

Workplace Safety Climate and Respiratory Protection Practices in Acute Care Hospitals

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Objectives

The goals of this analysis were to examine the relationship between safety climate (SC) measures and:

- Location (Minnesota or Illinois)
- Demographic characteristics of participants
- Type of employee: Healthcare worker (HCW), Unit manager (UM) or Hospital manager (HM)
- Participants' responses about fit testing, medical clearance and training

Methods

Twenty-nine hospitals in Minnesota and Illinois were surveyed as a part of REACH II, a NIOSH sponsored survey of regional respiratory protection practices and policies in acute care hospitals. Data collection in each facility included interviews with hospital managers (directors of nursing, employee health, infection prevention and environmental health and safety) and unit managers and healthcare workers in medical/surgical, ICU, pediatrics, emergency department and respiratory therapy. Questions addressed risk assessment, medical evaluation, fit testing, training, program evaluation and infection prevention practices. Each participant completed a written 11-question safety climate questionnaire (Figure 1). All information was considered confidential, no personal identifiers were collected and only aggregated data were provided to each hospital.

Safety climate questions were converted to a Likert scale, in which 'disagree' = 0 and 'don't know' = 1 (neither agree nor disagree) and 'agree' = 2. For each participant, a safety climate score was calculated by adding the value for each question (range: 0-22). Contingency tables with Chi-square analyses were used to evaluate the relationship between safety climate score and the examined variables.

Methods

Figure 1. Safety Climate Responses (Ave & SD)

	Minnesota						Illinois					
	HM Ave (SD)	UM Ave (SD)	HCW Ave (SD)	N	HM Ave (SD)	UM Ave (SD)	HCW Ave (SD)	N	HM Ave (SD)	UM Ave (SD)	HCW Ave (SD)	N
Question:												
A properly fitted respirator can protect workers from on-the-job exposure to airborne infectious diseases.	1.1 (0.4)	1.2 (0.6)	1.1 (0.4)	47	1.1 (0.4)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	180
An N95 respirator is more effective than a surgical mask at protecting workers from airborne infectious diseases.	1.1 (0.4)	1.2 (0.6)	1.1 (0.4)	47	1.1 (0.4)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	177
Workers at my workplace use respirators when they are required.	1.1 (0.4)	1.1 (0.4)	1.1 (0.4)	47	1.1 (0.4)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	177
Supervisors correct workers if they do not wear a respirator when required.	1.4 (0.4)	1.1 (0.4)	1.1 (0.4)	47	1.1 (0.4)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	178
Supervisors correct workers if they do not wear a respirator properly (e.g. if only one strap was used).	1.6 (0.3)	1.1 (0.4)	1.1 (0.4)	47	1.1 (0.4)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	177
At my workplace, safety hazards are quickly corrected.	1.1 (0.3)	1.1 (0.4)	1.1 (0.4)	46	1.1 (0.4)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	177
At my workplace, all reasonable steps are taken to minimize exposure to airborne infectious diseases.	1.0 (0.3)	1.0 (0.4)	1.0 (0.4)	47	1.0 (0.3)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	174
The health and safety of workers is a high priority with management when it comes to respiratory protection.	1.0 (0.3)	1.0 (0.4)	1.0 (0.4)	47	1.0 (0.3)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	177
Workers are provided with training about proper use of respiratory protection.	1.2 (0.4)	1.1 (0.4)	1.1 (0.4)	47	1.1 (0.4)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	178
Management communicates information about safety and health on a regular basis.	1.1 (0.3)	1.1 (0.4)	1.1 (0.4)	47	1.1 (0.4)	1.0 (0.3)	1.0 (0.2)	46	1.0 (0.3)	1.0 (0.3)	1.1 (0.3)	177
Safety Climate Score (All Questions Combined)	0.8 (0.3)	0.8 (0.4)	0.8 (0.4)	46	0.8 (0.3)	0.8 (0.3)	0.8 (0.2)	46	0.8 (0.3)	0.8 (0.3)	0.8 (0.3)	177

Results

Comparison of Safety Climate Scores with Demographics (by state)

Demographic	MN p-value	IL p-value	Finding
Length of employment	0.72	.091	No significant relationship between safety climate scores and length of employment
Educational level	0.66	.081	No significant relationship between safety climate scores and educational level

Comparison of Safety Climate Scores by Interview Type

Comparison	T-Test p-value	Finding
Minnesota Healthcare worker vs. Unit manager vs. Hospital manager	<0.0002	In Minnesota, safety climate scores for Healthcare Workers were significantly more negative than for Managers (unit & hospital)
Illinois Healthcare worker vs. Unit manager vs. Hospital manager	0.11	In Illinois, no significant difference in safety climate scores between groups

Results

Comparison of Safety Climate Scores by Interview Type & State

Comparison	p-value	Finding
All participants	0.0002	MN participants had significantly more negative safety climate scores compared with IL participants.
Healthcare worker	<0.0001	MN healthcare workers had significantly more negative safety climate scores than IL healthcare workers.
Unit manager	0.3	No significant difference in unit managers' safety climate scores between states.
Hospital manager	0.8	No significant difference in hospital managers' safety climate scores between states.

Minnesota Healthcare Worker Variables Comparison of Safety Climate Scores with Selected Variables

Variable	p-value	Finding
Frequency of Medical Evaluation	0.15	No significant difference in safety climate scores for MN HCW receiving OSHA recommended medical evaluation and those not.
Frequency of Fit Test	0.10	No significant difference in safety climate scores for MN HCW that received OSHA recommended frequency of fit testing and those that did not.
Frequency of Training	<0.0001	Safety climate scores were significantly worse for MN HCW who did not receive training at the OSHA-recommended frequency compared to those who did.
Format of Training	<0.0001	Safety climate scores were significantly worse for MN HCW who received Independent training (e.g. online) vs. those receiving In-person training.

Minnesota Training Variables and Healthcare Worker Job Type Patient Care vs. Non-Patient Care vs. Physicians/Nurse Practitioners/Physician Assistants

Variable	p-value	Finding
Training HOW to wear a respirator	<0.0001	Non-Patient Care jobs were significantly more likely than other job categories to say they were not trained about HOW to wear a respirator.
Training WHEN to wear a respirator	<0.0001	Non-Patient Care jobs were significantly more likely than other job categories to say they were not trained about WHEN to wear a respirator.
Training Frequency	<0.0001	Patient Care jobs were significantly more likely than other groups to say they received training at the OSHA frequency.
Training Format	0.0125	Non-Patient Care and MD/PA jobs were more likely than Patient Care jobs to say they had received independent training (e.g. online) than In-person training.

Non-patient care jobs = do not provide direct clinical care to patients, but are likely to enter patient rooms (e.g. environmental services, food services, maintenance). Patient-care jobs = provide direct care to patients (e.g. RN and other nursing jobs, respiratory therapist, phlebotomist, radiology or other technicians)

Conclusions

COMPARING MINNESOTA AND ILLINOIS

- Safety climate scores were significantly different between the two states, for all employees combined.
- Managers in Minnesota had significantly higher safety climate scores than healthcare workers. No differences were found in safety climate scores among interview types in Illinois.

MINNESOTA

- Non-patient care employees were more likely to be inadequately trained to wear respirators even though these individuals reported utilizing respirators to enter airborne isolation rooms.
- **Lack of training in respiratory protection was associated with more negative safety climate scores.**
- **In-person training was associated with more positive safety climate scores.**
- **Training that occurs at least as frequently as OSHA requires was associated with more positive safety climate scores.**

Implications for Practice

- Assessing safety climate at the healthcare worker level is vital to accurate assessment of the workplace culture.
- Providing annual, in-person training about respiratory protection may promote more positive safety climate.
- Include non-patient care employees in the hospital's respiratory protection program or clarify who is allowed to enter an infectious patient's room.
- Ensure that clinical leaders such as Physicians, Nurse practitioners and Physician Assistants are receiving adequate training.

Study Limitations

- Converting the Safety Climate questions to a numeric Likert scale may not be appropriate.
- More large, urban hospitals in Illinois than in Minnesota may have introduced differences in the two samples.
- It is not possible to conclude in which direction the safety climate associations occur: i.e. does poor safety climate lead to or result from failure to properly train, fit test or medically evaluate employees.