

# Organizational Climate and Nurse Health Outcomes in the United States: A Systematic Review

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*Received April 26, 2007 and accepted September 12, 2007*

**Abstract:** Increasing interest has been focused on understanding the role working conditions play in terms of the serious issues facing hospitals today, including quality of patient care, nurse shortages, and financial challenges. One particular working condition that has been the subject of recent research, is the impact of organizational climate on nurses' well-being, including occupational health outcomes. To examine evidence-based research on the association between organizational climate and occupational health outcomes among acute-care registered nurses, a systematic review of published studies was conducted. Studies assessing the association between organizational climate variables and three common health outcomes in nurses (blood/body fluid exposures, musculoskeletal disorders, and burnout) were reviewed. Fourteen studies met the inclusion criteria. Although most were cross-sectional in design and variability was noted across studies with respect to operational definitions and assessment measures, all noted significant associations between specific negative aspects of hospital organizational climate and adverse health impacts in registered nurses. While evidence for an association between organizational climate constructs and nurses' health was found, data were limited and some of the relationships were weak. Additional studies are warranted to clarify the nature of these complex relationships.

**Key words:** Organizational climate, Nurses, Hospital, Quality of worklife, Occupational health, Blood and body fluid exposures, Musculoskeletal disorders, Burnout, Working conditions

## Background

In the United States (U.S), nearly 60% of the nation's 2.4 million registered nurses (RNs) are employed in the acute care hospital setting<sup>1</sup>. Comprising approximately 25% of the total hospital workforce, RNs are the single largest workgroup in the U.S. healthcare system<sup>1</sup>. However, current and projected nursing shortages in this large and critical workgroup, ranging from 340,000 to one million by the year

2020, are increasingly of concern<sup>1-3</sup>. The causes for this shortfall are numerous and varied and include: aging workforce; rapid exit of newly trained nurses; limited capacity to train new nurses; fear and concern regarding contagious and potentially fatal diseases; and job dissatisfaction<sup>4-8</sup>. Shortfalls are especially problematic given that there is heightened demand for skilled nurses to provide increasingly complex nursing care. Recruitment and retention is further compromised by the fact that nursing is a high stress, high strain profession, with very high rates of workplace injuries and illnesses; in 2005, the Bureau of Labor Statistics (BLS)

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reported that the nursing industry had the 13th highest work injury rate (8.7 injuries per 100 full time nurses) in the U.S.<sup>9)</sup>

Back injuries are a special concern, as nursing ranks seventh nationally of all occupations in terms of back-related lost work days<sup>10)</sup>. Another important occupational health risk that is especially prevalent in nursing is the risk of exposure to blood and body fluid exposures. An estimated 350,000–500,000 blood and body fluid exposures occur in health care each year, primarily among nurses<sup>11)</sup>. Over 20 different pathogens, including human immunodeficiency virus (HIV) and hepatitis B and C viruses, may be transmitted through these exposures<sup>12)</sup>. To date, there have been 57 documented cases of occupational HIV transmission among healthcare workers, including 24 nurses, as reported by CDC, through December 2001<sup>13, 14)</sup>. Finally, another area of concern with regards to the nursing profession is the well-documented adverse mental health problems associated with nursing. Rates of depression, anxiety, somatization, and burnout reported by nurses are among the highest of all the care-giving professions<sup>15–17)</sup>. Burnout, in particular, has been associated with high rates of nurse dissatisfaction and turnover<sup>18)</sup>.

In the past decade, efforts have been made to better understand the role of hospital working conditions with respect to important outcomes, including nurses' health and well being. For example, a number of studies have examined the relationship between hospital working conditions and patient safety, and more recently, studies have sought to determine how nurses' well being affects patient safety as well as the "working conditions-patient outcomes" relationship<sup>19–22)</sup>. Researchers from a variety of disciplines are exploring this topic from various perspectives to better understand what is needed to retain and recruit nurses, improve patient quality of care and patient safety, and, at the same time, improve the health and well being of nurses.

As with many complex issues that are examined by researchers from various disciplines, the issues, relationships and even the terminology may not be standardized for even the most basic concepts. For example, some researchers in the field refer to hospital setting factors as "*working conditions*", others refer to them as "*organizational climate*", and still others refer to them as "*job characteristics*". These broad terms are further defined and operationalized quite differently. For example, the classification system for "*working conditions*" established by the Agency for Healthcare Research and Quality (AHRQ), includes the following categories: (1) workforce staffing, (2) workflow design, (3) personal/social factors, (4) physical environment, and (5) organizational culture and climate factors<sup>23)</sup>. Under this classification system, organizational factors are considered a

subset of working conditions, yet in other publications, working conditions are considered a sub-construct under organizational factors<sup>24)</sup>. This confusion is likely due to the various disciplines studying these important relationships (e.g., nursing, occupational safety, sociology and health policy).

To help bring some clarity to this topic, and building upon earlier work by the health sociologist Terry Beehr and colleagues, a new conceptual model was developed to provide a guiding framework to this review<sup>25, 26)</sup>. The model is depicted in Fig. 1.

In this model, the various factors comprising three major domains: organizational characteristics, individual characteristics, and working conditions, that characterize or affect the hospital work setting are thus conceptualized as driving the overarching construct referred to as "quality of work life", broadly defined as "*the sum of perceptions employees have about their experience at work and related to work*". Within the working conditions domain, we can further conceptualized three constructs that help to define this, including organizational climate, job characteristics, and work environment. A number of factors are provided for each of these three constructs in the model in Fig. 1, but the list is by no means all inclusive and is simply illustrative. With some careful thought we might envision a connective link for all of these domains, elements and outcomes, including outcomes at the corporate or facility level, perhaps through the overarching concept of quality of worklife, as shown in Fig. 2, although clearly this line of research is very much in its infancy.

Because of the complexity involved in attempting to review all working condition aspects with respect to health outcomes in nurses, a decision was made to limit this review to a specific sub-construct of working conditions, namely, organizational climate, as well as a limited number of nurse-level perceptions of job characteristics, including staffing, scheduling, decision-making, and interpersonal relationships. Organizational climate, in particular, has been especially problematic to define, and therefore to measure. In general, organizational culture is seen as the underlying principles, values, and norms of an organization. These are operationalized through policies and procedures in the work place and measured through audits, injury rates, compensation rates, etc., depending on the particular aspect of culture that is being assessed (i.e., patient safety culture might be assessed by patient falls rates). It is important to note that there are multiple types of organizational culture, e.g., patient safety, employee safety, ethical conduct, diversity, etc. All of these help to define a particular work place. At the employee level, culture is perceived as the "climate" of an organization and measured

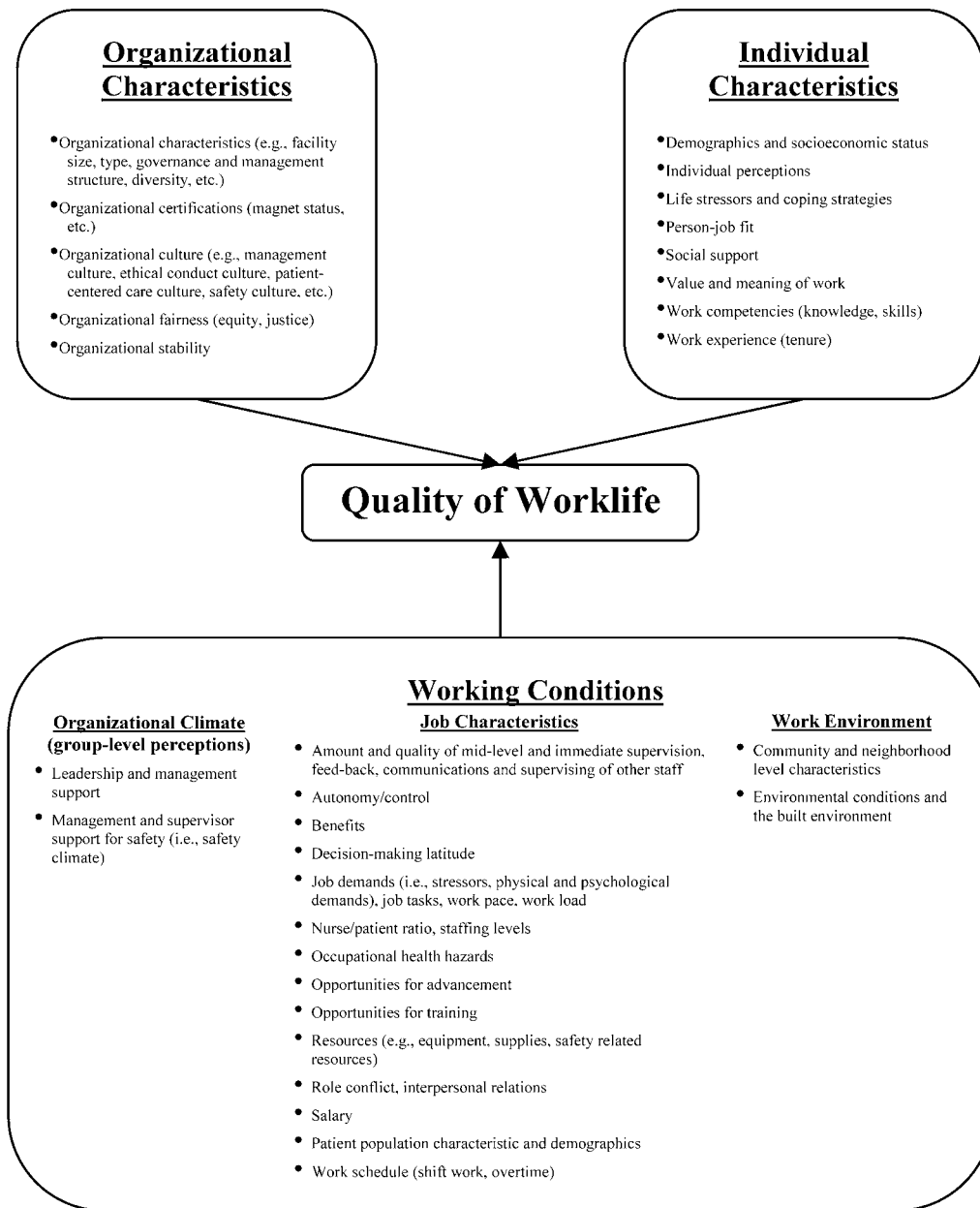


Fig. 1. Conceptual model of quality of hospital worklife domains.

using various climate surveys. One particular and especially relevant aspect of organizational culture in terms of worker safety and occupational health outcomes is safety culture, assessed at the employee level as safety climate. Other aspects of organizational climate, such as leadership quality and nurse management characteristics, have also been studied with respect to employee health outcomes.

Using this as the guiding principle for selection of studies for inclusion, a systematic literature was conducted. To further provide clarity, a table of definitions of terms used in this review is provided (see Table 1).

## Methods

A multi-step approach was followed for this review. In the first step, a search was conducted of the MEDLINE and CINAHL electronic databases for publications related to this topic. Only articles published in the English language within the past 10 yr (January 1997–July 2007) in peer-reviewed journals were considered. An initial search was performed using the keywords “hospital”, “RN” or “nurse”, AND at least one of the following occupational health outcomes: “blood and body fluid exposures,” “sharps injury,”

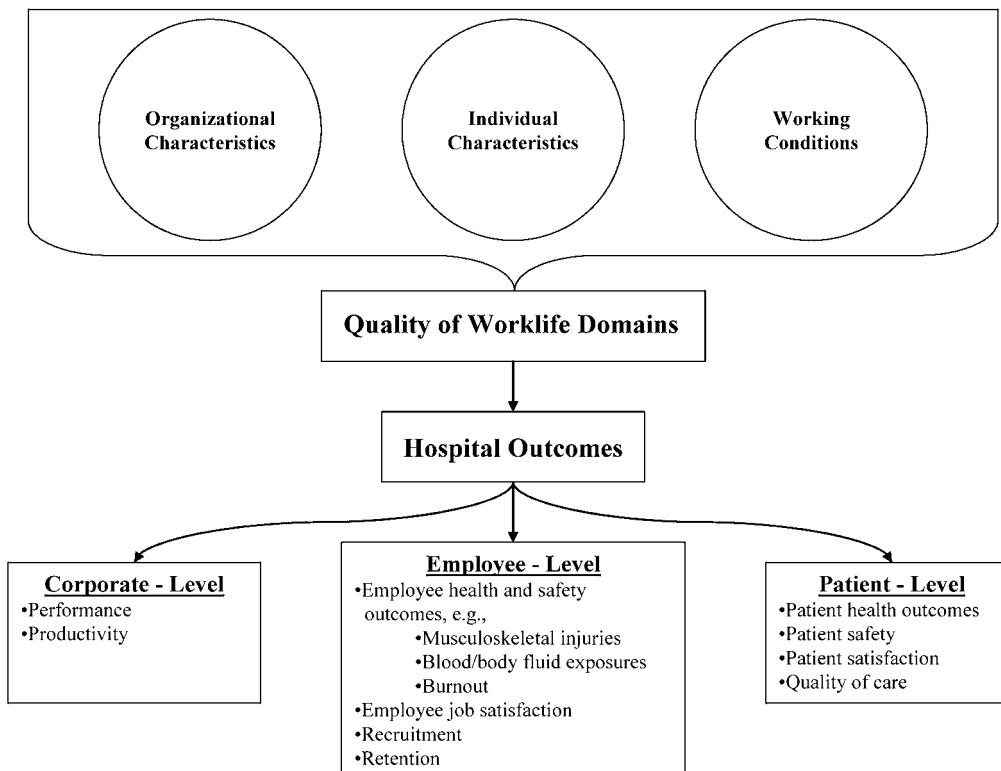


Fig. 2. Theoretical model of quality of worklife and hospital-related outcomes.

“needlestick injury,” “back pain,” “musculoskeletal injury,” “burnout”, OR the terms “occupational health”, or “occupational safety”. This search was then narrowed by a set of keywords to capture organizational climate factors, including: “administrative/supervisory support”, “leadership”, “management”, “organizational climate”, “organizational culture”, “safety climate”, and certain specific job characteristics, including, “resource adequacy”, “interpersonal relations”, and “staffing”.

A total of 1,654 titles were identified using this approach. Either abstracts, or, full citations, if the abstracts were not available, were retrieved and then reviewed by at least two authors to determine if they met the criteria for inclusion, i.e., they reported on primary research conducted in U.S. acute care hospital-based RNs, AND examined relationships between organizational climate factors or other specific working condition variables AND at least one of the following occupational health outcomes: (1) blood and body fluid exposure, (2) musculoskeletal injuries, and (3) burnout. Although we did not specifically select for “magnet” status (i.e., hospitals with outstanding reputations for recruiting and retaining nurses, or with formal recognition through an American Nurses’ Credentialing Center process)<sup>24</sup>, we included this for those studies in the review if all other

considerations for inclusion were met, since this is an indicator of organizational climate (i.e., leadership). From this procedure, 368 abstracts appeared to meet the criteria and full citations were retrieved for further examination. Of these, 14 met the criteria for inclusion in this review. The reasons for exclusion included the following: they did not report on original quantitative data; they did not assess the specific relationships of interest; they were editorials or concept papers; they lacked statistical analysis; research was conducted in a non-U.S. country; and because the research included all hospitals employees, and not specifically or primarily RNs.

In the next step, all articles meeting the inclusion criteria as described were then audited and summarized in evidence tables, developed for each of the three outcomes. The evidence tables include the following information: an overview of the research methods (sampling and setting, design, response rates, level of analysis), variables studied, and the significant key relationships reported. The studies are organized in the tables by year and then alphabetically. Each study is discussed in the text and then a critical analysis of the body of evidence is given.

**Table 1.** Definition of terms

Term	Definition
Blood/body fluid exposure	Exposure to blood, tissue, or other body fluids such as semen, vaginal secretions, cerebrospinal, pleural, peritoneal, pericardial, synovial, and amniotic fluids, etc., through: (1) percutaneous injury (i.e., a needlestick or a cut with a sharp object), (2) contact with mucous membrane or non-intact skin (i.e., skin chapped, skin abraded, skin dermatitis), (3) prolonged contact with intact skin or contact that involves extensive areas of skin <sup>76</sup> .
Burnout	An index of dislocation between what people are and what they have to do. It represents “an erosion of values, dignity, spirit and will- an erosion of the human soul.” Causes of burnout at work are attributed to six specific sources: work overload, lack of control, insufficient reward, unfairness, breakdown of community, and value conflict <sup>77</sup> .
Musculoskeletal disorder	A condition resulting from repetitive injury over time and from overuse to a part of the musculoskeletal system. In the workplace, it usually refers to lower back, shoulders, hand and wrist (i.e., carpal tunnel), and lateral and medial rotator cuff injuries <sup>78</sup> .
Organizational climate	Employees’ collective perceptions of organizational attributes, such as decision making, leadership, and norms. Climate is conceptualized as the surface manifestation of the culture within a given organization <sup>79</sup> .
Organizational culture	The underlying principles, norms, values, beliefs, and assumptions within the organization <sup>79</sup> . As such, organizational culture influences all aspects of work.
Quality of worklife	The sum of perceptions employees have about their experience at work and related to work.
Safety climate	Employees’ collective perceptions regarding the organization’s commitment to safety <sup>80</sup> . The surface manifestation of safety culture within a given organization.

## Results

Five of the papers focused solely on blood and body fluid exposures (Table 2), two focused solely on musculoskeletal injuries (Table 3), four focused on burnout (Table 4), two examined both musculoskeletal injuries and blood and body fluid exposures (cited in both Tables 2 and 3), and one focused on all three outcomes (Tables 2, 3 and 4). The sample sizes ranged from 34 RNs to over 10,000, and the studies were geographically diverse. Most studies were cross-sectional with the exception of a set of three longitudinal analyses conducted by one research team<sup>27,28</sup>, and a study by Hofmann and Mark<sup>29</sup>. The unit of analysis also varied, with the majority of researchers analyzing individual RNs (n=9), followed by nursing unit (n=4), and one that analyzed hospital level data. Response rates varied across studies, and ranged from 26% to 86%. Occupational health outcomes were mainly assessed by self-reported measures for needlesticks and musculoskeletal injuries (with one team using nursing unit aggregated occupational health records), and mental health outcomes were most commonly assessed using the Maslach Burnout Inventory (MBI) (5 out of 6 studies)<sup>30</sup>. The organizational climate measures varied across studies, however, most of the investigators employed scales from

the Nursing Work Index-Revised (NWI-R)<sup>31</sup> or instruments derived from this questionnaire. Each of the studies are discussed below.

### *Blood and body fluid exposures and musculoskeletal disorders*

In one of the first studies conducted on safety climate and needlesticks, Gershon *et al.*<sup>32</sup>, examined the relationship between six major sub-constructs of safety climate and self-reported exposure incidents among a sample of clinical hospital workers (N = 789), which included a large number of nurses (N = 481, 61%) employed by a large urban medical center. Using a blood/body fluid-specific safety climate scale, this research team found that negative perceptions of senior management support for safety programs, and low frequency of safety-related feedback/training were significantly related to poor compliance with safe work practices as well as with increased rates of self-reported blood and body fluid exposure incidents ( $p < 0.05$ ). The authors concluded that safety climate can be an important factor with respect to the adoption of safety procedures and risk of exposure.

In 2002, Clarke *et al.*<sup>33</sup> reported on data originally collected in 1991 from a large sample (N = 1,692) of RNs working on in-patient units in 20 hospitals. The investigators

**Table 2. Associations between quality of worklife variables and blood and body fluid exposures in hospital nurses**

Reference	Sample and setting	Design, response rate and level of analysis	Quality of worklife variables		Blood and body fluid exposures	Significant findings*
			Items or scales	Measures	Source	
Gershon <i>et al.</i> , 2000 <sup>32)</sup>	<u>Sample:</u> 481 hospital nurses  <u>Setting:</u> large urban health center	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> 60%  <u>Analysis Level:</u> Nurse	<ul style="list-style-type: none"> <li>• Safety Climate                             <ul style="list-style-type: none"> <li>◦ Senior management support for safety programs</li> <li>◦ Workplace barriers to safe work practices</li> <li>◦ Cleanliness and orderliness of the work site</li> <li>◦ Conflict and communication among staff members</li> <li>◦ Safety-related feedback/training by supervisors</li> <li>◦ Availability of personal protective equipment and engineering controls</li> </ul> </li> </ul>	Hospital Safety Climate Scale <sup>23)</sup>	Self-reported blood and body fluid exposures and compliance with safe work practices.	<ul style="list-style-type: none"> <li>• Low levels of senior management support for safety programs and lack of safety-related feedback and training correlated with increased exposure incidents.</li> <li>• Workplace barriers (job hindrances) were significantly correlated with lack of compliance.</li> </ul>
Clarke <i>et al.</i> , 2002 <sup>33)</sup>	<u>Sample:</u> 1,692 nurses  <u>Setting:</u> 40 inpatient units in 20 hospitals.	<u>Design:</u> Cross-sectional and prospective elements  <u>Response Rate:</u> 85%  <u>Analysis Level:</u> Unit	<ul style="list-style-type: none"> <li>• Nurse manager leadership</li> <li>• Resource adequacy</li> <li> </li> <li>• Staffing Data</li> </ul>	Nursing Work Index-Revised Scale <sup>31)</sup>  Hospital Data	Self-reported safe work practices, needlestick injuries and near misses	<ul style="list-style-type: none"> <li>• Negative perceptions of nurse manager leadership, low staffing levels, and low resource adequacy correlated with unsafe work practices, increased needlestick risk, and near misses.</li> </ul>
Clarke <i>et al.</i> , 2002 <sup>34)</sup>	<u>Sample:</u> 2,287 medical-surgical unit nurses  <u>Setting:</u> 22 hospitals in 11 cities	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> 56%  <u>Analysis Level:</u> Nurse	<ul style="list-style-type: none"> <li>• Resource availability</li> <li>• Nurse staffing</li> <li>• Administrative support</li> </ul>	Nursing Work Index-Revised Scale <sup>31)</sup>	Self-reported needlestick injuries and near-misses	<ul style="list-style-type: none"> <li>• High patient loads correlated with increased rates of needlestick and near-misses.</li> <li>• Low levels of administrative support correlated with needlestick risk.</li> </ul>

\*Significance =  $p < 0.05$

(Continued)

examined the relationship between prospectively and retrospectively collected self-reports on sharps injuries and resource adequacy, nurse manager leadership, and staffing data. The investigators collected adequacy and leadership data using the NWI-R<sup>31)</sup>, which contains a number of items that address nurses’ perceptions of a number of organizational characteristics at work. Staffing data came directly from administrative records on full-time equivalent RN positions and daily patient census on the hospital units selected for study. Extensive analyses were conducted at the unit level, and odds ratios were estimated for the relationships of interest. They found that, in general, nurses working on units with poor work climate scores and low staffing levels were more likely to report risk factors associated with needlestick injuries. For example, units reporting low resource adequacy

scores were more than three times more likely to report recapping used needles (Odds Ratio [OR] = 3.30, 95% Confidence Interval [CI<sub>95%</sub>] 2.08, 5.23), and units rating their nurse leadership as poor were more than twice as likely to similarly recap (OR = 2.16, CI<sub>95%</sub> 1.22, 3.16). Low nurse staffing was significantly associated with retrospectively reported needlesticks (OR = 3.03, CI<sub>95%</sub> 1.22, 7.51) although not with prospectively reported needlesticks. However, low nurse staffing was correlated with prospectively reported near-misses (OR = 1.95, CI<sub>95%</sub> 1.02, 3.73). The authors concluded that both staffing and nurse leadership play a role, along with resources, such as safer needle devices, in minimizing the risk of needlestick injuries.

Another study by Clarke and colleagues<sup>34)</sup> involved a large sample of nurses (N = 2,287) employed in medical surgical

**Table 2. (Continued) Associations between quality of worklife variables and blood and body fluid exposures in hospital nurses**

Reference	Sample and setting	Design, response rate and level of analysis	Quality of worklife variables		Blood and body fluid exposures	Significant findings*
			Items or scales	Measures	Source	
Hofmann and Mark, 2006 <sup>29)</sup>	<u>Sample:</u> 1,127 <u>Setting:</u> 81 units in 42 acute care hospitals	<u>Design:</u> Predictive design <u>Response Rate:</u> N/A <u>Analysis Level:</u> Unit	• Safety climate (composite)	Safety Climate Scale <sup>35-37)</sup>	Archival records of needlestick injuries	• Safety Climate was not significantly correlated to needlestick injuries.
Stone and Gershon, 2006 <sup>38)</sup>	<u>Sample:</u> 837 nurses <u>Setting:</u> 39 ICUs in 23 hospitals	<u>Design:</u> Cross-sectional <u>Response Rate:</u> 49% <u>Analysis Level:</u> Unit	• Organization climate (composite) • Staffing ratio • Scheduling • Hospital characteristics ◦ Magnet status	Perceived Nurse Work Environment Scale <sup>39)</sup>	Administrative data on blood and body fluid exposure	• Magnet hospitals had lower rates of blood/body fluid exposures.
Stone <i>et al.</i> , 2007 <sup>40)</sup>	<u>Sample:</u> 2,047 nurses <u>Setting:</u> 13 New York City hospitals	<u>Design:</u> Cross-sectional <u>Response Rate:</u> 50% <u>Analysis Level:</u> Unit	• Organizational Climate ◦ Professional practice ◦ Nursing management ◦ Nurse-physician collaboration ◦ Positive scheduling climate ◦ Unit decision-making ◦ Opportunities for advancement	Perceived Nurse Work Environment Scale <sup>39)</sup>	Self-reported blood/body fluid exposure	• Low scores on professional practice and nurse management scales were significantly correlated, at the univariate level, with blood/body fluid exposures. • After adjusting for demographic and employment characteristics, only the nurse management scale remained significantly correlated.
Clarke 2007 <sup>41)</sup>	<u>Sample:</u> 11,516 nurses <u>Setting:</u> 188 Pennsylvania hospitals	<u>Design:</u> Cross-sectional <u>Response Rate:</u> 52% <sup>18)</sup> <u>Analysis Level:</u> Nurse	• Nurse participation in hospital affairs • Nursing foundations for quality of care • Nurse manager ability, leadership and support of nurses • Staffing and resource adequacy • Nurse-physician relations • Composite measure of the Practice Environment Scale • Staffing (patient load)	Nursing Work Index-Revised Scale <sup>31)</sup>  Practice Environment Scale of the Nursing Work Index <sup>42)</sup>	Self-reported needlesticks	• High scores on the composite measure was significantly associated with lower risk of needlesticks.
Trinkoff <i>et al.</i> , 2007 <sup>27)</sup>	<u>Sample:</u> 2,273 nurses (wave 1) 2,624 nurses (waves 2 and 3) <u>Setting:</u> Two U.S. states	<u>Design:</u> Longitudinal <u>Response Rate:</u> 62% wave 1 85% wave 2 86% wave 3 <u>Analysis Level:</u> Nurse	• Scheduling	Standard Shiftwork Index <sup>81, 82)</sup>	Self-reported needlestick injuries	• Adverse schedule characteristics was significantly associated with an increased risk of needlestick injury.

\*Significance =  $p < 0.05$ 

units. These nurses were recruited from 22 U.S. hospitals, 20 of which were designated as magnet hospitals. Using measures of resource availability and administrative support from the NWI-R, as well as nurses' reports of staffing, they found that high patient loads (OR=1.52, CI<sub>95%</sub> 1.06–2.20) and low levels of administrative support (OR=1.53, CI<sub>95%</sub>

1.05–2.22) were associated with needlestick injuries, albeit at a lower impact than they had found in their previous study. Near-misses were also associated with these factors. The authors concluded that levels of staffing and working climate variables are important factors with respect to needlesticks, even in better-than-average hospitals, and that the nature of

**Table 3. Associations between quality of worklife variables and musculoskeletal injuries in hospital nursing staff**

Reference	Sample and setting	Design, response rate and level of analysis	Quality of worklife variables		Musculoskeletal disorders or symptoms	Significant associations*
			Items	Source	Source	
Daraiseh <i>et al.</i> , 2003 <sup>43)</sup>	<u>Sample:</u> 34 nurses  <u>Setting:</u> Hospitals in the mid-west	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> N/A  <u>Analysis Level:</u> Nurse	<ul style="list-style-type: none"> <li>• Work demands                             <ul style="list-style-type: none"> <li>◦ Interpersonal relations</li> <li>◦ organizational demands</li> </ul> </li> </ul>	Work Demand Factors <sup>83)</sup>	Self-reported musculoskeletal disorders <sup>84)</sup>	<ul style="list-style-type: none"> <li>• Work demands were significantly associated with musculoskeletal symptoms.</li> </ul>
Hofmann and Mark, 2006 <sup>29)</sup>	<u>Sample:</u> 1,127  <u>Setting:</u> 81 units in 42 acute care hospitals	<u>Design:</u> Predictive design  <u>Response Rate:</u> N/A  <u>Analysis Level:</u> Unit	<ul style="list-style-type: none"> <li>• Safety climate (composite)</li> </ul>	Safety Climate Scale <sup>35-37)</sup>	Archival records of musculoskeletal disorders	<ul style="list-style-type: none"> <li>• Safety climate was significantly and inversely associated with musculoskeletal disorder.</li> <li>• This relationship was significantly moderated by the complexity of patient conditions.</li> </ul>
Stone and Gershon, 2006 <sup>38)</sup>	<u>Sample:</u> 837 nurses  <u>Setting:</u> 39 ICUs in 23 hospitals	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> 49%  <u>Analysis Level:</u> Unit	<ul style="list-style-type: none"> <li>• Organization climate (composite)</li> <li>• Staffing ratio</li> <li>• Scheduling</li> <li>• Hospital characteristics                             <ul style="list-style-type: none"> <li>◦ Magnet status</li> </ul> </li> </ul>	Perceived Nurse Work Environment Scale <sup>39)</sup>	Administrative data on musculoskeletal injury	<ul style="list-style-type: none"> <li>• Organizational climate was inversely related to rates musculoskeletal injury.</li> <li>• Magnet hospitals had lower rates of musculoskeletal injuries.</li> </ul>
Trinkoff <i>et al.</i> , 2006 <sup>28)</sup>	<u>Sample:</u> 2,617 nurses  <u>Setting:</u> Two U.S. states	<u>Design:</u> Longitudinal  <u>Response Rate:</u> 62% wave 1 85% wave 2 86% wave 3  <u>Analysis Level:</u> Nurse	<ul style="list-style-type: none"> <li>• Scheduling</li> </ul>	Standard Shiftwork Index <sup>81, 82)</sup>	Self-report of musculoskeletal disorders/injury <sup>84)</sup>	<ul style="list-style-type: none"> <li>• Increased perceptions of physical demands explained increased risk for musculoskeletal disorders.</li> </ul>
Stone <i>et al.</i> , 2007 <sup>40)</sup>	<u>Sample:</u> 2,047 nurses  <u>Setting:</u> 13 New York City hospitals	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> 50%  <u>Analysis Level:</u> Unit	<ul style="list-style-type: none"> <li>• Organizational climate                             <ul style="list-style-type: none"> <li>◦ Professional practice</li> <li>◦ Nursing management</li> <li>◦ Nurse-physician collaboration</li> <li>◦ Scheduling climate</li> <li>◦ Unit decision-making</li> <li>◦ Opportunities for advancement</li> </ul> </li> </ul>	Perceived Nurse Work Environment Scale <sup>39)</sup>	Administrative data on musculoskeletal injuries	<ul style="list-style-type: none"> <li>• Low scores on the organizational climate factors correlated with musculoskeletal injury, any occupational injury.</li> </ul>

\*Significance =  $p < 0.05$

N/A = Not Available

these associations are multifaceted and complex.

A 2006 paper by Hofmann and Mark<sup>29)</sup> studied safety climate and a number of nurse and patient outcomes as part of a larger study (the Outcomes Research in Nursing Administration Project II). For this review, their findings on needlesticks and back injuries was abstracted. The authors measured safety climate using a composite scale adapted from the revision by Mueller *et al.*<sup>35)</sup> of Zohar’s original

Safety Climate Scale<sup>35, 36)</sup>, coupled with items from Rybowskiak’s Error Orientation Scale<sup>37)</sup>. This composite allowed the researchers to assess a broad perspective of safety climate, which included the development and adherence to safety protocol and constructive responses to errors. Needlesticks and back injuries were collected three months after the climate measures were collected; in this study incident record data were collected. They found that

**Table 4. Associations between quality of worklife variables and burnout in hospital nursing staff**

Reference	Sample and setting	Design, response rate and level of analysis	Quality of worklife variables		Burnout	Significant associations*
			Items	Source	Source	
Garrett, <i>et al.</i> , 2001 <sup>44)</sup>	<u>Sample:</u> 77 nurses  <u>Setting:</u> Large acute care hospital	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> 26%  <u>Analysis Level:</u> Nurse	<ul style="list-style-type: none"> <li>• Environmental dynamism</li> <li>• Environmental complexity</li> <li>• Environmental dominance</li> <li>• Need for information</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Perceptions of involvement</li> <li>• Peer cohesion</li> <li>• Supervisor support</li> </ul>	<ul style="list-style-type: none"> <li>• Work Environment Scale<sup>45, 46)</sup></li> <li>• Perceived Environmental Uncertainty in Hospitals<sup>47)</sup></li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Social Climate Scale<sup>45, 46)</sup></li> </ul>	Maslach Burnout Inventory <sup>30)</sup>	<ul style="list-style-type: none"> <li>• Perceived Environmental uncertainty, lack of supervisor support, low work involvement, and lack of peer cohesion correlated with high levels of certain aspects of burnout (emotional exhaustion and depersonalization).</li> </ul>
Aiken, <i>et al.</i> , 2002 <sup>18)</sup>	<u>Sample:</u> 10,184 nurses  <u>Setting:</u> 168 adult general hospitals	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> 52%  <u>Analysis Level:</u> Hospital	<ul style="list-style-type: none"> <li>• Patient load</li> </ul>	Self-reported Patient Load	Maslach Burnout Inventory (Emotional Exhaustion Scale) <sup>30)</sup>	<ul style="list-style-type: none"> <li>• Increased patient load correlated with increased rates of burnout. (OR=1.23; CI<sub>95%</sub>=1.13–1.34)</li> </ul>
Vahey 2004 <sup>21)</sup>	<u>Sample:</u> 820 nurses  <u>Setting:</u> 40 units from 20 urban hospitals	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> 86%  <u>Analysis Level:</u> Nurse	<ul style="list-style-type: none"> <li>• Staffing adequacy</li> <li>• Administrative support</li> <li>• Nurse-physician relations</li> </ul>	Nursing Work Index-Revised Scale <sup>31)</sup>	Maslach Burnout Inventory <sup>30)</sup>	<ul style="list-style-type: none"> <li>• Nurses in units with poor environments were 2–3 times more likely to exhibit high levels of certain aspects of burnout (emotional exhaustion and depersonalization).</li> </ul>
Stone <i>et al.</i> , 2006 <sup>48)</sup>	<u>Sample:</u> 850 nurses  <u>Setting:</u> 13 New York City hospitals	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> 42%  <u>Analysis Level:</u> Nurse	<ul style="list-style-type: none"> <li>• Shift length</li> </ul>	Perceived Nurse Work Environment Scale <sup>39)</sup>	Maslach Burnout Inventory <sup>30)</sup>	<ul style="list-style-type: none"> <li>• Nurses working 12-h shifts were generally less likely to report emotional exhaustion than nurses working 8-h shifts.</li> </ul>
Stone <i>et al.</i> , 2007 <sup>40)</sup>	<u>Sample:</u> 2,047 nurses  <u>Setting:</u> 13 New York City hospitals	<u>Design:</u> Cross-sectional  <u>Response Rate:</u> 50%  <u>Analysis Level:</u> Unit	<ul style="list-style-type: none"> <li>• Organizational climate               <ul style="list-style-type: none"> <li>◦ Professional practice</li> <li>◦ Nursing management</li> <li>◦ Nurse-physician collaboration</li> <li>◦ Scheduling climate</li> <li>◦ Unit decision-making</li> <li>◦ Opportunities for advancement</li> </ul> </li> </ul>	Perceived Nurse Work Environment Scale <sup>39)</sup>	Maslach Burnout Inventory <sup>30)</sup>	<ul style="list-style-type: none"> <li>• Low scores on organizational climate factors correlated with high rates of burnout.</li> </ul>

\*Significance =  $p < 0.05$ 

musculoskeletal disorders were correlated to safety climate, and that this relationship was moderated by the complexity of patient care; i.e., risk of musculoskeletal disorder increased as acuity increased. The authors, however, did not find a relationship between safety climate and needlesticks. This may perhaps be explained by the fact that incident data were

used to identify needlesticks, and the published rate for formally reported needlesticks is approximately 50%, therefore reliance on the records may therefore have seriously underestimated the true number. Nevertheless, these authors did generally find significant associations between safety climate and adverse hospital outcomes. They concluded

that an overall safety climate that encompasses the development of high quality safety practices and programs, and encourages adherence, compliance, and error reporting, will be effective in reducing adverse outcomes.

More recent work by Stone and Gershon<sup>38)</sup> focused on nurses employed on intensive care units (ICUs). A sample of 837 RNs employed in 39 different ICUs in 23 hospitals across the U.S. were anonymously surveyed on a number of various working conditions including organizational climate, which was measured using the Perceived Nurse Work Environment (PNWE) scale<sup>39)</sup>. This scale was derived from the NWI-R<sup>31)</sup> and has similar items. ICU-specific administrative data on staffing, patients, and nurse injuries was provided by the hospitals. Following extensive analysis at the unit level, it was noted that ICUs affiliated with hospitals that had attained magnet status had lower rates of needlestick and musculoskeletal injuries. A composite organizational climate measure was significantly associated with musculoskeletal injuries but not with needlesticks.

In another study by Stone and colleagues<sup>40)</sup>, involving a large sample of ( $N = 2,047$ ) nurses employed in 13 New York City hospitals. Organizational climate factors were measured also using a modified version of the PNWE scale. They found that poor perceptions of nurse management was significantly associated with blood/body fluid exposure ( $OR=1.38$ ,  $CI_{95\%}$  1.02, 1.86), after controlling for demographic and employment characteristics. Stronger effects for organizational climate on burnout and musculoskeletal disorder were noted. For example, in a multivariate model controlling for demographic and employment characteristics, most of the organizational climate factors had independent effects on the three sub-constructs of the burnout as measured by the Maslach Burnout Inventory (MBI)<sup>30)</sup> personal accomplishment, emotional exhaustion, and depersonalization. Musculoskeletal disorders were independently associated with poor nurse/physician collaboration, poor perceptions of nurse management, and lack of opportunity for advancement. They concluded that improving the organizational climate is likely to improve occupational health outcomes in nurses.

More recently, Clarke *et al.*<sup>41)</sup> analyzed organizational climate using the Nurse Work Index-Practice Environment (NWI-PES) scales<sup>31, 42)</sup> and self-reported occupational data obtained from Aiken's<sup>18)</sup> sample of Pennsylvania nurses (data collected in 1999). A composite measure of the NWI-PES was used. Data from 11,516 staff nurses employed in 188 acute care hospitals in Pennsylvania showed that nurses working in the top 25% of hospitals on a composite measure of the NWI-PES (i.e., nurses participation in hospital affairs,

quality of care, nurse manager support and leadership, resource adequacy, interpersonal relations with physicians), were approximately 20% less likely to sustain needlestick injuries, even after controlling for individual nurse and hospital characteristics and the use of safety needle devices. However, this relationship was mainly absent with respect to the individual scales comprising this measure. Notably, significant exceptions included nursing foundations of quality care and collegial nurse/physician relations ( $p<0.05$ ). Contrary to earlier studies on staffing levels and needlesticks, they did not find a significant correlation between staffing and needlestick injuries.

In a probability sample of 2,624 nurses recruited from two states, Trinkoff *et al.*<sup>27)</sup> conducted a large three-wave longitudinal survey of nurses to examine a number of job demands as well as the impact of scheduling on needlestick injuries. Fifty-eight percent of the sample included hospital-based nurses. The authors found that adverse schedule characteristics, such as long work hours and non-day shifts and weekends, significantly increased the risk of needlestick injury. A strength of this body of work was the longitudinal design as well as the high follow-up rate.

Only two papers reported solely on musculoskeletal disorders. In 2003, Daraiseh *et al.*<sup>43)</sup> published a pilot study on the impact of a wide range of working conditions on various health outcomes in a small sample of hospital nurses. Two of the working condition categories they assessed are of interest here, namely, "social demands", (i.e., interpersonal interactions), and "organizational demands", (i.e., burdens of work schedule, work responsibility, work structure and managerial procedures). The authors noted significant associations between these two composite variables and neck and lower back symptoms.

Trinkoff *et al.*<sup>28)</sup> conducted analyses on a sample of 2,617 registered nurses in two U.S. states as part of her longitudinal cohort to assess the impact of perceived work demands and self reported work schedules on rates of musculoskeletal problems. This research team found that perceptions of work demands and self reports of scheduling characteristics, including working more than 13 h per day, were significantly associated with self reported musculoskeletal problems.

#### *Burnout*

In 2001 Garrett and McDaniel<sup>44)</sup> published a report on social climate and burnout in a small exploratory study involving 77 hospital nurses with a low response rate of 26%. The social climate measure consisted of three dimensions: a relationship dimension, which included involvement, peer cohesion, and supervisory support; a

personal growth dimension, which included autonomy, task orientation, and work pressure; and a system maintenance and change dimension, which included clarity, management control, innovation, and physical comfort. Elements of all three of these dimensions are of relevance here. They used standardized scales to measure these dimensions<sup>45–47</sup>, and the MBI<sup>30</sup> to measure burnout. They found that lack of supervisory support and lack of involvement explained half of the variability in the emotional exhaustion domain of the burnout inventory. Similarly, lack of supervisory support was the best predictor of depersonalization.

Aiken *et al.*<sup>18</sup> examined the impact of patient-to-nurse ratios on nurse burnout in a very large sample (N=10,184) of nurses from 168 general adult hospitals in Pennsylvania. Using self-reported staffing data and the MBI<sup>30</sup>, this research team found that higher ratios were significantly associated with higher levels of nurse burnout. For every additional patient per nurse, burnout increased by a factor of 1.23 (CI<sub>95%</sub> 1.13–1.34) or 23%.

A cross-sectional study was conducted by Vahey *et al.*<sup>21</sup> involving 820 nurses from 20 urban hospitals, with data originally collected in 1991. They examined the effects of organizational climate on nurse burnout. Nurse work environment was measured using a composite measure which was derived from the NWI-R<sup>31</sup>. They specifically examined staffing adequacy, administrative support, and nurse-physician relations. The MBI<sup>30</sup> was used to measure these dimensions of burnout. The authors found that nurses reporting high NWI-R<sup>31</sup> scores (i.e., positive perceptions of organizational climate) were significantly less likely to report high scores on two of the three burnout subscales (emotional exhaustion and depersonalization).

In 2006 Stone *et al.*<sup>48</sup> reported on the effect of different shift length schedules (8 h vs. 12 h) and organizational climate on burnout in nurses. Organizational climate was measured using the PNWE<sup>39</sup>; here organizational climate as well as nurse demographics was controlled for in examining the independent effect of shift length on burnout. They found that nurses working 12-h shifts were significantly less likely than nurses working 8-h shifts to report one of the dimensions of burnout, namely emotional exhaustion.

## Discussion

To our knowledge, this is the first systematic review of organizational climate and employee health outcomes in U.S. hospital-based RNs. The results of research reviewed here were consistent in that settings with more positive organizational climates (as perceived by nurses) had lower

rates of adverse occupational outcomes. However, not all of the various sub-climate scales of organizational climate were significantly associated with the adverse outcomes of interest. In terms of needlesticks, one study, using a very specific blood/body fluid safety climate scale, did find that certain sub-constructs (management support and feedback/training), were correlated with needlesticks. In another study<sup>29</sup>, using a composite safety climate scale, this correlation was not noted. However, in several other needlestick studies examining risk factors, safety climate has repeatedly been found to be significantly associated with both risky behaviors and with blood/body fluid exposures<sup>49–52</sup>. These papers were not reviewed here since these were predominantly risk assessment studies and further, did not meet the inclusion criteria for this review. Nevertheless, additional studies are warranted, especially with regards to hazard specific safety climate scales. Other important organizational factors associated with needlesticks noted in this review included leadership characteristics (management), resources, and patient load (staffing).

With respect to musculoskeletal disorders, leadership characteristics, staffing, and adverse scheduling played important roles. A recent review by Lang *et al.*<sup>53</sup>, (for the period of 1980–2003) examined the impact of staffing on hospital outcomes, including nurse outcomes. They found evidence for an association between nurse staffing and needlesticks, as well as burnout, although they did not identify any publications on staffing and musculoskeletal disorders. They concluded that the evidence on staffing and nurse outcomes was limited. We found a similar sparsity on these types of studies as well.

Regarding burnout, we did find evidence for an association between negative aspects of organizational climate and burnout, especially the emotional exhaustion sub-construct. This was associated with leadership variables, especially supervisory support. In terms of scheduling, one study in our review found that longer shifts were less likely to result in emotional exhaustion. In a review by Smith and colleagues<sup>54</sup> on the evidence on 8- and 12-h shifts on nurse performance, they concluded that longer shifts increased employee fatigue but also increased job performance. Employees working longer shifts also work fewer shifts, perhaps indicating that a more compressed work week allows the nurses to have more control and therefore motivation over their work. In Stone *et al.*'s study<sup>48</sup>, longer shifts were associated with less emotional exhaustion. This interesting finding requires additional study since burnout has been shown to be an important correlate of job dissatisfaction, and turnover<sup>18, 55, 56</sup>.

Taken together, the findings in this review are significant not only with respect to the deleterious impacts these injuries and exposures have on the health and wellbeing of the affected nurses, but also because of the implications for overall health care costs given the frequency of these types of exposure. Recent data on the cost of treating and managing blood/body fluid exposures ranged from \$71–\$4,838, with costs much higher when the exposure was to a known HIV-infected source patient<sup>57</sup>). As an example, the direct cost of workers' compensation for needlestick injuries in Washington State was almost one million dollars over a 5-yr period<sup>58</sup>). The expense related to management of other types of injuries can also be substantial. The costs of workers' compensation, diagnostic tests and physician services have been estimated to range anywhere from \$50,000 to \$100,000 per musculoskeletal injury for nurses<sup>59</sup>). Finally, additional related costs of adverse outcomes are significant as well; published estimates of replacing nurses are very high (\$42,000–\$64,000), especially for some specialties<sup>60</sup>). The burden of all of these outcomes on the overall health care system is enormous.

A systems approach to reducing adverse nurse outcomes is especially needed, because even though much better and safer devices have been introduced to help minimize risk, at least with respect to needlesticks and musculoskeletal disorders, these injuries continue to occur. Traditionally, occupational health and safety specialists focused on engineering controls to address workplace injuries and exposure. This has been shown to be remarkably effective in reducing certain types of adverse occupational health outcomes (e.g., such as intravenous line-associated needlesticks)<sup>61</sup>). However, many hospitals have found that even with the availability of safety devices designed to reduce this type of exposure, needlesticks continue to occur with some frequency<sup>50</sup>). While ergonomic and safety device interventions have been shown to be effective in preventing injuries, effort on the part of occupational health experts, health administrators and policy makers to implement interventions aimed at the organizational level may result in more positive organizational cultures and thus more positive shared employee perceptions (of safety climate) resulting in a shared commitment between workers and management to organizational stated safety-related goals and objectives.

There were both strengths and limitations to this body of research evidence. Definitions and terminology for both the independent and dependent variables were not uniform across studies. This is a problem in the field of organizational climate studies in general. Additionally, while many studies

applied the NWI-R<sup>31</sup>), many different sub-constructs were used. Standardization of both terminology and measurement is needed to bring clarity to the subject. An additional limitation of this body of evidence is the cross-sectional nature of the majority of studies, precluding the determination of causality. Lastly, most of the studies were conducted by a limited number of researchers. While the research teams were interdisciplinary and accessed geographically diverse settings, the lack of variability among the research teams may also bias the results. It should be pointed out that the sparsity of research studies, especially longitudinal, is undoubtedly related to minimal financial support for this line of research.

Strengths of this research base include the sample populations studied, which were large and geographically dispersed. Most researchers appropriately used the nursing unit or hospital as the level of analysis when data were clustered (i.e., lack of independence of observations and resulting correlations); or in some studies sophisticated analyses were conducted to control for clustering of data. Also, response rates were generally good.

There are a number of limitations of this review. For example, while extensive efforts were made to conduct a comprehensive review, eligible studies may have been missed. To simplify the complex review, a decision was made early on to limit this first review to studies conducted in the U.S. The rationale was that additional variables would be added if the non-U.S. studies were included just by virtue of the fact that health care delivery might vary considerably. However nursing practice in many developed and developing countries is similar to that of the U.S., and international researchers have reported comparable findings<sup>22, 62–75</sup>). A review of the international contributions to the literature on quality of worklife variables and nurses' outcomes is planned for the future.

Despite these limitations, this report provides support that there is a growing evidence base that hospital quality of worklife factors can negatively affect nurses' health. To better understand the impact of the work environment on both employee and patient safety, a comprehensive set of worklife variables, including organizational climate, should be addressed when developing data bases. Clearly much more research is needed to further explore these organizational factors, and research is needed as well on the interventions best suited to develop a positive climate for nurses. This is especially important in the face of demographic changes in which an ever increasing shortage of qualified nurses is projected<sup>56</sup>). Monitoring nurses' worklife variables, and improving hospital working

conditions is likely to improve the safety of the employee as well as possibly improve the profitability of the hospital through improved system outcomes (such as lower turnover of the employees, and reduced risk coverage), and the quality of patient care delivered.

## Acknowledgement

This study was funded in part by an unrestricted grant made by the Jonas Center for Nursing Excellence, and by the Centers for Disease Control/National Institute for Occupational Safety and Health, (R01 OH008215-03).

## Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the funding agency.

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