



Published in final edited form as:

*Hum Factors*. 2022 December ; 64(8): 1404–1411. doi:10.1177/0018720820984583.

## Evidence-based Strategies for Improving Occupational Safety and Health Among Teleworkers During and After the Coronavirus Pandemic

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### Abstract

**OBJECTIVE:** To review practical, evidence-based strategies that may be implemented to promote teleworker safety, health, and well-being during and after the Coronavirus pandemic of 2019 (COVID-19).

**BACKGROUND:** The prevalence of telework has increased due to COVID-19. The upsurge brings with it challenges, including limited face-to-face interaction with colleagues and supervisors, reduced access to ergonomics information and resources, increased social isolation, and blurred role definitions, which may adversely affect teleworker safety, health and well-being.

**METHOD:** Evidence-based strategies for improving occupational safety, health, and well-being among teleworkers were synthesized in a narrative-based review to address common challenges associated with telework considering circumstances unique to the COVID-19 pandemic.

**RESULTS:** Interventions aimed at increasing worker motivation to engage in safe and healthy behaviors via enhanced safety leadership, managing role boundaries to reduce occupational safety and health risks, and redesigning work to strengthen interpersonal interactions, interdependence, as well as workers' initiation have been supported in the literature.

**APPLICATION:** This review provides practical guidance for group-level supervisors, occupational safety and health managers, and organizational leaders responsible for promoting health and safety among employees despite challenges associated with an increase in telework.

### Keywords

Leadership; Management; Telework; Participatory Ergonomics

### Introduction

The coronavirus pandemic of 2019 (COVID-19) will likely be considered one of the defining events of the 21<sup>st</sup> century. As of November 2020, approximately 50 million cases of the disease have been reported globally, resulting in over one million deaths. The pandemic

has contributed to considerable occupational safety and health (OSH) challenges for workers in nearly all industries. The World Health Organization and the United States Occupational Safety and Health Administration have responded by developing guidance to address these challenges (United States Department of Labor; WHO, 2020). Common recommendations include promoting infection prevention and control training, providing access to resources such as personal protective equipment (PPE), and encouraging fair compensation.

In industries relying on service and knowledge workers where close personal interaction is not essential during this crisis, telework - or the practice of not commuting to a central work location - has become the prevailing approach to help prevent transmission of the disease (Belzunegui-Eraso & Erro-Garcés, 2020). Although telework may offer many advantages to working in traditional settings, OSH oversights as a consequence of the absence of face-to-face supervision, lack of access to relevant ergonomics information and technical support, increased social isolation from colleagues, and blurred boundaries between home and work inevitably affect teleworker OSH practices (Bentley et al., 2016; Carayon & Smith, 2000; Robertson, Schleifer, & Huang, 2012).

Robertson et al. (2012) developed a conceptual macroergonomics work system model that considers organizational, psychosocial, and workplace factors at the individual, group, and organizational work levels that drive teleworker OSH. At the individual level, telework creates a risk for many workers, as they are less likely to receive sufficient ergonomics training while working at home. Moreover, their homes are not outfitted with the full complement of resources needed to complete their work safely (Harrington & Walker, 2004). In particular, many workers use laptop computers and crude workstations which have been associated with non-neutral postures and increased musculoskeletal stress (Asundi, Odell, Luce, & Dennerlein, 2010; Bubric & Hedge, 2016). Regarding this challenge, management or leadership (i.e., group-level supervisors, OSH managers, and organizational leaders) plays a vital role in providing timely ergonomics support, and motivating teleworkers to practice safe and healthy behaviors at home.

Another risk at the individual level is that work and personal roles are blurred. Teleworkers tend to work longer hours at home to meet or exceed supervisors' expectations (Carayon & Smith, 2000; Lal & Dwivedi, 2010). Extended work hours with crude work stations may lead to an increase in musculoskeletal injuries, as tissue damage accumulates from working through sub-optimal conditions (Coenen et al., 2019). Thus, it is important to manage role boundaries to reduce such injuries.

Teleworkers lack consistent personal interaction with colleagues. During the COVID-19 crisis, teleworkers may further experience social isolation because most colleagues are also teleworking. The risk of social isolation calls for redesigning current practices by integrating and strengthening both relational perspective and proactive perspectives on work designs (Grant & Parker, 2009). According to Grant and Parker, relational perspectives on work design emphasize the role of interpersonal interactions and interdependence, and proactive perspectives on work design emphasize how workers take initiative to design their work. Both perspectives are consistent with the core concept of participatory ergonomics programs, which emphasize the importance of involving workers in developing

and implementing changes with the goals of improving productivity and reducing OSH risks (Burgess-Limerick, 2018).

At the group level, face-to-face interaction between employees and supervisors during the COVID-19 pandemic has become more limited. The limited communication has become a barrier to the implementation and execution of participatory ergonomics programs designed to promote the health, safety, and well-being of employees while also protecting them from workplace hazards (Burgess-Limerick, 2018; Rasmussen et al., 2017). This challenge echoes the need to redesign how tasks, roles, and contexts are structured in order to motivate teleworkers to take initiatives to participate in shaping ergonomics or other OSH programs (Grant & Parker, 2009). Limited face-to-face interaction with supervisors and team members can also lead workers to an inadequate understanding of performance expectations and role ambiguity (Bailey & Kurland, 1999; Robertson et al., 2012; Sardeshmukh, Sharma, & Golden, 2012). This may contribute to increased workload using equipment not designed with OSH in mind (Towers, Duxbury, Higgins, & Thomas, 2006). Clearly, management plays an important part in managing role boundaries and committing resources to promote OSH at home.

From the organizational perspective, the rapid restructuring of traditional work to a telework model may contribute to work policy conflicts (Pyöriä, 2011). For instance, consider activities that are traditionally conducted in person such as signing/approving documents or distributing valuable and/or protected resources. Teleworkers may be forced to decide between placing themselves at physical risk by entering the workplace to accomplish these tasks or violating work policies that prevent the transfer of sensitive information. Such situations have the potential to become more problematic when teleworkers feel pressured by supervisors to engage in immoral work practices (Fogarty & Shaw, 2010).

Another issue from the organizational perspective is that organizational technological systems may not support integration with resources typically found in a home office (e.g., laptops on an unsecure network), creating cyber security concerns that raise stress levels and increase the risk of negative health outcomes among teleworkers. Responses to such challenges focus on educating teleworkers on rapidly changing risks as well as committing resources to systems that allow safe access and integration with proprietary information sources, such as virtual networks and multifactor authentication (Murphy & Murphy, 2013).

In summary, teleworkers across industries are mutually challenged by limited face-to-face interaction and supervision, reduced access to ergonomics information and resources, and increased social isolation from colleagues as well as role ambiguity that may affect OSH outcomes. To help address these challenges, we provide a narrative review of practical strategies primarily derived from evidence-based interventions that may be implemented to promote teleworker safety, health, and well-being, particularly as it relates to ergonomics, during and after the COVID-19 pandemic. Strategies discussed include increasing motivation to engage in OSH behaviors via enhanced safety leadership, managing role boundaries to promote OSH behaviors at home, and integrating and strengthening interpersonal interactions, interdependence, as well as workers' initiation while redesigning work to the benefit of teleworkers.

## Enhance Safety Leadership

Management plays an indispensable role providing teleworkers with ergonomics guidance and motivating them to practice OSH behaviors at home. Working in environments where safety and health is valued, resources are committed, and OSH practices are prioritized by management have been shown to increase safety motivation, safety knowledge, safety compliance, safety participation, and safety climate, and to decrease accidents and injuries (Christian, Bradley, Wallace, & Burke, 2009; Clarke, 2013).

Evidence of past intervention studies provide insights to how management can motivate teleworkers to engage in desired OSH behaviors. One safety intervention program has successfully improved OSH behaviors (Reber & Wallin, 1984) by applying goal setting theory (Locke & Latham, 2002). According to Locke and Latham (2002), goals affect teleworkers' performance by providing them direction, energizing their efforts, encouraging them to persist in pursuing goals, and motivating them to take actions. It has been shown that specific, committed, and challenging goals tend to improve performance. In the OSH context, OSH-related goals direct workers' attention to desired OSH behaviors, energize workers' efforts to engage in desired OSH behaviors, and increase workers' persistence to engage in these behaviors. Through the training, supervisors learned to establish specific, challenging, and attainable goals pertaining to OSH behaviors. In addition, they learned to explain to workers why these goals are relevant to unit productivity, which compelled workers to accept and commit to these goals. Foremost, the supervisors reminded their workers each week of these goals.

Applying principles of social learning theory (Bandura, 1991), such as observing a role model's behavior and receiving verbal persuasion from managers to increase workers' self-efficacy and motivation to engage in OSH behaviors, Mullen and Kelloway (2009) designed an effective safety leadership training program for managers to improve workers' perception of safety climate. Through the training, these managers learned to engage in behaviors that reflect their concern for workers' safety and well-being, to communicate a vision of a safe and healthy workplace and act as role models by promoting and prioritizing OSH behaviors over productivity, to motivate workers to engage in OSH behaviors beyond minimum OSH standards, and to challenge workers to develop ways of improving current OSH practices and policies. These managers also learned to apply principles of goal setting theory to coach their workers to develop OSH-related knowledge and skills.

In a series of intervention studies, Kines et al. (2010), Zohar (2002), Zohar and Luria (2003), and Zohar and Polachek (2014) consistently showed the indispensable role of leaders across industries should organizations strive for improving OSH. For instance, in Zohar's (2002) leadership-based intervention, line supervisors and their immediate superiors received weekly feedback about the cumulative frequency of safety-oriented communications out of all recorded communications between line supervisors and their subordinates. This reflected their relative position pertaining to the priority of safety over other competing goals. Immediate superiors were trained to provide feedback to their line supervisors and used the frequencies of safety-oriented communications to highlight safety priority as an

explicit performance goal. Results showed significant improvements on safety climate, safety behaviors, and safety records after the intervention.

Based on evidence of the above leadership-based intervention studies, management can apply four practical and feasible strategies to motivate teleworkers to practice OSH behaviors at home. First, management can act as a role model in practicing OSH behaviors so that their teleworkers are convinced that OSH is the core vision of their units. For instance, management may engage in brief physical activities (e.g., exercise, walking), or break up sitting time with intermittent standing bouts every 30 minutes, which show evidence in reducing fatigue and musculoskeletal discomfort as well as improving work productivity (Bergouignan et al., 2016; Davis et al., 2020; Thorp, Kingwell, Owen, & Dunstan, 2014). Second, management needs to set expectations with specific, challenging, and attainable OSH goals with teleworkers, provide constant feedback and coaching about teleworkers' OSH behaviors, and monitor and reward teleworkers' OSH performance. One intervention approach that has shown benefits regarding goal clarification and updates on work progress, and that has been recommended during the COVID-19 pandemic, involves providing group development and communication training to teleworkers that are organized into virtual teams (Hertel, Geister, & Konradt, 2005; Rudolph et al., 2020). Third, management should take an active role in encouraging teleworkers to take ownership of reassessing OSH practices or policies traditionally implemented at work, and modifying and improving OSH practices applicable at home settings. Paid family leave and sick leave policies, for instance, may warrant revision to allow for more flexible schedules or temporary leave during the COVID-19 pandemic among teleworkers (Rudolph et al., 2020). Job crafting (Tims, Bakker, & Derks, 2013), such that teleworkers initiate modification of some aspects of their jobs so that their needs and abilities can be fulfilled, has also been proposed during the pandemic as a means to support workers transitioning to telework (Molino et al., 2020). Finally, management should engage in regular OSH-orientated communications with teleworkers to demonstrate their concerns and expectations for teleworkers' safety and well-being. Management may consider, for example, leaving some time before teleconference calls or electronic exchanges specifically for safety and well-being-orientated discussions. Managers should be selective with the mode of communications that they choose, however, as some forms of communication have been identified to be more effective than others are during the COVID-19 pandemic. One-on-one and small or "breakout" group meetings may be preferable to large group meetings as large group meetings may actually be less efficient due to potential functional communication issues (e.g., multiple people speaking concurrently). In addition, virtual meetings and check-ins that are perceived as too frequent and/or unnecessary may actually detract from the message (Waizenegger, McKenna, Cai, & Bendz, 2020).

## Manage Role Boundaries to Reduce OSH Risks

Intertwined roles of work and nonwork inevitably blur boundaries between work and personal life, particularly for teleworkers with infant or young children. Although teleworkers attempt to separate their work time and space from their home domain, most of them cannot disconnect completely from their mobile devices as well as emails. Thus, teleworkers often remain connected with work domain "anytime, anywhere" (Lal &

Dwivedi, 2010), which pose threats to safety and well-being such as work interference with personal lives (Derks, van Duin, Tims, & Bakker, 2015). The amount and frequency of work interference with personal life has been shown to be associated with increases in job stress as well as physical and mental health problems in a meta-analytic study (Amstad, Meier, Fasel, Elfering, & Semmer, 2011). Two recent meta-analyses have shown that family-support such that supervisors listen to workers' problems in balancing work and nonwork life, assist workers with scheduling conflicts, and ask for suggestions to facilitate balancing work and nonwork demands (Kossek, Pichler, Bodner, & Hammer, 2011; Michel, Mitchelson, Pichler, & Cullen, 2010) plays a critical role to reduce amount of work life interfering with personal life.

Two interventions designed to increase family-supportive supervisor behaviors and manage conflict of role boundaries are of interest. In the first intervention study (Hammer, Kossek, Anger, Bodner, & Zimmerman, 2011), each supervisor learned definitions and examples of family-supportive supervisor behaviors (i.e., emphasize emotional support, model healthy work-family behavior, schedule conflict resolution, and knowledge of company policies and cross-training on work skills), and role played different scenarios (e.g., a supervisor steps in to help resolve a conflict when a worker needs to come home to help a child). After the training, they set and monitored a goal of increasing six behaviors daily in the following 3–5 weeks. These behaviors included speaking with workers, asking about their family, saying something about the supervisor's family, providing positive feedback about their job performance, offering a constructive suggestion to improve their job performance, and offering ways for improving their work schedule.

In the second intervention study (Ode-Dusseau, Hammer, Crain, & Bodner, 2016), instead of role-playing as conducted in the first intervention study, supervisors generated examples of their experiences when their workers faced a dilemma resulting from work–family conflict. These supervisors then analyzed their response to these dilemmas and had to create strategies they could have utilized by following examples of four types of family-supportive supervisor behaviors (Hammer, Kossek, Yragui, Bodner, & Hanson, 2009) including: (a) supervisors act as a role model to demonstrate how to integrate and manage their own work and life boundaries; (b) supervisors provide support and express concern for their workers' experience of work interfering with life; (c) supervisors respond to workers' daily work and family needs through actions and with resources; and (d) supervisors creatively manage role boundaries by restructuring work to facilitate workers' performance on and off the job. After the training, they recorded and monitored numbers of each category of family-supportive supervisor behaviors each day for two weeks. Results of both interventions showed that family-supportive supervisor behaviors not only reduced work interfering with nonwork life but also improved workers' physical health, job satisfaction, work performance, work engagement, and commitment to organizations.

Lessons from the above intervention studies as well as meta-analytic studies offer the following practical and feasible strategies to manage teleworkers' role boundaries to proactively reduce or prevent OSH risks during and after the COVID-19 pandemic. First, management should be clear about their expectations regarding uses of mobile devices (Derks et al., 2015). Second, organizations should consider developing organizational

work-family support policies to manage role boundaries. A meta-analysis has shown that availability and use of organizational work-family support policies are associated with work interfering with family (Butts, Casper, & Yang, 2013). However, the availability of having such policies has shown a relatively small effect ( $\rho = -.08$ ). Limitations of such organizational policies can be improved by following intervention strategies (Hammer, et al., 2011; Odle-Dusseau et al., 2016). Specifically, supervisors likely enhance effects of organizational work-family support policies by engaging in family-supportive behaviors each day (Hammer et al., 2009). One family-supportive behavior managers can implement to support teleworkers during the COVID-19 pandemic includes helping teleworkers manage and resolve schedule conflicts. This may involve helping coordinate shift trading to promote work coverage when employees are sick or need time off (Sinclair et al., 2020). Another behavior that managers can employ is positive role modeling by demonstrating that they are taking care of their own health during the pandemic (Sinclair et al., 2020). For example, managers can refrain from responding to phone or email communications during off-work hours (Derks et al., 2015).

## Redesign Work

Teleworkers utilize various technologies to connect with colleagues, customers, suppliers, and so on, and may spend more time online than if they were working in a traditional office. Their home workspace has likely never been assessed or retrofitted to prevent musculoskeletal discomfort. Implementing engineering controls in the home office is likely not a feasible approach to protecting teleworker health given that teleworkers' physical workplaces are not owned by the organization. Thus, alternative strategies must be considered.

Ergonomics training has been shown to be effective for improving OSH-related behaviors (Robson et al., 2012), and reducing pain and discomfort among teleworkers (Harrington & Walker, 2004). Some PPE has shown efficacy preventing MSDs among workers who commonly use laptop, notebook, and tablet devices. In particular, some evidence supports mouse use feedback, forearm support and office workstation adjustments (Coenen et al., 2019). Equipment that facilitates standing and physical activity may also have benefits; although, more research has been recommended (Chambers, Robertson, & Baker, 2019; Commissaris et al., 2016). Davis et al. (2020) report common problems of home offices assessed during the COVID-19 pandemic and propose feasible solutions such as increasing postural variability (Davis & Kotowski, 2014) to address ergonomic concerns.

Furthermore, while teleworkers do not engage in traditional face-to-face communication with coworkers and supervisors, they may lack motivation or opportunities to take initiatives to participate in shaping ergonomics or other OSH programs. This potential impediment leads us to revisit how to redesign work by integrating motivation-focused job designs, rather than competing with, efficiency-focused job designs (Morgeson & Campion, 2002). The former emphasizes motivating features of work by designing jobs that offer more social interaction, communication, work scheduling/methods/decision-making autonomy, and the latter focuses on reducing mental overload, physical requirements, and increasing efficiency (Campion, Mumford, Morgeson, & Nahrgang, 2005). One evidence-based approach for

improving the quality of communication between teleworkers and helping them to develop coping strategies for telework-specific stressors that may arise during the COVID-19 pandemic such as social isolation involves building small teams of colleagues or “health circles” in the organization that maintain contact and exchange experiences (Konradt, Hertel, & Schmook, 2003; Konradt, Schmook, Wilm, & Hertel, 2000; Rudolph et al., 2020). Although different job design approaches aim at certain targeted outcomes, organizations should consider adopting an interdisciplinary perspective (or balance perspectives of different work designs) to consider various job design characteristics including motivational characteristics (e.g., autonomy), social characteristics (e.g., interdependence), as well as work context characteristics (e.g., ergonomics) while aiming at achieving efficiency, productivity, motivation, and well-being (Grant & Parker, 2009; Humphrey, Nahrgang, & Morgeson, 2007).

## Conclusions

The COVID-19 pandemic has led to a rapid increase in the prevalence of telework and introduced new challenges to the safety, health and well-being of workers not previously familiar with teleworking. Our review indicates that organizations that invest in resources to prevent exposure to physical and psychosocial stressors while simultaneously motivating teleworkers to engage in safe and healthy behaviors by providing active educational opportunities may lead to improved OSH outcomes.

## ACKNOWLEDGEMENTS

This study was supported by research funding from the Centers for Disease Control (CDC) / National Institute for Occupational Safety and Health (NIOSH; Grant # K01OH011183), with additional support from the Deep South Center for Occupational Health and Safety (CDC/NIOSH grant no: 2T42 OH008436-13). The contents are solely the responsibility of the authors and do not necessarily represent the official views of the Deep South Center or NIOSH.

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**KEY POINTS**

- Telework is becoming more prevalent as a result of the coronavirus pandemic of 2019 (COVID-19).
- Limited face-to-face interaction with colleagues and supervisors, inadequate ergonomics training and support for the home office, and blurred boundaries between work and nonwork responsibilities adversely affect teleworker safety, health and well-being.
- Evidence supports interventions intended to increase worker motivation to engage in safe and healthy behaviors via enhanced safety leadership, manage role boundaries to reduce occupational safety and health risks, and redesign work that strengthens interpersonal interactions and workers' initiation.