

Managing the Potential Hazards from Electromagnetic Interference (EMI) with Personal Medical Electronic Devices (PMED) in Workplaces

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Problem: PMED such as pacemakers and insulin pumps can be susceptible to EMI from the high electric and magnetic fields (EMF) in some workplaces. When employees with PMEDs want to work around EMF sources, the available recommendations on preventing EMI such as the EMF TLVs[®] can be difficult to apply. A clearer method is needed to collect and assess the information needed to make sound decisions on assuring the electromagnetic compatibility (EMC) of a PEMD with workplace EMF.

Resolution: NIOSH initiated a collaboration with PMED experts to develop a strategy for managing and mitigating the EMI risks for workers with PMED from lower frequency EMF. The proposed strategy calls for industrial hygienists to collaborate with workers with PMEDs and their physicians to gather key information on the EMC testing by the device manufacturer, the worker's EMF exposures, and the health consequences of a device malfunction. The goal of NIOSH's PMED strategy is an informed decision on whether the employee can work safely at the evaluated worksite. Our strategy includes PMED advisory limits on worksite EMF which we derived from ISO standards on acceptable EMC levels. When EMF exposures at a worksite exceeds either these advisory limits or a PMED's EMC levels, the malfunction risks can be mitigated by engineering and behavioral controls of EMF exposures, or by altering the PMED's settings.

Results: The proposed PMED risk management procedures were initially verified with EMF survey data conducted for employees with PMEDs. One example is an electrician with an implanted pacemaker who had been exposed to magnetic fields over 2,000 μT at his tractor manufacturing plant. Under the proposed strategy, he would not be allowed to continue that job because those exposures exceed NIOSH's 70 μT advisory limits. In another example, a steel worker with a Spinal Cord Stimulator had operated a galvanizing line with 280 μT exposures. Since the device manufacturer reported its EMC level was 264 μT , the line operator might be allowed to work in this environment with some restrictions.

Lessons Learned: Safety decisions on workers with PMEDs are difficult because neither the industrial hygienist nor most physicians have all the needed expertise. The proposed strategy is based on a new vision of collaboration with PEMD workers that can accurately assess their EMI risks and decide the best course for all parties. To improve these procedures, NIOSH will be seeking comments from industrial hygienists and other stakeholders before their publication.

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