of crews, and take stock of resources and protective gear (which are often non-existent due to their specificity).

- **Implement**: ensure that mitigation and contingency plans are in place. Make the necessary changes as and when the official information is communicated. Ensure that all team missions can be fulfilled.

- Sustainability

Try to make plans for the middle and long term. Crew leaders should be able to plan and manage their crews in three situations:

a) When the entire crew is quarantined for 15 days, separating the crew members, providing them with water, food and access to toilets in the facilities, or finding alternatives for safe transportation home;
b) When the crew is quarantine during the mission, devise solutions that do not affect operations;
c) When one or more crew members are isolated during critical periods, learn how to manage the operational activity in this situation. Agree on solutions with the entities under which the operational personnel work. (e.g., City Council or ICNF).

Most importantly, do not assume that the work will be the same as in any other year. Without an accurate estimate of the virus progression curve, the sustainability of SGIFR entities must be ensured during times when a greater volume of work is expected. These decisions can be made at higher

institutional level, but crew leaders are also expected to help maintain crew sustainability.

It may be necessary to redefine what "essential" work and "team mission" is. It is up to those in leadership positions to define the strategies to be implemented, but the work of crew leaders is no less important, as they will have to correctly transmit and manage the crews' expectations and needs in view of the ongoing institutional turmoil.

Plans should take into consideration a sudden increase of staff absenteeism as a result of these times of uncertainty and fear of potential contagion, family concerns and high level of emotional stress. The organisational structure must be prepared to cope with this labour shortage (Occupational Safety and Health Administration, 2020).

It is also necessary to take into account the disruption in supply patterns, not only of personal protective equipment, but of the entire commercial supply. As all other services will be affected by the pandemic, logistics autonomy and sustainability must be ensured. The potential impacts of the pandemic on the global and national economy could also lead to price hikes and shortages of some goods, and this should be provided for and ensured (Occupational Safety and Health Administration, 2020).

- Operational Decision-making and Mitigation

The dedicated technical support capacity of the health authorities should be considered in the operational decision-making process. This support should be provided in loco in complex events, or reach level III or higher of the SGO (Portuguese Operations management System).

To this end, the recommendation is to establish a liaison between the OCP Safety Officer, in close articulation with the Logistics Officer and/or Medical Emergency Technical Centre (Operations Unit), and the Local Health Authority, working together to establish the best conditions for decision-making monitoring and support in the TO. (U.S. Fire Administration , 2013).

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