
Hidden Environmental Footprint of Radiography and Fluoroscopy



Healthcare's environmental impact attracts closer attention, and imaging services are part of that picture. While conversations often focus on energy-hungry scanners such as MRI and CT, everyday x-ray services also carry a footprint that is easy to overlook. An assessment of radiography and fluoroscopy at a large academic medical centre examines impacts across the full life cycle, from manufacturing and transport to everyday use and supporting materials. The evaluation combines direct observation, record review, interviews and energy metering to map where effects arise and how they differ between modalities. It highlights energy consumption and medical linens as major contributors, shows that fluoroscopy is more intensive per scan than radiography and identifies practical actions in energy sourcing, equipment operation, procurement and demand management that can reduce avoidable harm without compromising patient care.

Where Impacts Arise

The assessment finds that electricity use is the single largest driver of emissions for combined radiography and fluoroscopy services. Although radiography handles far more examinations, fluoroscopy generates higher emissions per scan. Manufacturing and distributing the scanners themselves also add a notable share, with fluoroscopy units responsible for most of the production burden due to their higher manufacturing intensity. These patterns matter because the balance of impacts can shift as services change how they obtain and use power.

Must Read: [Life Cycle Assessment Quantifies MRI and CT Emissions](#)

Energy sourcing strongly influences the footprint. Modelling shows that switching from the local grid to solar photovoltaics would cut the energy-related share of fluoroscopy emissions by a large margin, after which production and distribution of equipment become more dominant. In radiography, supplies used around the scanners contribute a sizeable portion of emissions, and among these, medical linens stand out. Flat sheets used to cover scanner beds account for the largest share by both quantity and impact. A smaller contribution comes from the energy drawn by other equipment located in radiography rooms that supports clinical operations.

The analysis looks beyond greenhouse gases to other environmental effects, including ozone depletion, smog formation, acidification, eutrophication and impacts on human health and ecosystems. Scanner production features prominently across several categories, while linens play a relatively larger role in smog, acidification and eutrophication. This wider lens matters because interventions that cut carbon can still shift burdens elsewhere if materials and processes are not considered holistically.

Operational Patterns and Energy Choices

How equipment is used day to day also shapes results. Energy metering and workflow observation show that fluoroscopy systems spend only a small fraction of time actively scanning, yet they draw considerable energy while idling in low-power modes. By contrast, radiography units are active for much longer periods, reflecting the higher throughput of routine x-rays. These different utilisation patterns point to opportunities for improvement.

For fluoroscopy, the priority is to curb energy use when scanners are not needed. Reducing off-hours idling where it is clinically feasible, switching equipment fully off outside core times and clustering nonurgent studies can lower consumption without affecting access. For radiography, attention extends to the wider room environment, given the energy demands of other equipment that shares the space. Across both modalities, decarbonising electricity supply stands out as a high-yield measure. In the model, replacing the local grid mix with solar power substantially reduces emissions from service operations, strengthening the case for clean power procurement and on-site generation where practical.

Manufacturers and providers both have roles. As electricity becomes cleaner, the relative weight of production and logistics rises, making lower-impact manufacturing and distribution more important over a scanner's life. Design choices that enable rapid wake from off mode and truer low-draw standby can reduce waste without undermining responsiveness. On the provider side, procurement teams can prioritise equipment with strong energy performance in idle states and features that support flexible power-down practices, and they can align maintenance with operational schedules to avoid unnecessary run-time.

Materials, Linens and Smarter Use

Materials management is a clear lever. Medical textiles are a large non-energy contributor across the services studied. Emissions come from both the production of textiles and the repeated laundering required after each use, with flat sheets driving much of the impact due to sheer volume. Tightening linen protocols can therefore deliver meaningful reductions. Ensuring linens are used only when necessary, applied correctly and reused to their intended life can cut the number of items consumed. Procuring lower-impact textiles and optimising laundering pathways add further gains, and planning end-of-life uses helps extend value from materials already in circulation.

Other consumables contribute relatively little in comparison, and drugs account for a small fraction, largely from contrast agents. Even so, routine checks on protective equipment policies, stocking practices and opportunities to switch to reusable or reprocessible options can yield incremental benefits that add up over time, especially when paired with better scheduling and power management.

Demand management is another important strand. Reducing imaging that offers limited clinical value lowers environmental impacts directly while also easing pressure on staff and equipment. The assessment points to a significant share of imaging that may be of low value, with radiography often implicated. Practical steps include targeted education, refreshed clinical guidelines and clinical decision support to align ordering with current best practice. Specific candidates for reduction include daily chest radiographs in intensive care, facial bone radiographs for facial trauma and routine post-operative radiographs. Cutting these examinations trims linen use, energy consumption and related downstream effects without affecting care quality when decisions are guided by established protocols.

Radiography and fluoroscopy carry a meaningful environmental footprint shaped by how electricity is sourced and used, how scanners are manufactured and maintained and how supporting materials are managed. Fluoroscopy is more intensive per scan, while radiography's high throughput brings room equipment and textiles to the fore. The assessment outlines practical actions: adopt cleaner power, reduce idle energy, use power-down features more consistently, tighten linen protocols and engage vendors on lower-impact design and supply chains. Coupled with efforts to curb low-value imaging, these measures offer a realistic path for radiology services to reduce emissions and broader environmental effects while maintaining timely access and quality care.

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