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## Photovoice in the Workplace: A Participatory Method to Give Voice to Workers to Identify Health and Safety Hazards and Promote Workplace Change – a study of University Custodians

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### Abstract

**Background**—Photovoice, a photographic participatory action research methodology was used in a workplace setting to assess hazards that were creating extremely high injury and incidents rates for university custodians and to promote the conditions to eliminate or reduce those hazards.

**Methods**—University custodians participated in a Photovoice project to identify, categorize and prioritize occupational hazards and to discuss and propose solutions to these problems. Results were presented to management and to all custodians for further discussion. The effort was led by a worker-based union-sponsored participatory evaluation team in partnership with a university researcher.

**Results**—Visual depiction of hazardous tasks and exposures among custodians and management focused primarily on improper or unsafe equipment, awkward postures, lifting hazards, and electrical hazards. The process of taking pictures and presenting them created an ongoing discussion among workers and management regarding the need for change and for process improvements, and resulted in greater interest and activity regarding occupational health among the workers. In a follow-up evaluation one year later, a number of hazards identified through Photovoice had been corrected. Injury rates for custodians had decreased from 39% to 26%.

**Conclusions**—Photovoice can be an important tool, not just for identifying occupational hazards, but also empowering workers to be more active around health and safety and may facilitate important changes in the workplace.

### Introduction

This paper describes a Photovoice project intended to identify health and safety hazards of university custodians and to promote a safer work environment.

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Photovoice is a participatory action research method that has been used to understand public health and sociological concerns of communities and to lead to changes that improve those communities. [Wang 1999, Wang 1998, Wang 2005] Studies have addressed such issues as youth violence, teenage pregnancy, and community health needs assessments. [Jurkowski 2007, Webb 2004, Photovoice.com 2008] Photovoice is a method that gives voice to the voiceless – those with low social and/or economic status – by allowing them to tell their own stories through photos that they take themselves. Photographs and videos have been used to spark discussion and problem solving in participatory ergonomics programs, although these are generally provided by an ergonomics professional for discussion by a team. [Kuorinka 1997] The Photovoice method, therefore, seemed appropriate to investigate health and safety concerns of university custodians.

Photovoice, developed by Caroline Wang at the University of Michigan in 1996, is based on the work of Paulo Freire, who inspired peasants to take more control of their communities through education and empowerment [Freire 1970]. Freire's work also informs the popular education movement in occupational health. [Delp 2002, Wallerstein 1992, Wallerstein N. and Lyons 1992] Photovoice enables people to record and reflect their community's strengths and problems; promotes dialogue about important issues through group discussion and photographs, and provides participatory means of sharing expertise to create healthful public policy. According to Wang, Photovoice enables us to gain "the possibility of perceiving the world from the viewpoint of the people who lead lives that are different from those traditionally in control of the means for imaging the world." [Wang 2005]

While Photovoice has been used in some workplace settings, such as agriculture [Abundantia 2009] and garment factories [Cohen 2006], the method is not widely known to occupational health professionals and, to our knowledge, has not been published in occupational health professional journals.

Custodians are low-wage, low-status workers who are exposed to physical, chemical and psychosocial hazards in the course of their work. In 2007, 942,500 janitors or custodians were employed in the US. Universities and colleges employed 75,330 custodians, with a mean hourly wage of \$12.12. [BLS 2007] Well documented risk factors of cleaning work include musculoskeletal hazards from floor cleaning, lifting, carrying, awkward postures and high hand postures. [Sogaard 2006]

Other hazards may include chemical exposure, noise, electrical, hazards, safety hazards from ladders and wet floors, and psychosocial stress. [Arif 2007] [Ising 2000] [Goggins 2007] [Nazaroff 2006] The use of bleach and other cleaning agents has been associated with asthma in cleaning personnel. [Medina-Ramon 2005] [Henneberger 2005] A typical bucket full of dirty water, which often needs to be lifted to waist height to dump in a sink, can weigh at least 40 lb. [Ising 2000] [Nazaroff 2006] Custodial work is non-routinized. [Gold, et al. 2006] Work processes may vary from day to day or by building, making it difficult to assess and categorize hazards.

The Photovoice project developed as part of an evaluation of a joint labor-management occupational health and safety management program, based on American National Standards Institute/American Industrial Hygiene Association (ANSI/AIHA) Z10-2005. The program had been established in 2005 by the Facilities Management Division of the University of Iowa and the American Federation of State, County, and Municipal Employees (AFSCME), the union representing custodial, maintenance, grounds, and utility workers at the university. The program is intended to identify root causes of injuries and near misses and to create positive change in response, rather than blaming worker error. It is led by a steering committee composed of labor and management. "Go-To" members in each

building or unit investigated incidents and near misses. After two years, both the union and management wanted to evaluate the program. As reported by management, culture change seemed to have occurred in a number of shops, with the development of participatory structures to identify and solve health and safety concerns, as well as reduction in incidents and injuries. Job-related injuries for custodians remained among the highest in the country, however, at 39%. AFSCME's evaluation team was asked to evaluate the program.

The University of Massachusetts Lowell has led evaluation efforts of AFSCME health and safety training since 1996. Evaluation is conducted by a team of rank and file union members from across the U.S. who have been active in health and safety issues. The training and development of a cadre of worker evaluators was originally part of a joint effort by several unions to conduct worker-based evaluation of health and safety training programs. [Daltuva 2004, Lippin 2000, McQuiston 2000] UMass Lowell has provided guidance and training to team members to build their evaluation skills. Team members have developed course evaluation questionnaires, and conducted and analyzed interviews and focus groups to assess the impact of various health and safety training programs. This was the first time they addressed program evaluation.

The program evaluation consisted of an on-line survey of all 700 Facilities Management personnel, key informant interviews with management and union leaders, and focus groups with workers from each work area, including custodians. The Photovoice project was developed to further identify health and safety issues of the custodians by having them visually demonstrate the hazards they faced. Custodians were particularly selected because of concerns expressed by management and the union's industrial hygienist. The Photovoice methodology was selected as a tool to give voice to the workers on campus with the least social status and power, the custodians, to identify the problems that contributed to their high injury rates, the causes of those problems, and to hear any suggestions for resolving them. The results were to be shared with other custodians and to be used to assist management in targeting areas of concern.

An essential pre-condition for doing such a project with workers is the assurance that the workers will be free to take pictures during work without management harassment, interference, or other negative repercussions. All custodial supervisors were informed of the project and that project participants had to be allowed to take pictures on work time without interference. When questioned later, participants reported that no one had experienced interference during their photography sessions; one supervisor actually encouraged the picture-taking and suggested some scenarios.

## Materials and Methods

The 242 person custodial workforce at the University of Iowa is an experienced aging population. Average age is 48.4 years with an average length of employment of 11.4 years. It is predominantly white (77.3%) and male (66%). Hispanics are the largest minority group (5.0%) with 5.3% of unknown ethnic background. The custodians are responsible for cleaning approximately 120 buildings spread over 1,700 acres or 2.66 square miles.

### Photovoice Methodology

The Photovoice process implemented in this study consisted of 5 phases: (1) Recruitment and scheduling, (2) Orientation, (3) Photography, (4) Debriefing, categorization, and prioritization, and (5) Report back to the community and decision-makers.

## Recruitment and Scheduling

Photovoice participants were selected by Facilities Management staff from a list of 66 who volunteered at an AFSCME-sponsored ergonomics training program two months earlier to represent the demographics, work areas, and work shifts of custodial staff. The goal was to have 16–20 Photovoice participants. Two of the three Photovoice groups represented the night shift, which comprises two-thirds of the custodial work force. Sixteen volunteers participated, with cross-campus and cross-shift representation. They included union and non-union members, both male and female. A wide range of building types were represented by the group, including classroom buildings, research labs, athletic facilities, a library, and both old and new buildings. Meetings were scheduled during work time.

## Orientation

Custodial volunteers met on Tuesday, March 7, 2007, for orientation, discussion of the range of health and safety concerns they might encounter, and practice using a digital single use camera. The orientation was conducted by two AFSCME evaluation team members and the UMass Lowell researcher. Participants were asked to describe any hazards or conditions in their work that could contribute injury or illness. Probes were used to encourage them to think about anything that might cause back or shoulder strain, chemicals that irritated eyes, nose, throat or skin, trip or fall hazards. Each participant was asked to fill out a simple log form, indicating the photo number, where it was taken and why. While the team was prepared to assist with the logs after the photos were developed, this proved to be unnecessary.

## Photographs

Participants took pictures in their work area. They were allowed to simulate a typical hazardous situation, if it wasn't occurring during the limited study period. They could each take a maximum of 25 photos, the capacity of the cameras. All cameras were returned to the evaluation team on Thursday evening, March 9 for developing. Photo logs accompanied each camera.

## Debriefing, categorization, and prioritization

Separate sessions were held that Friday for day and night shifts. Each participant was given the pictures s/he had taken and asked to pick the 6–10 most significant pictures. This helped eliminate duplicate pictures and encouraged participants to consider which photos were most important to them. Photos were posted on a board. Each participant discussed his or her photos and why s/he had taken them. As photos were discussed, one of the evaluation team members summarized the hazard on a white board. Similar themes were grouped together, since photos from different parts of campus often showed the same hazard. After all photos were discussed, participants were asked to review their discard piles of photos to see if any concerns had been left out. They were then asked to look at the initial categorization of photos and asked if changes were needed. Each participant was given 5 stickers and asked to select at least three issues they thought were most important. They were allowed to use two stickers if one hazard was particularly important to them. Hazards were prioritized by the number of stickers. Participants were then asked to look at the hazards and asked which ones might be quick fixes that could be addressed first. Participants were asked for suggestions on ways to improve health and safety conditions. They were also asked to comment on the Photovoice process.

## Report back to community and decision makers

Summaries from Photovoice sessions were reviewed by the full evaluation team on April 13–14. Photovoice participants had been asked about the best method for reporting the

results. They unanimously recommended a presentation to groups of custodians. One hour presentations on the Photovoice results were conducted for custodians in Facilities Management as well as for the joint Health and Safety Steering Committee on May 7<sup>th</sup>. Sessions were held for day and night shifts during working hours, with 25–150 people in each session. The five sessions consisted of a PowerPoint presentation of photographs with a summary of key hazards and recommendations for improvement. Attendees were then encouraged to provide feedback on the hazards shown, to discuss how these related to their particular work areas, and to add any additional health and safety concerns. This helped identify hazards that may have been missed by the Photovoice participants and provided the evaluation team with information on the extent of identified hazards across campus. Approximately 95% of all Facilities Management Division custodians attended these presentations.

A written report was prepared by the evaluation team for AFSCME and for the Facilities Management Division detailing the findings and proposing short and long term solutions.

**Protection of human subjects**—A number of measures were taken to protect workers from retaliation or exposure. Supervisors were notified about the Photovoice project and were cautioned against interference or harassment. No photos were taken without written permission of subjects. To protect identities of participants, faces were obscured in pictures and presentations. All Photovoice participants signed informed consent forms. All forms and methodologies used in this study were approved by the UMass Lowell IRB (protocol no. 07-006-SIQ-S-XPJ).

## Results

Hazards identified through the Photovoice process focused primarily on ergonomic risks. Electrical safety, trips and falls, faulty equipment, chemical and biological hazards, psychosocial stressors, fire safety, noise, and ambient temperatures were also concerns. Ergonomic hazards included heavy lifting and awkward postures related to trash, recycling, and medical waste removal, as well as disposal of dirty water after mopping floors. Day and night shift custodians experienced similar hazards, although some work, such as medical waste disposal was only handled at night.

### Ergonomic Hazards

A number of buildings contained trash receptacles called “jet cans.” These were cylindrical steel cans with a steel shell that had to be lifted overhead to remove trash and then carefully replaced after inserting a clean bag. These cans were so tall custodians were forced to lift bags overhead to remove the trash. The steel shell had to be lifted completely overhead. Replacing it reportedly resulted in cuts, in addition to the strain on shoulders, arms and backs (figure 1). Recycling bins were large, and departments often discarded large quantities of paper or written materials. Even though they were wheeled, it was difficult for an individual to move them. Emptying them entailed lifting the bins into dumpsters. Although medical waste containers were supposed to be limited to 50 lb., they were often heavier than 75 lb. Workers were required to stack them four-high, forcing them to lift them overhead on tiptoes. The combined weight and awkward posture may have resulted in back and shoulder strain. Emptying mop buckets required lifting them to sinks that were over waist high, another possible source of back and shoulder injury. Paper towel dispensers were hung too high for workers to reach easily (figure 2). They were often placed above trash bins, causing workers to lean and stretch over the garbage can to replenish the towels. University vans were too high for many to easily enter; no stools or steps were provided.

Floor and carpet cleaning equipment were reportedly not repaired or replaced when damaged. One custodian had injured his back twice in one year because a carpet extractor only worked when it was pushed down and forward. On two occasions the extractor “jumped” forward, resulting in hospitalization and 3–6 months off work, yet it was never repaired. A floor polisher only moved backward, creating an awkward and hazardous working condition.

### Electrical/Lighting Hazards

Custodians were required to change light bulbs, but reported not having the training or equipment to handle the many high (16–20 ft.) electric lights or the specialized fluorescent bulbs that can easily break during installation without appropriate tools. In many cases the only ladders available were wood or metal, even though policy was to use fiberglass. Inaccessible lighting was another concern. For lights that were above desks, library carrels, in crowded closets, etc, changing the light was difficult and hazardous. Ladders placed on desks were not uncommon (figure 3).

### Trip and Fall Hazards

The Photovoice project took place a few days after a heavy ice storm, so there were still a number of treacherous walkways that appeared in photos. Custodians store their equipment in cramped closets that make it difficult to remove or maneuver equipment. In new academic buildings with soaring ceilings and ceiling to floor interior windows, custodians were required to wash the windows and the narrow ledge, 20 feet above ground, with no fall protection (figure 4). Custodians also worried about poorly placed electrical outlets that forced them to vacuum with the electrical cord across the front entrance of a building, creating trip hazards for building occupants.

### Chemical/Health Hazards

Chemical hazards were of less concern, but some interesting issues emerged. Management had ordered new cleaners and graffiti wipes that were supposed to be environmentally friendly. The new products reportedly caused dermatitis and blisters, however. Workers had not been consulted before the new products were ordered. Overflowing toilets and drains that backed up sewage every time a toilet was flushed were a graphic illustration of health hazards faced by custodians.

As participants discussed the hazards they had photographed, a theme that emerged was the lack of consideration or respect for them or for their role. Problems were not fixed or appeared to be ignored. Participants expressed the opinion that their well-being was not always considered. Custodians discussed that during the summer, when temperatures in Iowa soared to the upper nineties, air conditioning was turned off at night to conserve energy, even though the custodial staff was working. Custodians also noted the impact of new vendors for trash and medical waste bags based on lowest bid. The new bags were thinner, necessitating double-bagging, and were harder to open and access. Again the workers had not been consulted. These experiences led the evaluation team to recommend the need for worker input and participation in decisions that might result in changes to the workplace. When purchasing new products or equipment, workers should be involved in testing them to see if they are indeed an improvement. Table I shows long and short term recommendations developed by the evaluation team, based on Photovoice participants’ input. These were presented in report-back sessions.

Other hazards or priorities photographed included: chemical storage, emergency response issues, such as blocked exits and improper fire extinguishers, excessive noise, lack of electrical switches and/or outlets, vehicle fumes, and contact with animals, particularly



raccoons. They also discussed the need for at least two custodians in a building for safety and support.

Custodial work is isolated. Only one or two custodians may work in an entire building. There is little opportunity to meet with other custodians. Custodians expressed the opinion that better communication between groups in different parts of the campus would be extremely helpful in identifying and solving safety problems. They expressed surprise that problems they were facing in their own area were found all over campus. Solutions to problems were apparently not shared either. Participants suggested a campus-wide forum, such as a custodial safety committee that would enable them to discuss and solve problems collectively.

The need to improve labor-management communication was a common theme. There seems to be little feedback to an individual who makes a formal complaint about an unsafe condition and the status of that request.

### Report-Back Sessions

The primary purpose of report-back sessions, which included over one hundred custodians in a single session, was to present the results of the Photovoice project and obtain feedback. However, the sessions also provided a forum for information exchange among custodians, as well as additional information for the evaluation team on the University's occupational safety and health program. In response to findings related to removal of recycling waste, some custodians stated that they had solved those problems. A supervisor had given the lead custodian in the area a catalog and told him to select and order ergonomically safer equipment. Other departments or buildings had been told that there was no funding for better equipment or that the decision rested with higher management. Some custodians were surprised to learn that metal and wood ladders were still being used, when theirs had been discarded and replaced by fiberglass.

Management publicized the entire PowerPoint presentation on their safety web site to make it available to all employees and supervisors in the Facilities Management Division.

The report-back to management led them to a greater understanding that even though policies may exist on paper they are not always carried out in practice. The Photovoice process exposed some weaknesses they intended to address. In a follow-up evaluation one year later, a number of hazards identified through Photovoice had been corrected. An area safety committee for custodians has been established. Most ladders and some jet cans had been discarded. Vans had been modified for easier access. New equipment had replaced the old, unsafe floor scrubbers and carpet extractors. Paper towel dispensers had been lowered for greater accessibility; pumps had been installed to eliminate lifting heavy buckets; bucket lifts were being used for high electrical and cleaning work. New ergonomic systems for trash and recycling disposal were being installed. A mechanical system for handling medical waste was being considered, and containers were only being stacked two-high. Management reported that custodian injuries had decreased from 39% in 2007 to 26% in 2008 and 20% in 2009.

### Discussion

The Photovoice project had an impact in the workplace beyond the actual identification and prioritization of hazards. It also had a social impact. The act of taking pictures created a "buzz" in the work environment community. It highlighted health and safety issues that had not been clearly recognized before. The process of bringing together custodians who work all over the campus seemed to build a sense of solidarity and the realization that, while many

of them faced similar hazards, management handled exposures differently building by building. Photovoice enabled the least empowered workers to describe their workplace and define their issues together.

Through this methodology participants define their community (workplace) issues and propose solutions. The report-back process serves as a way of organizing workers, making them more aware of workplace hazards, and creating collective will to change the work environment. Custodians initially seemed to have a sense of helplessness about being able to affect policy, but in thinking more critically about their work environment and in sharing ideas with other workers, they seemed to gain a sense of social empowerment. Photovoice triggers a dialogue that might not otherwise occur. It goes beyond hazard mapping and job hazard analysis, common classroom methods by which workers identify the hazards they face in their workplaces. Because Photovoice occurs in the work area, and because it is a dynamic process, it can have greater impact.

The Photovoice project was conducted to help identify hazards that were resulting in excessive lost time injuries. The facilities Management Division had no dedicated safety, industrial hygiene or ergonomics staff. Asking workers to identify what made them hurt or what they felt were safety problems seemed a good starting point for management to be able to address them. The visual impact of the photos and the stories associated with them were quite powerful. This was not meant to be a “scientific” study where hazards are quantified. Not all suggestions offered by participants may have been practical, but having workers, especially those who feel they have little power, define their issues in a public manner can help create a sense of empowerment.

While Photovoice has some similarities to participatory ergonomics (PE), there are a number of differences. PE programs may address micro or macro ergonomics issues, usually identified by an ergonomist or knowledgeable safety professional. [Kuorinka 1997, Haines, et al. 2002, Laing, et al. 2007, Laitinen, et al. 1997]. Such programs generally involve a long-term commitment of several months to several years, involving problem-solving and continuous improvement with workers, supervisors, management, and a health and a safety professional, usually an ergonomist. [Haims and Carayon 1998, Henning, et al. 2009, Carrivick, et al. 2002] In PE programs an ergonomist may take photos or video for review by the PE committee. [Kuorinka 1997] Photovoice is a short term project that helps define an issue and is intended to be presented to both the community as a whole (custodians) and to policy makers (management). This particular Photovoice project was intended to identify a wide variety of health and safety hazards beyond ergonomics or work organization issues. Photovoice offers an additional tool that might be used as part of a PE program to have teams identify hazards for further discussion and problem-solving. It could also be a tool to be used by health and safety committees to gain a better understanding of particular or more general problems.

This methodology can be an effective way for workers to identify hazards and to facilitate change in the workplace in a variety of situations. Training sessions, which introduced Photovoice to AFSCME health and safety trainers, have resulted in a number of photographic projects. In addition to exposing hazardous conditions, workers have adapted the methodology to demonstrate good work practices or safe handling equipment to reinforce the value of preventive measures. Photovoice is also a relatively low-cost method. Cameras and developing costs are approximately \$20 per participant. Although materials for this project were funded by a federal grant, the cost was less than \$350. While Photovoice may not be appropriate in all situations or workplaces, it is another tool that can be applied to build worker participation in promoting safe work environments.



## Limitations

Photovoice can be a powerful tool for researchers and workers to better understand the occupational hazards of at-risk workers. In order for it to be effective, however, workers must be guaranteed the right to photograph their workplace during work time and without management interference or retaliation. This may make it difficult for workers in non-union settings to feel secure enough to photograph the issues of most concern to them due to fear of retaliation. While the cost for materials is relatively low, it may be a deterrent to implementation. If participants are illiterate, it may be difficult for them to complete the photo logs. Practitioners need to be prepared to assist in filling in the information. Photovoice relies on workers to define their own hazards. While there are a number of means of confirmation, it is possible that a worker might exaggerate a hazard. A Photovoice project such as this is not a substitute for an ongoing health and safety or PE program. It is meant to involve workers in defining their own concerns, presenting them through pictures, and hopefully stimulating change.

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**Figure 1.**



**Figure 2.**



**Figure 3.**



**Figure 4.**



**Table I**

## University of Iowa Photovoice Recommendations

<b>Hazard</b>	<b>Recommendation Short Term</b>	<b>Recommendation Long Term</b>
<b>Ergonomic</b>	Lower paper towel dispensers	Mop sinks <ul style="list-style-type: none"> <li>• Mechanical lift/pump system</li> <li>• Redesign floor drains</li> </ul>
	Replace jet cans	More ergonomically friendly dumpsters
		Develop safer recycling methods <ul style="list-style-type: none"> <li>• Smaller recycling bins</li> <li>• More frequent pick-up</li> </ul>
		Replace damaged floor/carpet equipment that cause injuries
<b>Chemical Exposure</b>		Safer/alternate chemicals and cleaners
		Safer chemicals for graffiti removal
<b>Safety</b>		Replace metal and wooden ladders with fiberglass
<b>Electrical</b>	Electricians handle light fixtures above a particular height	Install new electrical outlets, switches
	Electricians handle fluorescent lights	Train custodians on procedures and hazards of lighting
	Energy efficient lighting	
<b>Biological Hazards</b>		Train lab students about sharps and biohazard disposal
<b>Work Organization</b>	Involve workers in new chemical selection	Improve communication between custodians in different buildings or areas
		More worker input/feedback on safety concerns
		Campus-wide health and safety committee for custodians
		Improve communication <ul style="list-style-type: none"> <li>• Close loop (feedback) on safety reports</li> </ul>