

▶ **Work at the Sharp End:**
Human factors/ergonomics for protecting healthcare workers and patients



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Human Factors/Ergonomics (HF/E) is an essential discipline and approach for the management of work during crisis situations such as the COVID-19 pandemic.

HF/E, the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, is also the profession that applies theory, principles, data, and methods to the design of work in order to optimize human well-being and overall system performance. Consideration of the science and profession of HF/E is critical to supporting the healthcare system – and especially for supporting and protecting the clinicians at the ‘sharp end’ of the system whose work involves direct interactions with patients as well as the patients themselves. High exposure jobs, such as healthcare delivery and support staff (e.g., doctors, nurses, and other hospital staff) who must enter patients’ rooms and medical

transport workers (e.g., ambulance vehicle operators) who move known or suspected COVID-19 patients in enclosed vehicles (OSHA 3990-03 2020), require special HF/E protections to be provided by governments, employers, and worker organizations.

HF/E strategies for ensuring protection of healthcare workers’ safety will also protect the patients they serve. Both healthcare workers and patients are part of a work system that includes humans interacting with tools and technologies in a physical and psychosocial organizational environment as well as an external environment, under specific organizational conditions. Each component of the work system impacts the other components. The current COVID-19 situation creates a hazardous environment (inside as well as external to the organization) that can negatively impact the humans that are working or being cared for within it. Management of organizational conditions at all levels according to HF/E strategies can mitigate this negative impact.

▶ **Healthcare workers - at the sharp end**

INFORMATION SHARING

Situational awareness and shared mental models are basic HF/E requirements for effective teamwork in healthcare as well as in other domains. Clear and timely information is essential for comprehensive situational awareness and accurate shared mental models among doctors, nurses, other hospital staff, and patients, as well as for fostering trust among workers and between staff and patients. Disseminating information is critical to building shared

mental models for collective sensemaking. Team handoffs, briefings, and debriefings are important vehicles for information sharing and for confirming that information has been conveyed correctly. Explicit information sharing is challenging but crucial during this health crisis in order to compensate for the lack of exchange of implicit knowledge through nonverbal communication because of the extensive use of Personal Protective Equipment (PPE).

STRUCTURED/STANDARDIZED PROCESSES

Structured checklists and standardized procedures are HF/E tools to prevent missing important steps and equipment. These procedures are especially critical when workers are under stress, as stress can increase the chances of error. It is important to use simple and direct questions and to adopt a mnemonic like ABCDE to start and coordinate an action. Practices such as these will facilitate the cognitive process of recalling technical knowledge in stressful situations.

PERSONAL PROTECTIVE EQUIPMENT

Healthcare workers and clinicians on the sharp end need safe and effective personal protective equipment (PPE) that is designed according to HF/E principles and easy and comfortable to put on, to wear, and to remove. This critical resource must be managed with a centralized approach in order to ensure that everyone that needs PPE has access to it. It is essential that each hospital has specific procedures and a centralized point of distribution to manage PPE in order not to waste basic equipment that is precious and scarce during emergency situations.

Clinicians and healthcare workers also need support, training, and clear medical directions for using PPE including the correct use of PPE, and protective practices such as algorithms for the procedures for putting on and removing PPE, algorithms for the correct procedure for ventilation in Intensive Care Units, requirements for hand hygiene, etc. Simulation is a key HF/E practice to improve the correctness of PPE donning. Simulation training must also be planned to test new and risky procedures that change in real time, not only because of the dynamics of the pathology but also because of the changes in the organizational context (presence of operators with different levels of experience, availability of equipment and drugs, change in the environment design and space allocation).

PSYCHOLOGICAL SUPPORT

Clinicians at the sharp end and also healthcare operators involved at any level in the pandemic should have the possibility to access psychological support in real time and after the emergency is over. Facing an emergency is a traumatic experience and can lead to burnout and post-traumatic stress syndrome. Work organizations should organize psychological services and promote individual and team support at all levels.

RECOMMENDATIONS FOR RISK MANAGERS

Regional communities of Risk Managers play critical roles in support of high-priority activities and HF/E strategies during the COVID-19 emergency. For example, they can track reports related to the management of critical issues of the emergency in order to help provide an immediate response and to provide institutional memory to the organization. Reporting and learning systems should be made available for collecting these reports, which can also be used for the purpose of analyzing ex post critical aspects of emergency management and identifying elements for learning and improving. Timely reporting of any brand-new critical incidents and rapid sharing of learning points from them will be important as we navigate this unprecedented situation.

Clinical Risk Managers can also provide continuous updating of procedures for quality and safety systems, as well as proactive assessments of risks for patients and operators that change due to the reorganization of clinical care pathways in continuous and progressive re-modulation, and respond to the needs of operators that have to quickly revise usual working methods. Risk managers should have active involvement in training and information relating to the use of PPE and getting them on and off efficiently. They are involved in continuous monitoring of the correct application of infection prevention practices such as hand washing, infection prevention practices, and the development of strategies and tools for communication to operators, patients and citizens. Clinical risk managers can facilitate the effectiveness of coordination and communication between the frontline workers and management; they can collaborate on medical directions so that the multiple subsequent indications can be integrated and translated for real-time and real-life implementation at the frontline.

RECOMMENDATIONS AT THE LEVEL OF LOCAL COMMUNITIES

Participation, engagement, and buy-in from local and regional communities requires support from governments and effective communication from competent authorities and institutions to disseminate key messages related to basic health behavioural rules. For example, communities need information regarding hand and respiratory hygiene, social distancing, hygiene for indoor activities including how to manage waste in the case of people who test positive to COVID-19, how to use protective equipment, and a dedicated contact in the event of onset of any symptoms for a preliminary first triage. Visual alerts, such as those created by the World Health Organization (WHO), and easy-to-understand formats are essential. ILO's Encyclopedia on Occupational Safety and Health provides criteria and detailed guidelines for the design of messages and symbols based on HF/E principles for simplicity and easy recognition

The crisis will be long therefore there is a need to face today's situation with awareness and unity, with an eye to the future. For this reason, it is really important to give maximum transparency to what we are doing in the health service and maintain consistency between internal and public communications, to keep the morale of the workers high and to ensure the confidence of the population toward the medical institutions. Safety comes first, especially in times of crisis.

References

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