HFES White Paper
Protecting Workers When Working from Home

Background:

Millions of workers continue to work remotely from home, with some estimates indicating that more than 55% of these remote workers will continue work at home into the future (Global Workplace Analytics, 2020). Overall, about 45% of U.S. workers have the ability to work remotely, with some occupations being above 70% (BLS, 2020). While many occupations (e.g., manufacturing, construction, warehousing) are less likely to work from home, 38% of management, business, and financial operations, and 35% of professional workers worked at least partially remote (Global Workplace Analytics, 2020).

Remote work, work from home, virtual work, or telecommuting (hereafter referred to as telework), which was developed in the 1970s, involves different work strategies using information and communication technologies such as desktop computers, laptops, tablets, or smartphones for work that is completed outside the employer's buildings (Belzunegui-Eraso & Erro-Garces, 2020). Telework has traditionally allowed workers to save time and money otherwise spent commuting. Still, in the current pandemic, its value also reduced the COVID-19 risks regarding employees gathering at work. This abrupt shift in the nature of work conditions is impacting many who are not prepared to adopt this new and unfamiliar work mode with complete physical and social separation from the organization. Consideration of human factors and ergonomics (HFE) requirements through a holistic approach are needed as many new teleworkers are being asked to work from home with little support for setting up a workstation, ensuring a safe work environment, or protecting their physical and psychological health and social well-being (Bentley, et al., 2016; Robertson & Mosier, 2020).

Telework has advantages over the traditional brick and mortar offices including greater work flexibility, improved job satisfaction, work-family balance, productivity, and reductions in fatigue (de Macedo et al., 2020; Oakman et al., 2020; Grandjean & Harrison, 2007). However, the negative mental and physical health and safety impacts of telework are significant, such as a sense of isolation, extended work hours, high demand and low control over work, poor workspace setup and lack of organizational support (Oakman, et al., 2020; Robertson, et al., 2016). Telework arrangements often do not meet the same occupational safety and health standards as those available at conventional workplaces. Thus, both employers and workers play an important role in establishing and implementing telework practices to protect and promote safe and healthy telework behaviors, social wellbeing, and performance (WHO/ILO technical note, 2021). Regardless of where work is completed, awkward postures while operating a computer or laptop can cause musculoskeletal symptoms such as stiffness, soreness, back pain, neck pain, and eye fatigue. Current home office arrangements can be inadequate, especially configurations such as a computer atop a kitchen table, a laptop used in a recliner, work being completed while sitting in a bed or on the floor, and sitting in a common household chair (Davis, et al., 2020). Laptop use while seated on a couch, for instance, causes awkward wrist postures while typing on the keyboard or using a touchpad, causes the arms to not be supported, and places stress on the upper back and neck (Werth & Babski-Reeves, 2012). Long-term use of laptops and using laptops for extended durations in individual settings increases the risk of musculoskeletal discomfort when performing office work (Asundi et al., 2010, Jacobs et al., 2009). None of these types of arrangements are geared towards completing a full day of work, especially from an ergonomics perspective. Poor physical environment and workplace design, along with inadequate Information Technology (IT) equipment can result in musculoskeletal disorders, eye strain and injuries (WHO/ILO 2022). Further effects in terms of work-related injuries and other health problems will likely manifest, ultimately affecting workers performance, given the lack of HFE considerations in the work environment.

When telework is planned, organized and implemented in a thoughtful manner, telework can be beneficial for worker's physical and mental health, performance, and social wellbeing. A new culture of telework is created along with a new way of working. To achieve these benefits requires a work system or holistic approach that

addresses the complexity of telework, including the physical environment, work organization, social interactions, performance issues and organizational support. Attention to HFE issues from both a micro- (individual workers) and macro- (organization and environment) perspective is essential to support and protect workers to ensure their wellbeing and performance and to achieve the benefits of telework.

Key Messages and Actions:

1) *Companies must accommodate workers in their home office similar to when on company properties, which means they must follow the "General Duty Clause." The Occupational Safety and Health Administration (OSHA) needs to ensure companies are protecting their virtual workers through proper ergonomics. Employers have the responsibility to provide a safe and healthy work environment for all workers as noted in the ILO Centenary Declaration for the Future of Work, 2019, which states that "safe and healthy working conditions are fundamental to decent work".*

The best way to successfully accommodate teleworkers' physical and mental health and social wellbeing is to use a work systems approach that integrates holistically the characteristics of the job, physical, environmental, and psychosocial issues, and organizational factors (Robertson et al., 2012; Oakman et al., 2020). HFE practices should be incorporated in the design of tele-workstations, environments, jobs, as well as psycho-social, organizational practices.

2) *Companies must ensure individuals who are working in a home setting have a proper ergonomic workspace and equipment:*

Create a dedicated workspace that is private, quiet, and secure. Have a properly fit and adjusted ergonomic office chair (e.g., height adjustable, adjustable armrests, lumbar support, etc.) Create a work zone fit to the user by arranging the computer monitor so the top of it is at approximately eye level, and input devices so that they are close to the body, allowing for a relaxed, neutral, and comfortable posture which reduces overstretching and awkward, non-neutral, postures. For laptop use, consider an external keyboard and mouse to allow for proper viewing height of the monitor and reduced neck strain. Reduce visual strain by positioning the monitor to eliminate glare. If possible, also utilize an external monitor connected to the laptop for a larger viewing area.

Vary sitting or standing postures and take short breaks often, approximately after every 30-45 minutes of work. Move through a variety of sitting and standing postures to promote healthy work habits and reduce musculoskeletal and visual discomforts. Eye strain can be reduced by periodically focusing on objects at different distances. It is suggested that every 20 minutes one should look at an object 20 feet away for 20 seconds before re-focusing on their work.

Adopt healthy computing behaviors by integrating routine breaks into the daily work regimen and receiving ergonomic reminders via wearables, computer software, or phone apps to encourage and promote physical activity. These practices can reduce sedentary behaviors and promote wellbeing. Take a walk and break up the routine of static postures and fixation to reduce muscular and eye strain. Adults should undertake 150–300 minutes of moderate-intensity, or 75–150 min of vigorous-intensity physical activity, or some equivalent combination of moderate-intensity and vigorous-intensity aerobic physical activity, per week (WHO-43). While this may be challenging during periods of telework, the workers routine can be scheduled to integrate times for physical activity. This may include scheduling a recreational physical activity, fitness class, or even encouraging a walk (WHO/ILO 2022).

3) *Companies need to promote health, safety, wellbeing and performance:*

Provide training on how to optimally set up a workstation and healthy computing postures to enhance physiological wellbeing, performance and reduce musculoskeletal and visual symptoms, and recommendations and resources to facilitate social connectiveness.

Create a remote ergonomics evaluation and surveillance system to monitor HFE assessments, training, and implementation of corrective actions. Creating online HFE resources and training on how to manage and

balance work/life boundaries and simultaneous workload and family demands will help workers gain a better sense of control, reduce stress and positively impact work performance. Employers should provide HFE training for both workers and managers on how to apply HFE guidelines to ensure and maintain a safe working environment, including recognizing and managing slip, trip and fall hazards. Managers also need to be trained in effective risk management and distance leadership as telework presents some unique challenges in managing the wellbeing and performance of teleworkers. This training should cover how to respond to workers' safety and health issues, such as early reporting of symptoms, follow-up actions and return to work.

Organize telework to meet the needs of workers and the organization by focusing on work outputs rather than on processes. Refrain from excessive electronic monitoring of workers such as tracking keystrokes and mouse movements or requiring that video cameras be turned on at all times. Establish performance management practices and well-planned strategies and policies regarding telework to support and enhance teleworkers' productivity. Telework requires a different management approach to yield productive outcomes. Organizational support of resources, such as providing high-level IT support, training for both managers and employees on how to productively work as a teleworker are required for teleworkers to be more productive. The ability to telework fosters wellbeing, work-life balance and flexibility which contributes to employee's productivity (Bosua, et al., 2013; Bentley, et al., 2016; Grandjean & Harrison, 2007).

4) *Companies need to foster work/life balance to help workers minimize disruptions and enhance flexible workstyles:*

Define boundaries for work and personal time to ensure workers maintain a routine of work and nonwork related activities as well as a time management schedule. Managers can promote the opportunity for work/life time flexibility to control and manage competing demands of work and family tasks. Respecting these boundaries of work and personal time can reduce psychosocial stressors (e.g., job control) and enhance worker performance

Establish an organizational policy of where teleworkers are able to disconnect from work and refrain from engaging in work-related electronic communications, reducing stress, anxiety and burnout (The Telework Enhancement Act of 2010). Communicate with employees regarding hours of being in contact and establish tasks, responsibilities, decision-making authority, autonomy and results to be achieved, adjusting workload and work assignments when necessary.

5) *Companies must address mental stress resulting from social isolation and psychosocial stressors:*

Employers need to provide teleworkers with communication and technology tools that will help them to connect efficiently with co-workers and managers. Regular communication with managers and peers about current happenings, sharing of information and problem-solving ideas, and discussing performance related issues can reduce psychosocial strain. Additionally, organizations should provide resources for workers to connect with co-workers for virtual informal gatherings (e.g., virtual happy-hours, virtual coffee breaks, etc.). These can help workers maintain a sense of belonging to the organization and reduce any sense of isolation. Companies need to be cognizant of the number of web conferences employees are involved in, specifically the number of concurrent meetings.

6) *Telework has complex considerations to enable workers to be successful:*

Employers should provide clear direction on maintaining confidential company information, enable security measures for workers working from home, and establish telework policies and procedures supporting work at home including purchasing of equipment, technology, office furniture and supplies (The Telework Enhancement Act of 2010). Information Technology and other telephone, internet, and equipment support and services should be provided and their availability should be communicated to teleworkers. While the shift is being made from traditional offices to home worksites, employers need to consider the impact on workers including financial costs of maintaining a safe and comfortable work environment at home and the

impact of different geographical weather variations (i.e., warmer/colder climate effects air conditioning and heating costs). Legal and safety issues regarding equipment and maintenance contracts, insurance (e.g., workers' compensation, home owner's insurance, disability insurance), and union issues need to be formalized as organizational policies.

Employers of teleworkers should develop programs for reasonable telework practices, including assistance for assessing and managing the risk factors for health and safety, provision of remote IT support and occupational health services, including ergonomic, mental health and psychosocial support, as well as measures for healthy, fair and inclusive work organization. Create workplaces that are designed to enable people with diverse abilities to be physically active (WHO, 2018). Also, employers need to accommodate telework organizational practices for the physical disable and functionally limited to include: equipment, tools and training to modify the telework environment. These accommodations should be planned in consultation with disabled workers and their representatives (ILO, 2002; ADA, 1990; The Telework Enhancement Act of 2010).

References:

American Disability Act (ADA) www.ada.gov

Asundi K., Odell D, Luce A, & Dennerlein JT. (2010), Notebook computer use on a desk, lap and lap support: Effects on posture and comfort. Ergonomics. 12(53), 74-82.

Bentley T, Teo S, McLeod L, Tan F, Bosua R, Gloet M. The role of organisational support in teleworker wellbeing: a socio-technical systems approach. Appl Ergon. 2016;52:207–15

Bosua R, Gloet M, Kurnia S, Mendoza A, Yong J. Telework, productivity and wellbeing: an Australian perspective. Telecommunications J Aust. 2013;63(1): 11.1–11.12. 20.

Davis, K., Benden, M., Dennerlein, J., Robertson, M., Andre, T. 2020. HFE summit for Work and Learning From Home, webinar; Human Factors and Ergonomics Society, www.hfes.org.

Davis, K.G., Kotowski, S.E., Daniels, D., Gerding, T., Naylor, J., Syck, M., (2020), The Home Office: Ergonomic Lessons From the "New Normal", *Ergonomics In Design*, 28(4), 4-10.

de Macêdo TA, Cabral EL, Silva Castro WR, de Souza Junior CC, da Costa Junior JF, Pedrosa FM, da Silva AB, de Medeiros VR, de Souza RP, Cabral MA, Másculo FS. (2020), Ergonomics and telework: A systematic review. *Work*. (Preprint):1-11.

Gerding T., Syck M., Daniel D., Naylor J., Kotowski SE, Gillespie GL, Freeman AM, Huston TR, Davis, K.G., (2021), An assessment of ergonomic issues in the home offices of university employees sent home due to the COVID-19 pandemic, *Work*, 68(4), 981-992.

Gajendran RS, Harrison DA. The good, the bad, and the unknown about telecommuting: meta-analysis of psychological mediators and individual consequences. J Appl Psychol. 2007;92(6):1524–41. 10

Belzunegui-Eraso, A., Erro-Garces, A. (2020). Teleworking in the context of the Covid-19 crisis. *Sustainability*. 12(3662).

Global Workplace Analytics (2020). Global Work-from-Home Experience Survey. Retrieved from https://globalworkplaceanalytics.com/work-at-home-after-covid-19-our-forecas, (Accessed 5/18/20).

International Ergonomics Association & International Labour Organization (2020). *Principles and Guidelines for Human Factors/Ergonomics (HF/E) Design and Management of Work Systems*. https://secureservercdn.net/50.62.194.59/m4v.211.myftpupload.com/wp-content/uploads/2014/10/Principles-and-Guidelines_May2020-2.pdf, last accessed 02/08/2021.

Managing disability in the workplace: ILO code of practice. Geneva: International Labour Organization; 2002 (https://www.ilo.org/skills/pubs/WCMS_103324/lang--en/index.htm

Ipsen, C. COVID-19 leadership challenges in knowledge work. https://doi.org/10.1080/14778238.2021.1877579 last accessed 2021/02/08.

Jacobs K, Johnson P, Dennerlein J, Peterson D, Kaufman J, et al. (2009), University Students' Notebook Computer Use. *Applied Ergonomics*; 40, 404-409.

Kotowski, S.E., Davis, K. G., and Gerding T., (2021), Almost a Year In: Virtual Offices Remain an Ergonomic Trouble Spot. Work, (In Review).

International Labour O. ILO Code of Practice on Managing Disability in the Workplace. International Labour Organization Geneva; 2002.

Oakman et al. BMC Public Health (2020) 20:1825 https://doi.org/10.1186/s12889-020-09875-z, last accessed 02/08/2021.

Robertson, M. M., & Maynard, W. (2016). Managing the safety and performance of home-based teleworkers: A macroergonomics perspective. In A. Hedge (Ed.), Ergonomics Design for Healthy and Productive Workplaces (pp. 299-320). Boca Raton, FL: CRC Press.

Robertson, M.M., Mosier, K. (2020) Work from home: Human factors/ergonomics considerations for teleworking. https://www.ilo.org/global/topics/safety-and-health-at-work/events-training/events-meetings/world-day-safety-health-at-work/WCMS_742061/lang--en/index.htm (2020), last accessed 02/08/2021.

Robertson M. M., Schleifer, L. M., & Huang, Y. H. (2012). Examining the macroergonomics and safety factors among teleworkers: Development of a conceptual model. Work: A Journal of Prevention, Assessment and Rehabilitation, 41 (Suppl. 1), 2611-2615.

Telework Enhancement Act of 2010, https://www.congress.gov/111/plaws/publ292/PLAW-111publ292.pdf

Werth AJ, & Babski-Reeves K. (2012) Assessing Posture While Typing on Portable Computing Devices in Traditional Work Environments and at Home. Proceedings of the Human Factors and Ergonomics Society 56th Annual Meeting.

World Health Organization, WHO/ILO Technical Brief: Healthy and safe telework. (2022). Geneva: World Health Organization and the International Labour Organization. https://www.who.int/publications/i/item/9789240040977

World Health Organization, Global action plan on physical activity 2018-2030: more active people for a healthier world: at-a-glance. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/bitstream/hand le/10665/272722/9789241514187-eng.pdf)