AMERICAN JOURNAL OF INDUSTRIAL MEDICINE 35:112–123 (1999)

Concerns of the Dry-Cleaning Industry: A Qualitative Investigation of Labor and Management

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Background *Occupational scientists agree there are hazards associated with dry-cleaning, but do dry-cleaning owners and workers concur? Knowledge of owners' and workers' perceptions can help guide intervention efforts to reduce worker exposure. To better understand these issues, a qualitative study was conducted using focus group methodology and constant comparative analysis.*

Methods *Two owner and four worker focus groups were held.*

Results *Findings suggest that overall, health and safety issues were not of great concern. Owners were primarily concerned with the economic impact of regulations. Workers did express some anxiety about solvent exposure and burns, but most felt that these hazards were "just part of the job." Also, other than the installation of air-conditioning in the shops and the provision of health benefits, workers could not think of ways health and safety on the job could be improved.*

Conclusions *These findings will be used to develop comprehensive safety and health interventions (e.g., engineering plus education and training) in dry-cleaning shops.* Am. J. Ind. Med. 35:112–123, 1999. *Published 1999 Wiley-Liss, Inc.*†

KEY WORDS: dry cleaners; health and safety; perchlorethylene; qualitative methodology

INTRODUCTION

Health and safety hazards in the dry-cleaning industry have been identified by NIOSH scientists and other researchers [Materna, 1985; Ruder et al., 1994]. Some of the hazards include exposure to toxic spotting chemicals, working with hot and heavy pressing equipment, which can cause burns, and working with poorly designed, nonadjustable workstations that may lead to cumulative trauma disorders. Perhaps the most important hazard for workers in dry-cleaning facilities today is exposure to perchlorethylene (PCE). PCE can enter the human body through both respiratory and dermal exposure and can have both short- and long-term negative health consequences. Symptoms associated with respiratory exposure include depression of the central nervous system, damage to the liver and kidneys, impaired memory confusion, dizziness, headache, drowsiness, and eye, nose, and throat irritation. Repeated dermal exposure may result in dry, scaly, and fissured dermatitis [Tabershaw et al., 1977a]. Numerous health risks to exposed workers have been documented [Materna, 1985; van der Gulden and Zielhuis, 1989]. Transitory effects of PCE include poisoning [Lukaszewski, 1979], cardiac damage [Abedin et al., 1980; Nakamura, 1985], coma [Patel et al., 1977], respiratory damage [Boulet, 1988; Patel et al., 1977], and blood disorders [Ratnoff and Gress, 1980]. Long-term or permanent damage to the liver [Meckler and Phelps, 1966] and kidney [Shafer and Shafer, 1982], neurological effects [Cai et al., 1991; Ferroni et al., 1992], and excess deaths from

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Accepted 29 September 1998.

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''other forms of heart disease'' and ''other diseases of the liver'' [Nakamura, 1985] have been reported. In addition, reproductive disorders such as subtle changes in sperm quality, infertility problems, and a significantly increased risk for spontaneous abortion were found [Eskenazi et al., 1991a,b; Windham et al., 1991]. PCE is a known animal carcinogen and is associated with increased death rates in humans [IARC, 1995]. The International Agency for Research on Cancer (IARC) classifies it in group 2A as a probable human carcinogen: sufficient evidence of animal carcinogenicity and limited evidence of human carcinogenicity [IARC, 1995]. NIOSH recommends that PCE exposure be reduced to the lowest feasible level.

NIOSH policy states that the best strategy for controlling exposure is to substitute toxic materials with less hazardous ones. If substitution is not feasible, then engineering controls that contain hazardous workplace emissions at their source are preferred over administrative or behavioral controls [NIOSH, 1983]. Some recommend that the most effective approach would include all of the control strategies [Goldenhar and Schulte, 1996].

When developing safety and health intervention strategies for any industry, it is important to speak directly with members of that target population, primarily to assess their needs and perceptions about health and safety issues [Needleman and Needleman, 1996]. If a mismatch is discovered between actual health risks and those perceived by the population, a different intervention approach than originally conceived might be necessary. This type of mismatch has been previously discussed [Covello, 1983; Harris, 1983; Sandman et al., 1994; Slovic, 1987]. The way to collect this type of information is by using qualitative data collection methods such as focus groups or interviews [Moore and Garg, 1996]. The importance of using methods such as these, which are not traditional approaches in occupational health and safety, has been described [Goldenhar and Schulte, 1996; LaMontagne and Needleman, 1996]. Recent empirical examples have demonstrated how such methods can be used to elicit important occupational information from female construction workers [Goldenhar and Sweeney, 1996], farmers [Ferguson and Scharf, 1996; Parrot et al., 1996], and nurses [Sinclair et al., 1996].

Given the lack of strong positive results from a variety of knowledge-based approaches attempting to change occupational health-related behaviors [Porru et al., 1993; Saarela et al., 1989] and other health behaviors [Alciati, 1996], it is likely that merely informing dry-cleaning owners of these demonstrated health and safety hazards will not effectively influence their health and safety-related behaviors.

One of the primary strengths of qualitative data collection methods, such as interviews, focus groups, and observation, is that they permit the researcher to understand the world as seen by the target audience rather than predetermining it using an a priori framework developed by the researcher [Morgan and Kreuger, 1993]. The information obtained can then be used to help design interventions to influence the target population's attitudes and behaviors or to design structured surveys. Specifically, focus group methodology allows the researcher to directly interact with the respondents, allowing for clarification of responses and needed follow-up questions. From the rich data obtained, the researcher can obtain deeper levels of meaning and make important links which would be impossible with survey data. Additionally, the respondents can comment on and build upon others' responses. [Stewart and Shamdasani, 1990]. As with all data collection methods, there are, of course, some limitations. These include the inherent limited generalizability of the findings due to the small number of respondents in each group and the unavoidable interdependence of the responses obtained. Also, given the typically large amounts of data collected, summarization and interpretation can be arduous. Nevertheless, these data collection methods are extremely valuable, particularly in the exploratory stages of a research problem, as they allow the researcher to reevaluate their assumptions, reframe current definitions of the research problem, and perhaps even reconceptualize what needs to be studied [Needleman and Needleman, 1996].

Our goal in this study was to describe, rather than explain, dry-cleaning owners' and workers' concerns regarding health and safety and whether certain health and safety practices might or might not be followed. This information could be used to determine what motivational techniques might be useful for influencing employer and employee safety and health behaviors. To our knowledge, the type of health and safety-related information we desired had not previously been collected from dry-cleaning owners and workers.

METHODS

Participant Selection

The focus groups were conducted April through September, 1996. Recruitment for the six focus groups was achieved using purposeful rather than probability sampling [Patton, 1990]. That is, individuals were identified as experts in the field and asked to participate in the focus group discussion. For this study, an expert was defined as an owner or worker in a dry-cleaning shop with at least six month's experience. We anticipated that these experts, or so-called ''information-rich cases,'' would provide us with a great deal of information about health and safety beliefs in the dry-cleaning industry. Each group was homogenous with respect to employment status (owner vs. worker) and/or gender (two male-only non-owner worker groups, two female-only non-owner worker groups, and two owner-only groups — one owner group had one woman participant).

For one owner focus group, the president of an association of dry cleaners in a southwest Ohio city solicited association members for participation. Those willing to participate returned a postage-paid postcard and a contract marketing research firm then called them. The other focus groups were conducted elsewhere in southwest Ohio. Because there were no organizations of dry cleaners in the second area, the second owner group and worker groups were recruited from a database of dry-cleaning shops in the county identified through the American Business Information CD-ROM directory [ABI, 1994]. We excluded facilities known to be drop shops (no dry-cleaning machines on the premises) and assigned a random number to each shop. The database was sorted by shop size (smaller shops first) and by random number within the shop size category. There were 96 shops with 1–9 employees and 83 with 10 or more employees. We concentrated on recruiting from the smaller shops because they are typical of this industry.

Because of the typically small shop size, 70% of U.S. dry cleaners having four or fewer workers [ABI, 1994], and due to the high percentage of shops operated exclusively by owners and their relatives, dry cleaning has traditionally not been a unionized industry; 10% or less of the work force is unionized. The three main unions that bargain for dry cleaners are the AFL-CIO Laundry and Dry Cleaning International Union, the Textile Processors, Service Trades, Health Care, Professional & Technical Employees International Union, and the Union of Needletrades Industrial and Textile Employees AFL-CIO CLC. In southwest Ohio, where our focus groups were held, we know of no unionized shops, not even the three largest (50 or more employees) shops. Therefore, the issue of union vs. non-union differences was not an issue in this study.

The first 48 small shops on the list were sent introductory letters a week before the contractor (a second marketing research firm) began calling shop owners and workers requesting participation. The contractor called the shops and elicited the names and home phone numbers of potential participants. Insufficient numbers of participants were recruited, so we sent letters to the remaining 48 small shops. The six owners needed for the second owner group were recruited from this pool, as well as six workers. Finally, we sent introductory letters to the remaining 83 dry-cleaning shops (with 10 or more employees each), and 15 more workers agreed to participate.

It was important that the most highly solvent-exposed workers (machine operators and spotters) and the workers at greatest risk of burns and ergonomic injury (pressers) be represented on every panel and that panels include no more than two counter personnel, inspectors, or other workers in lower risk jobs. No two individuals from a single shop were to be on the same panel nor were owners or relatives of owners to be on the worker panels. In two situations, the contractor did not adhere to the latter two guidelines. This might have influenced worker willingness to speak frankly (see Discussion.)

There are no specific guidelines or power calculations governing sample size in qualitative inquiry, since the purpose is to gain understanding of a phenomenon and not to determine significant differences. However, to facilitate an open and manageable discussion, it is recommended that each group have between 8 and 12 participants [Morgan, 1996]. Patton [1990] suggests that the validity, meaningfulness, and insights generated from qualitative inquiry have more to do with the information-richness of the cases selected and the capabilities of the researcher than with the sample size. There were seven participants in each owner group and six in each male worker group. One female worker group had four participants and the other had five. All groups were conducted in southwest Ohio. Each was held in the evening after work and refreshments were provided. The same highly experienced focus group moderator conducted all of the groups. Participants were informed that the sessions were being audiotaped and that the information was being collected for NIOSH research. To ensure confidentiality, participants were asked to not use last names nor mention the names of the shops where they worked. The audiotapes were transcribed verbatim and are the major source of data for this article. To ensure that only participant comments were analyzed, one of the co-authors (AR), who observed the focus groups and took notes on who was speaking, labeled each comment with either an M (moderator) or P (participant). All moderator comments could then be excluded from the analyses.

The owner focus group interview guide covered the following topics: general business concerns for the dry-cleaning company owner, government regulations in the dry-cleaning industry, and health and safety issues. The discussion topics in the workers' groups included: job satisfaction and dissatisfaction, health and safety issues, and use of protective clothing and personal protective equipment (PPE) (see Table I) (see Appendix for the interview guides). During debriefing sessions following the first owner and first worker focus groups, the moderator and investigators decided that the interview guides were performing satisfactorily and that changes were not necessary.

The transcripts were analyzed using the qualitative computer program Martin — Version 6.0 [Martin, 1991]. This software program allows for the phrase-by-phrase analysis of transcripts. Using the questions from the interview guide (Appendix) as a framework, the first and second authors used a constant comparison procedure, looking for converging themes both within and across the owner groups and the worker groups separately [Janesick, 1994]. As phrases were encountered which seemed to reflect themes, they were descriptively coded and grouped together into theme-based folders. The folders were then labeled accordingly (e.g., health and safety, regulations). The contents of the folders were then scrutinized to identify subthemes

TABLE I. Themes and Sub-themes

Employers
1) Business and Economic
   a) Regulations
   b) Labor pool
2) Health and Safety
   a) PCE exposure
   b) Burns and ergonomics
   c) PPE use

Employees
1) Job Satisfaction
   a) Challenge, Autonomy, Steady Income, Long Hours, No Benefits
2) Health and Safety
   a) Employer concern for employee
   b) PCE exposure
   c) Burns and Ergonomics
   d) PPE use
   e) Training

within the larger themes. For example, within health and safety concerns there were concerns about burns, PCE exposure, PPE use etc. The comments were recoded to reflect the more specific concerns and then grouped together accordingly. After the two lead authors independently reviewed and coded the transcripts, comparisons were made of the major themes and subthemes. The few differences that were identified were discussed and resolved. For example, one author had recoded use of PPE as a subtheme while the other had not. It was ultimately decided that this was a subtheme under the major theme of health and safety. The findings described below come from this combined analysis. We use quotes to illustrate the discovered themes.

RESULTS

Owners

We asked the owners to rank order their concerns (see Appendix, Business Issues, question A). The results across both focus groups showed that government environmental regulations, economics, and general labor issues were of more concern to the owners than was the issue of worksite health and safety. The following quote perhaps best reflects the owners' sentiments.

> ''. . . you are dealing with equipment and things and chemicals that if misused or mishandled can be very dangerous. . . . but yet when I am thinking about regulations I'm thinking . . . that probably impacts us more than anything else.''

This rank ordering is obviously related to the overarching themes that emerged from analyzing the transcripts. The major themes are business and economic concerns and health and safety concerns. Within the business theme, regulations were the major concern that came up. In terms of health and safety, there was consensus that dry cleaning was not a hazardous industry, and it was not until participants were prompted that they discussed exposure to PCE, burns, and ergonomics.

Business and economic concerns

Regulations. The owners were somewhat concerned about the Occupational Safety and Health Administration (OSHA), but clearly more so about the Environmental Protection Agency (EPA). Of particular concern was the EPA's Superfund Amendments and Reauthorization Act (SARA) of 1986 (Public Law 99–499) and the Comprehensive Environmental Response Compensation and Liability Act of 1980 and subsequent amendments (1989; 40 CFR 302). These laws and regulations have designated PCE as a hazardous substance and toxic pollutant and PCE waste (spent solvent) as hazardous waste. These laws and regulations mandate extensive (and costly) cleanup of contaminated soil, and impose strict, retroactive, and joint and several liability (whereby any person ever having had ownership of the business is responsible for clean-up efforts). A number of the owners had transferred personal property out of their names to protect it from seizure and potential personal bankruptcy. The following statements reflect the owners' feelings.

> ''. . . retroactive liability. Where, perhaps 40 years ago maybe something that we did that was perfectly normal and legal at the time, they'll be coming back on me and possibly holding me up or maybe taking the business away from me that I had no control over of something that was done perhaps 45 or even 50 years ago.''

> ''Everything I own is in my wife's name. I'm a corporation. I'm the head of the corporation. I own nothing, not my house, nothing. And I don't own anything because I'm the head of a corporation, because if they walk in, they can either be nice or not nice.''

The owners unanimously agreed to feeling helpless about the continual barrage of regulations, many of which they did not fully understand or about which they felt uninformed. One owners' comment reflects this frustration:

> ''We all hear cases where people have been inspected, and one inspector told them to do this, this, and this. Another inspector goes to another place and doesn't inspect that at all. So, [we] really don't know what's expected.''

Given this level of fear, it was surprising that only one of the owner-participants had ever had an EPA inspection. He reported to the group that, in fact, the inspection was a pleasant and helpful experience.

> ''And I have to say publicly that my experience with them, . . . was a very good experience. They were not a part of the big bureaucracy, the machine that I thought was going to come in and just delve into us and rip us apart. They were very kind. And they do give us all the opportunity in the world to correct whatever needs to be corrected. But still, there is the horror stories that you do hear out there.''

An in-depth interview with one dry cleaner who did not participate in a focus group agreed with the other owners, but also acknowledged that it was the owners who were not educating themselves about the requirements and regulations. His comment was:

> ''. . . Some owners aren't even aware of what the environmental laws are; less than 10% of owners go to trade association meetings where they would be exposed to information about the laws. . . . One owner I know had been told he had a chiller unit. I looked at it and it was a water cooler unit. . . . Owners don't have enough technical knowledge to make informed decisions about what to buy.''

Health and safety

Overall, they generally agreed that the dry cleaning industry presented very few occupational health and safety risks. The following quotes are illustrative of this lack of concern.

> ''. . . it is a very low risk business. We do not worry about our employees lifting something too heavy, throwing their back out. We do not worry about our employees getting a hand caught in a machine.''

> ''You don't worry about cuts or abrasions. Picking something up . . . accidents, . . . there are no fork lifts running over them. It's a fairly easy job.''

Current training in the industry generally ignores health and safety risks and is usually limited to demonstrating correct machine operation and shop procedures. However, when discussing the training necessary for a new employee, the owners did acknowledge that there were some innate risks in the industry that require training. One owner stated:

> ''If it's a new employee, I'm scared because they will make careless mistakes. . . . They don't know what the equipment can do. That's also why I have somebody with them. I train them. I make sure that they're not alone. I think we all take precautions. I think we all care about our employees, but accidents are going to happen.''

As partially reflected in the above statement, a number of the owners did say that they were concerned about the health and safety of their employees.

> ''When the health and safety regulations are applied to us, the perception is that we are [like] Simon Legrees and we have no concern or care for these people, and if it wasn't for those regulations, they'd be dying like flies in our plants, and that just simply isn't true. We have a lot of concern. They are almost like family.''

More specifically, with respect to health and safety, three major areas were discussed: exposure to solvents (more specifically, PCE), burns and ergonomics, and use of personal protective equipment (PPE).

PCE exposure. The owners, including one of the cleaners we personally interviewed, were insistent that they had been in the business for years, as had their fathers, and no one to their knowledge had suffered any illness due to PCE exposure. They believed that the jury was still out with respect to the hazards of PCE and that even the scientists could not agree. This same belief can be found in much of the trade literature [CEC, 1993; Dow, 1995]. They also said that they trusted their solvent manufacturers to sell them only safe chemicals. These convictions are reflected in the following quotes.

> ''None of us believe perc is a carcinogen. Tests have been done on rats or mice — these are the basis of the epi (epidemiologic) studies. DuPont has done a study which shows that perc doesn't cause cancer.''

> ''I've been around it for 35 years, and I have not found any danger to me or anybody around.''

> ''We just assume the product is safe. In other words, the chemical company is making a safe product for you to use. If it was a dishonest chemical company, maybe it wasn't safe to use.''

Burns and ergonomics. The owner groups did not have much to say about burns and in neither group was ergonomics mentioned as a concern. With respect to burns, they attributed the occasional burn to inattentiveness. For example, one owner said:

> ''In 21 years, I probably burned myself four times, and it was just complete carelessness.''

PPE use (gloves, respirators)

The owners stated that they did have PPE available for the workers, primarily for dealing with large spills or for handling hazardous material, as required ((1996) Code of Federal Regulations, 29 CFR 1910.132 paragraph (a)). However, it sounded as though the PPE typically was not used or was used improperly. In the focus groups, all of the owners agreed that protective garments were not necessary to protect their health and that they would be unwilling to require that their employees wear gloves or respirators as standard operating procedure.

The owners stated that only when cleaning the still were solvent-resistant (Neoprene) gloves used. Even then, the gloves were not always used. The need for respirators was not discussed. One owner participant summed up the groups' beliefs by saying:

> ''Most of us have modern equipment . . . there is no reason to [use gloves or respirators].''

Also, both the owners and the workers felt that customers would be offended if the employees used gloves to handle incoming clothing.

> ''It's offensive to the customer if the counter person wears gloves. And it's pretty hard to ring the cash register or pin a tag on a garment.''

As the discussion continued, it became clear that the owners (and workers) perceived that garments with bodily fluids (e.g., blood and vomit) were more of a hazard than solvent contaminated-sludge from the still. All owners said that they washed their hands frequently and encouraged their employees to do so as well. The following quotes exemplify these viewpoints:

> ''I wouldn't touch wet blood.''

> ''I think one of these days my skin will fall off . . . I wash so much.''

Employees

The major themes that emerged when analyzing the transcripts from the worker groups were job satisfaction and health and safety concerns. Within the overarching job satisfaction (dissatisfaction) theme were the issues of challenge, autonomy, benefits, and sometimes long hours, job security, and unmotivated co-workers. In terms of health and safety, the workers had mixed reactions in terms of owner's concern about workers. A majority of workers were concerned about PCE exposure, and a majority were not concerned with burns. Handling blood (or other bodily fluid)-stained clothes was of great concern. Training in the shops was also a concern for the workers (see Table I). Each of these issues is presented below including illustrative quotes from focus group participants.

Job satisfaction

Challenge, autonomy, steady income, long hours, no benefits. It seemed that for the most part the employee groups were satisfied with their jobs. In fact, when asked for suggestions regarding workplace improvements, they could only come up with the desire to have their shops cooler in the summer and warmer in the winter. Workers directly involved with cleaning and pressing spoke of deriving great satisfaction from making the clothing look nice and spot-free. The women in particular liked the sense of autonomy they experienced while working in dry cleaning compared to other jobs they had held. They reported that when they came to work, they basically knew how much work they had to get done during the course of the day. They then had the freedom to work at their own pace without constant supervision. The men liked the steady income that dry cleaning provided and believed that there would always be a need for pressers and spotters, no matter where they went in the United States. The following quotes illustrate the workers' beliefs.

> ''It's very challenging to be able to remove spots that people bring in to you. They wear these garments, right? But they don't know what they get on them, and then they expect for you to be a magician, and in many instances, it works out favorably for you. I enjoy that.''

> ''You don't have someone standing over your back. What they're watching is the clothes coming down the lines. As long as those are fine, you don't have to deal with nobody else.''

> ''A lot of the old timers used to tell me, 'I can go anywhere across the United States and get a job pressing.' And I found that to be true. You can go any place.''

Of course, not all comments were positive. On the negative side, many of the workers complained about the low pay, the long hours for some (sometimes 6 days/week and 10–12 hours/day), and the short, sporadic hours (i.e., part-time work) for others and, similar to the owners, some commented on having to occasionally work with co-workers they characterized as lazy and incompetent.

> ''[I work] anywhere from 10 to 12 sometimes 13 hours a day. If we have a breakdown or something like that and you have a schedule to meet, sometimes that means you'll have to work 12, 13, 14 hours that day to try to catch up.''

> ''I don't mind my job, but the money stinks, and if a better opportunity comes along, I'll probably take it.''

> ''They just don't understand what they come to work for. It's just not a paycheck. When you work together, things get done quicker. When you work against each other, it's going to take you all day.''

Lack of benefits, particularly health insurance, was also mentioned as a negative aspect of their job.

> ''. . . No benefits, no union, no nothing. So if you want any medical insurance, you have to pay for that out of your pocket. That's what I really hate.''

Not surprisingly, the workers were not concerned with regulations. In fact, none had ever worked in a shop which, to their knowledge, had been investigated by the EPA or OSHA.

Health and safety

Employers' concern for employees. One way of eliciting the workers' health and safety concerns was to ask them how they thought shop managers felt about worker health and safety issues. The findings suggest that the picture is mixed. Most seemed to have worked both in shops where they believed that management cared about health and safety and in others where management was more neglectful. However, many of the comments reflected a general distrust of management motives when it came to health and safety. For example, workers said:

> ''You'll find some (owners) that cheat. You'll find some who don't care, who try to get by knowing that they should do the right thing but they don't, because the right thing will cost them. But for the most part, the owners that I have worked for over the years, they might have been a little slow in doing things, you know, but they get them done ultimately.''

> ''Their only concern was getting those clothes out of there. They didn't care about nothing else. You have people that fell down, fainted in there, everything else, they didn't care. Just get the clothes out.''

> ''The owners are going to make their money first. They're going to worry about the safety and everything when it comes to their butt getting chewed for something.''

PCE exposure. When asked if they had any health and safety concerns, none of the workers spontaneously mentioned PCE exposure. However, when probed as to whether they had any concerns related to exposure from solvents, there was some discussion, as illustrated in the following quotes, about potential acute and chronic effects of PCE and other chemicals.

> ''. . . if we're cooking out the still or something, if I'm around there in them fumes, you get a buzz going. That stuff can't be all that great for you. And getting it on your hands or something, that's one of the chemicals that you're spotting.''

> ''When they bring those clothes out of the dry cleaning machine, they're not dry, and the PCE smell. Because everybody up there is high by this time of day and then almost everybody has a headache, a real bad headache.''

> ''What all these different fumes and chemicals that I'm working around may be doing to my body, physically, you know what I'm saying? It might not be apparent on the surface that you can see, but like you say, all these different chemicals, they've got to be affecting you some kind of way. It may be something that happens 50 years from now, that could have been attributed to me working in dry cleaning.''

However, it was not a consensus, as reflected in the following quotes.

> ''It's just sludge. It ain't going to kill you.''

> ''I do spotting, so I deal with chemicals all the time, but I'm not a bit concerned with them.''

Burns and ergonomics. Similar to the owners' beliefs, both the male and female workers attributed burns from the steam of the presses and the puff irons to their own carelessness. Burns were ''just part of the job.'' Some of the women, but not the men, also complained of having carpal tunnel syndrome from pressing. Again, however, this was accepted as ''just part of the job.''

> ''You ain't a presser if you've never been burned.''

> ''Every time I've burnt myself it's usually been my own fault, being careless.''

> ''I wear braces at night. . . . I get cortisone shots. . . . But, there's nothing else except to have surgery, and they're saying well maybe it will work and maybe it won't work. And I said, 'Oh, well, I'll just live with it'.''

PPE use (gloves, respirators). With respect to using PPE (i.e., gloves and respirators), the employees were no more likely to wear them than the employers. It seemed that the only case where most workers would wear gloves was when it came to handling clothing contaminated with blood, vomit, or other bodily fluids (similar to employers). Blood, because of AIDS, was of particular concern. When handling blood-soiled garments, all stated that they had no problem donning latex gloves.

> ''The thing that concerns me the most is when we have clothes that come in that are . . . like got a lot of blood on them.''

> ''[My co-worker], she does pressing, or cleaning and pressing and spotting, and whenever she spots, she always pulls out a pair of rubber gloves. . . . She's scared to death of blood and AIDS.''

One woman's comment showed her apparent concern about contracting AIDS from a bloody garment. However, she still did not wear gloves.

> EMPLOYEE: ''Well, I'm very careful when I handle clothes with blood. I'm very careful because of the AIDS, HIV situation.''
> MODERATOR: ''Do you wear gloves?''
> EMPLOYEE: ''No, I don't wear gloves.''

The workers expressed resistance to wearing gloves on a continuous basis. Gloves were perceived as too hot and cumbersome (similar to what the owners said) and as hampering the tactile sense necessary for effective spotting. They believed, as did the owners, that customers would be insulted if they saw workers wearing gloves. However, a few of the women did say that if the gloves were tighter fitting and smaller, they might consider using them. If gloves were legally required, workers said they would wear them, but they would not like having to do so. The following quotes reflect worker sentiment with respect to these issues.

> ''Well, they have these green gloves. They're like this long. So you can't really do nothing with them. You know, they're not like those latex fitted-type gloves that you can work in.''

> ''You can't roll nothing. You can't push nothing. You can't do anything with gloves on.''

> ''If we had gloves, . . . that fit nice. . . . We have to pick up little tiny things and move stuff . . . I think that they would be used more. I know that I would use them.''

Only one worker said she wore a dust mask when handling sooty clothing. Others said they knew they were supposed to wear a respirator when changing filters on the machines, but that they most often did not do so. Apparently, as reflected in the following quote, there was also an element of embarrassment about wearing a respirator or mask when it can be seen by the public.

> ''. . . as far as wearing one of them big masks, I don't think you could get anybody to wear something that's going to be uncomfortable and you're moving around a lot. Plus you're being seen by the public because your plant's kind of like opened, and you don't want to look like an idiot standing in there.''

Health and safety training. Worker training appears to be very shop-specific. Some owners/managers train their workers both in terms of safe and efficient equipment operation and others do not. Quotes from two workers reflect this reality.

> ''But see, we can't get really a hold of real, real right, factual information that we should be able to get a hold of. They say you could go to the filing cabinet and get any information that you want to on any of the hazards in our plant. But if you ever read them, they don't tell you, oh, it's the FDA this, and it's OK by this. It's not high enough whatever, the toxic stuff in it is not high enough to even matter. But they don't say over a period of years what it's going to do to you.''

> ''Yeah, you got to read this paper, and he takes you around and shows you everything and shows you how everything works, you know what I'm saying? And he tells you what to do in case of an accident or something. I mean, I've worked at other plants, you know, just come through the door and start working. They don't tell you nothing. They wouldn't even tell you where the first aid kit is.''

DISCUSSION AND CONCLUSIONS

The results here show that the dry-cleaning owners and workers participating in our focus groups do not have an

accurate perception of the dangers associated with exposure to PCE as well as other occupational hazards in their industry. In this study, all owners denied that solvent exposure has any health effects. Some workers felt that excessive exposure to PCE might not be good for them, but none reported any health effects. One woman did suggest that a co-worker's cancer might be due to PCE exposure. Most of the shops represented in the focus groups had dry-to-dry machines, although many of those machines were older models. While it is true that the dry-to-dry machines eliminate the former hazard of wet transfer, i.e., handling garments still wet with PCE solvent, older dry-to-dry machines may result in exposures as high as the old transfer equipment [Ewers, 1998]. Older transfer machines continue to be used in some shops, and the most modern machines (sometimes called fifth generation machines), with dramatically lower exposures, are likely cost prohibitive for many small shops, although the owners did not mention this.

Dry cleaners (both owners and workers) also dismissed other hazards. Burns from hot equipment such as pressing machines are now considered less likely because newer machines require two hands to operate (so neither hand could be trapped in the press). Whether or not the equipment is new, burns are attributed to the negligence or carelessness of the burn victim. An analysis of burn incidents might show whether they might be associated with solvent overexposure effects such as lightheadedness and loss of coordination [Stewart et al., 1970]. Workers associate afternoon headaches with PCE, but not other neurological effects, which might be a factor in burns and other injuries.

The possibility of musculoskeletal disorders is denied despite the fact that most of the pressing equipment is non-adjustable and requires repetitive motions and awkward postures, both of which are risk factors for cumulative trauma disorders [Armstrong, 1986]. This denial is not simply that of an unresponsive management. In fact, in the vast majority of dry-cleaning shops, the owner participates in shop production activities, and his or her health and safety risks are as great as those of the other workers. This is evidenced by the fact that over 70% of dry-cleaning shops have no *employees* (OSHA definition), based on the discrepancy between OSHA's count of U.S. dry cleaners and that of the ABI database, and all shop activities are performed by owners and their families. In a separate study which looked at environmental exposure from a smelter, those in the community who were at greatest risk denied that risk most strenuously, possibly because they also received the most immediate benefits from tolerating the risk [Baird, 1986].

It does appear that if an exposure is perceived to be risky, dry cleaners will take steps to protect themselves from that risk. For example, when handling blood-soiled garments most stated that they had no problem donning latex gloves even though they did not find it necessary to wear any type of gloves (latex or neoprene) when working with PCE or other spotting chemicals. Some workers did wear a respirator when performing maintenance on the machine. However, none of the workers who wore respirators had been fit-tested and half of the men who said they wore them had full beards, so even when worn, respirators are providing only the illusion of safety rather than genuinely protecting the worker.

The focus group findings show that owners were extremely concerned with being inspected by the EPA and to some extent by OSHA. Thus, an intervention might be making modifications to bring a shop well into compliance with EPA and OSHA regulations. OSHA funds a consultative service for small businesses through state workers' compensation programs. Owners are generally not cited for violations found during the consultations as long as these are remedied within a reasonable time frame. Some states go further. Ohio, for example, has a low-cost loan program administered through the workers' compensation program to cover the costs of bringing the workplace into compliance. The loans will also cover the cost of reducing exposure levels even if the levels are already below the OSHA PEL. For example, a dry cleaner could reduce PCE exposure to a level below the anticipated new ceiling (reportedly 1–5 ppm, according to *Drycleaners News* [1997]) when OSHA issues a modified PEL. ''No-fault'' inspections, loans for improvements, and lowered OSHA PEL, combined with education, might motivate some dry-cleaning owners to make health and safety changes in their shops. Unfortunately, smaller dry cleaners not covered by workers' compensation would not be eligible for the loan program.

The workers were very concerned with temperatures in the shop. To effectively air condition a building, it must be sealed. In a dry-cleaning shop this would be counterproductive to reducing worker exposure to PCE. A possible intervention, as mentioned earlier, would be to isolate the dry-cleaning machine(s) in a separate room and ventilate it to the outside to decrease worker exposure. This way, the area where the workers were performing most of their tasks could be air-conditioned, and similarly heated to warm cold shop temperatures in the winter. Alternatively, switching to non-solvent-based cleaning would eliminate the need to enclose the machines to control emissions.

When developing health and safety interventions for this industry, it is particularly important to target the owners because they can have the greatest impact on safety and health in their shop. Choosing significant control options, such as substitution (e.g., using wet cleaning), isolation (e.g., putting cleaning machines in separate rooms and venting to the outside; EPA-approved ventilation hoods), and purchasing more advanced equipment is a decision that must be made by the owners. The owners must have all of the facts about these issues so that they can make informed safety and health decisions. The EPA recently published a

comprehensive review of the pros and cons of alternative cleaning methods [EPA, 1998]. Much of the trade literature, however, does not adequately address or acknowledge the potential hazards associated with PCE. When these hazards are addressed, the focus is on environmental concerns rather than worker health concerns. Researchers in academia and government need to work more closely with trade-journal editors and writers, providing them with important safety and health information in a format which they can easily incorporate into their publications. Education and training materials for owners and workers should focus on worker health and provide options for solutions instead of just discussing problems.

Finally, both owners and workers regard garment cleaning as a *craft*, not just a job. They take pride in making soiled, creased garments look good again. It is the responsibility of those preparing health and safety training and education materials to understand this sense of pride and to attempt to decouple it from the use of specific solvents. Both owners and workers need to understand that they do not have to use solvents such as PCE to obtain that quality of craftsmanship.

There are some limitations to this study. First, we were not able to obtain as many participants as we had hoped. From 96 shops with an estimated 250–300 workers, we were only able to recruit six owners and only six workers. This represents about 2% of the worker population in the area. An additional 15 workers were recruited from 83 shops with approximately 900–1,000 workers (1.5% of the worker population). Although we did not intend to conduct additional focus groups, and the number of participants in each group was adequate, we would have preferred to have done all our recruiting from the first pool of 48 shops (an estimated 125–150 workers). One reason for the low worker participation was probably that, in effect, much worker solicitation was screened by the owner, since the only name we had for each shop was the name of the owner. If the owner always answered the telephone and never let the telephone solicitor speak to an employee, no employees could be recruited from that shop. This could have introduced bias, as owners would be unlikely to provide the names of ''troublemakers.'' However, worker participants did discuss workplace problems. Not complaining much about their current employers could be due to their not being ''troublemakers'' or to their not wanting to look foolish among their peers for continuing to work under poor work conditions. When one participant, recruited through a friend, did complain of her current employer, other women responded ''Why are you still working there?''

Two other factors probably affected the participation rate, particularly with respect to owner recruitment. These being a general mistrust of government agencies and other ''outsiders,'' as demonstrated by owner comments, and inexperience in focus group recruiting and failure to follow our guidelines by the second contractor. This latter factor may have had other effects as well: at three of the four worker focus groups, there was more than one participant from a single shop. One of the ''employees'' in one focus group was the son of an owner. The presence of other employees from their shop, and/or the presence of an owner's son, may have inhibited some participants.

Despite the limitations outlined above, the findings from this qualitative study allowed us to obtain a much more complete picture of worker and owner perceptions of health and safety issues in their industry and what might be a more successful type of intervention. A structured survey with preset response categories would not have given us as complete a picture. One motivation for this study was to learn if an educational intervention recommending the use of personal protective equipment, as a temporary means of reducing exposure in small shops until substitution of a non-solvent cleaning method or installation of engineering controls on a solvent-based system could be implemented, was realistic. The findings from these focus groups, in-depth interviews, and site visits have convinced us that trying to train workers to use gloves and respirators to control PCE exposure, even just during maintenance and other high-exposure activities, would not be feasible in this industry. An interim intervention, attempting to train workers to use PPE in a culture that does not support its use, is likely not the best way to promote health and safety. As stated above, owners agreed that PPE was unnecessary and that they would not require that their employees use it. As reflected by the workers' and employers' comments, there appear to be too many obstacles to modifying their work practices (e.g., lack of tactile sense, negative customer perception, lack of acknowledgment of any hazard associated with the exposure). Our educationally based interventions will not focus on changing worker and owner behavior; rather, we will focus our efforts on educating owners and workers as to the actual hazards that exist in dry cleaning as well as promoting substitution of non-solvent cleaning methods or low-cost retrofit engineering controls. We expect that if owners are provided with this type of information, they will be more amenable to making changes to reduce exposures to health and safety hazards. Working in a culture that is concerned with health and safety will enhance worker motivation to follow health and safety practices.

ACKNOWLEDGMENTS

We thank Martha Schimberg, a masterful moderator who guided the six focus groups on which this report is based, and Drs. Pamela Kidd, Allison Tepper, and Rick Driscoll for their insightful comments on earlier drafts of the manuscript.

APPENDIX

Discussion Questions for Owner Focus Groups

Business Issues

A. You face a lot of issues in your business — economics, labor questions, environmental and other governmental regulations, health and safety of you and your employees. Please rank them in order of importance and explain rankings. [Concerns (chosen in advance by the researchers) were listed on a posterboard and each participant was given five sticky dots to distribute among his/her items of concern. Scores for one owner group were: EPA = 14; Labor = 7; other government regulations = 7; dress codes = 3; general economics = 2; health and safety = 2. Scores for the other owner group were similar.]

Health and Safety Issues

A. What are the major health and safety issues for your employees/yourself/your family (if employed there)?
B. (If not mentioned above) What about:
   1. PERC
   2. Burns from hot equipment
   3. Ergonomic issues
   4. Falling equipment
   5. Mechanical hazards

Changes in the Shop

A. If you had unlimited funds to make health and safety changes in your shop, what would they be? Why those?
B. If a health and safety consultant came to your shop and made recommendations for ways to reduce health and safety hazards in a voluntary way, what factors would impact on whether or not you would do them?
C. What about wearing personal protective equipment (PPE) like respirators or gloves? Does, anyone in your shop wear these items? If so, when? If not, why not?
D. Suggestions for ways to get employees to wear PPE more often?

Regulations

A. Are there any kinds of federal or state regulations in your industry? What are they? Are they valid?
B. How strictly are they enforced?
C. How strictly does your company observe them? Why? Why not?
   1. Are there inspections?
   2. If yes, how often?
   3. Are these inspections announced?
D. Are these inspections a cause of concern for you? Why? Why not?
E. What causes the most concern?
F. What government body makes these regulations?
G. What is the difference between NIOSH and OSHA?

Discussion Questions for Worker Focus Groups

General Issues:

A. What do you like most about your job?
B. What do you like least?

Health and Safety Issues

A. What are the major health and safety issues for you?
B. (If not mentioned above) What about:
   1. PERC
   2. Burns from hot equipment
   3. Ergonomic issues
   4. Falling equipment
   5. Mechanical hazards

Changes in the Shop

A. If the owner of your shop had unlimited funds to make health and safety changes, what would they be? Why those?
B. What about wearing personal protective equipment (PPE) like respirators or gloves? Does, anyone in your shop wear these items? If so, when? If not, why not?
C. Suggestions for ways to get people to wear PPE more often?

Regulations

A. Are there any kinds of federal or state regulations in your industry? What are they? Are they valid?
   B. How strictly are they enforced?
   C. How strictly does your company observe them? Why? Why not?
      1. Are there inspections?
      2. If yes, how often?
      3. Are these inspections announced?
   D. Are these inspections a cause of concern for you? Why? Why not?
   E. What causes the most concern?
   F. What government body makes these regulations?
   G. What is the difference between NIOSH and OSHA?

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