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SAFETY CULTURE IN HEALTH CARE

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SAFETY CULTURE AND ITS LINKS TO PATIENT SAFETY

It is widely recognized that human factors play a crucial role in safety in modern workplaces, particularly in safety-critical domains such as aviation, ship handling, and operations in nuclear power plants. Thus, human errors and human factors–related failures lie behind the majority of accidents in aviation (e.g., Amalberti, 1998), at sea (e.g., Bryant, 1991) and in other high-tech industries (e.g., Hollnagel, 1998). By contrast, it is only fairly recently that it has become generally realized that health care shares many of the characteristics of both high-tech and low-tech human–machine system operations found in industry and that it is equally vulnerable to human failures (Kohn, Corrigan, & Donaldson, 1999). For example, a number of health care activities are performed by teams that are vulnerable to the same error mechanisms that may jeopardize the performance of cockpit crews or control room teams in process industry. Safe and efficient teamwork require that communication, coordination, and task allocation be conducted so that shared situation awareness may be maintained both in traditional human–machine systems (e.g., Glendon & McKenna, 1995) and in health care (e.g., Helmreich, 2000b). Finally, human error has now been recognized as the most important cause of adverse events in health care (Kohn et al., 1999). Therefore, appears useful to adapt—and not necessarily copy—some of the modes of analysis and survey and assessment methods that have been developed for the mainly high-tech human–machine system domains to investigate human factors aspects of patient safety in the medical domain (Helmreich, 2000b). This is not to suggest that health care is just like production industry or the transport sector. Health care differs from other safety critical domains, as it has been observed in the U.S. Institute of Medicine report (Kohn et al., 1999), " ... mostly because of huge variability in patients and circumstances, the need to adapt processes quickly, and the rapidly changing knowledge base ...." However, methods and techniques to coordinate team performance in high-hazard human–machine environments, such as air traffic control, process industry, aircraft carrier operations, may be successfully adapted to health care. Indeed, anesthesiology has long been leading other health care fields in adapting human performance management techniques, such as the crew resource management approach pioneered by the aviation industry (Gaba, Howard, Fish, Smith, & Sowb, 2001).

The recognition that operational safety (and, in health care, patient safety) depends on our abilities to control human error does not mean that efforts should be directed exclusively to the psychological mechanisms underlying human error. Rather, effective safety management should be directed at factors that are conducive to human failure (Rasmussen, 1986)—in particular factors that are within the direct control of the organization. Thus, *organizational factors*

have long been acknowledged to be of critical importance to safety in human–machine system operations (Griffiths, 1985; Reason, 1993). Reason's thesis indicates that organizational problems are frequently *latent causal factors* that contribute or even lead to the occurrence of human error made by frontline personnel and has become part of the industry standard in this field (Reason, 1997). Indeed, the majority of contributing causes to major accidents may be attributed to the organizations themselves (Reason, 1997). For example, it has been reported that 40% of incidents in the Dutch steel industry were caused by organizational failures (van Vuuren, 2000). Similarly, based on studies in aviation and maritime operations, quality and safety, by which the operators accomplish their tasks, are affected not only by their professional and technical competence and skills but also by their attitudes to and perceptions of their job roles, their organization, and management (Helmreich & Merritt, 1998).

The term *safety culture* was introduced in the late 1980s when, in the aftermath of the Chernobyl nuclear power accident in 1986, the International Atomic Energy Agency (IAEA) issued several reports analyzing and describing the causes of the disaster, arguing forcefully that the root causes of the accident were to be found in the safety culture that existed in the organization running the power plants (IAEA, 1991). Thus, the concept of safety culture was invoked to explain an organizational mindset that tolerated gross violations and individual risk taking behaviors (INSAG 1991). The INSAG (International Nuclear Safety Advisory Group) defined the notion as follows: "Safety culture is that assembly of characteristics and attitudes in organizations and people which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance" (INSAG, 1991, p. 4).

Since the publication of the INSAG reports, a large number of studies have developed models and measures of safety culture. Although we return to the definitions of safety culture in the subsequent section, it should be noted that, in recent years, a number of studies of safety culture have appeared in health care (see chapter 39 on assessing safety culture and safety climate in health care in this handbook), building on methods and techniques in other safety critical domains, e.g., of health care (Gershon et al., 2000; Helmreich & Merritt, 1998; Singer et al., 2003).

This chapter describes, first, how the notions of safety culture and safety climate are defined and used in the human factors literature about nonmedical domains as well as in the patient safety literature. Then, based on our experiences of safety culture studies, not only in health care but also in maritime, railway, process industry and other industrial domains, we illustrate some main themes of safety culture by reviewing results of recent questionnaire surveys. Finally, we discuss some issues in developing and maintaining a good safety culture.

SAFETY CULTURE AND SAFETY CLIMATE

Since the 1930s (Krause, Seymour, & Sloat, 1999), and thus long before the term safety culture was introduced, it has been acknowledged that differences in organizational factors have an effect on the rate of occupational injuries. Thus, organizational factors such as psychosocial stressors, work team atmosphere, and perceptions of leadership have been studied for decades in relation to occupational accidents, usually under the heading of "organizational climate" or "safety climate."

The distinction between safety culture and safety climate has been discussed by a number of authors. Safety culture is most commonly conceptualized as a three-layer structure, following Schein (1992) work on organizational culture, and summarized with small variations in literally hundreds of papers: (a) an inner layer of basic assumptions (i.e., a core of largely tacit underlying assumptions taken for granted by the entire organization), (b) a middle layer of "espoused" values (i.e., values and norms that are embraced and adopted), and (c) an outer layer of "artifacts" that include tangible and overt items and acts such as procedures, inspections, and checklists. Safety culture is seen as part of the overall culture of the organization that affects members' attitudes and perceptions related to hazards and risk control (Cooper, 2000). By contrast, the distinct but closely related notion of *safety climate* is viewed as governed by safety culture *and* contextual and possibly local issues, so climate refers to employees' context-dependent attitudes and perceptions about safety related issues (Flin, Mearns, O'Connor, & Bryden, 2000; Glendon & Stanton, 2000).

Because the term safety culture is much more commonly used than safety climate, we shall, having no need for distinguishing between underlying and overt attitudes and perceptions, mostly use the term safety culture in its inclusive sense. Still, we will sometimes use the term climate to

emphasize the need for referring to local, changeable, and explicit attitudes and perceptions.

Definition of Safety Culture

Numerous definitions have been proposed of the concepts of safety culture and climate (e.g., Flin et al., 2000; Pidgeon & O'Leary, 1994; Zohar, 1980). The most widely accepted and most often quoted safety culture definition is the one put forward by the Advisory Committee on the Safety of Nuclear Installations (in the United Kingdom):

> The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures. (Advisory Committee on the Safety of Nuclear Installations [ACSNI], 1993, p. 23)

According to this well-known definition, an organization's safety culture involves the shared *values, attitudes, perceptions, competencies and patterns of behavior* of its members. When an organization has a positive safety culture, there is a mutual and high level of trust among employees, and employees share the belief that safety is important and can be controlled.

However, a number of other, though not very dissimilar, definitions have been offered. For instance, Hale defines safety culture as "the attitudes, beliefs and perceptions shared by natural groups as defining norms and values, which determine how they act and react to risks and risk control systems" (Hale, 2000, p. 7). The Confederation of British Industry (CBI, 1990) defined safety culture as "the ideas and beliefs that all members of the organization share about risk, accidents and ill health."

In a comprehensive review, Guldenmund (2000) cited and discussed 18 definitions of safety culture and climate appearing in literature from 1980 to 1997. This proliferation of definitions has led to some difficulty in interpretation. It is not surprising, therefore, that Reason has noted in his discussion of safety culture and organizational culture that the latter notion "has as much definitional precision as a cloud" (Reason, 1997, p. 192).

Still, the most often cited definitions are similar in that they refer to normative beliefs and *shared* values and attitudes about safety related issues by members of an organization. Nearly all analysts agree that safety culture is a relatively stable, multidimensional, holistic construct that is shared by organizational members (e.g., Guldenmund, 2000). At the same time, safety culture is regarded as being relatively *stable* over time course; for instance, De Cock et al. (1986; cited in Guldenmund, 2000) found no significant change of *organizational* culture over a 5-year interval. The content of safety culture—the norms and assumptions it is directed at—is held to consist in underlying factors or dimensions, such as perceptions of commitment, leadership involvement, willingness to learn from incidents (see below). Moreover, safety culture has a *holistic nature* and is something shared by people, members, or groups of members within an organization. Indeed, the holistic or shared aspect is stressed in most definitions, involving terms such as "molar" (Zohar, 1980), "shared" (Cox & Cox, 1991), "group" (Brown & Holms, 1986), "set" (Pidgeon, 1991), and "assembly" (IAEA, 1991). When members successfully *share* their attitudes or perceptions, "the whole is more than the sum of the parts" (ACSNI, 1993, p. 23). Finally, safety culture is *functional* in the sense that it guides members to take adaptive actions for their tasks, as Schein (1992) regards organizational culture as "the way we do things around here."

Overlapping Types of Safety Culture

Viewing safety culture from a different perspective, we may distinguish between four overlapping spheres of safety culture, each of which may distinguish the perceptions and attitudes of different organizational units: national, domain specific, professional, and organizational culture. Thus, the safety culture shared by a given team of doctors and nurses will be shaped not only by their organization (hospital) but also by their different national cultures (see Helmreich & Merritt, 1998, for a review of a number of studies of especially aviation personnel). Again, when comparing different safety critical domains—healthcare, aviation, process industry, nuclear industry, and the like—we sometimes find considerable differences in attitudes and perceptions of safety relevant aspects (Gaba, Singer, Sinaiko, Bowen, & Ciavarelli, 2003). Finally, within the same domain, we should expect

that there might well be possibly-task-related-differences between professions, such as between doctors and nurses or pilots and cabin staff (Helmreich & Merritt, 1998). These different and sometimes overlapping layers of cultures are intertwined to shape the safety culture of any particular organizational unit, and each of them can have both positive and negative effects on patient safety (Helmreich, Wilhelm, Klinect, & Merritt, 2001).

Regarding the national culture, Hofstede (1991) built a famous model based on responses about values and norms across different countries involving four dimensions: power distance, individualism–collectivism, uncertainty avoidance, and masculinity–femininity. Hofstede carried out a number of questionnaire surveys with 20,000 IBM employees working in more than 50 countries, mapping the different national cultures in terms of these four dimensions. Adapting parts of this paradigm, Helmreich and his collaborators (e.g., Helmreich et al., 1998; 2001) have conducted comparative studies on national cultures in aviation, finding national differences similar to Hofstede results.

Shifting our attention to cultures within an organization, we may sometimes observe *local* variations of culture within an organization (we may even suppose, for simplicity, that the organization is characterized by the same national, domain-level, and professional culture). For instance, Itoh, Andersen, Seki, and Hoshino (2001) identified local differences in safety culture characterizing each of the different contractors of a railway track maintenance company. The study found a relationship between the cultural types and accident and incident rates. Such variations of culture within a single organization are often called local cultures or subcultures. The variations in subcultures may depend on both task- and domain-related characteristics (e.g., differences in work load, department, and specialties; exposure to risks; and work shift patterns) and on demographic factors (e.g., age, experience, gender, seniority, and positions in the organization); they may also, it is natural to speculate, be influenced by individual factors related to local leadership and the team atmosphere defined by the most dominating and charismatic team members.

Links to Safety Management and Performance Shaping Factors

The rationale behind studying the safety culture of a given organization and groups of members is, briefly put, that by measuring and assessing safety culture we may be able to identify weak points in the attitudes, norms, and practices of the target groups and organizations; in turn, knowledge of weak points may be used to guide the planning and implementation of intervention programs directed at enabling the target groups and organizations to develop improved patient safety practices and safety management mechanisms.

As can be seen from the definitions mentioned previously, safety culture is coupled not only to employees' beliefs and attitudes about safety-related issues (e.g., motivation, morale, risk perceptions, and attitudes toward management) and factors that affect safety such as fatigue, risk taking, and violations of procedures, all of which can be partially controlled or are influenced by efforts of safety management, but also to safety management issues such as management's commitment to safety, its communication style, and the overt rules for reporting errors, etc. (Andersen, 2002). In addition, as will be further discussed in the section on dimensions of safety culture, an organization's safety culture reflects its policies about error management and sanctions against employees who commit errors or violations, the openness of communications between management and operators, and the level of trust between staff members and senior management (Helmreich, 2000a).

It is well known that the probability of human error is influenced by various work environment factors such as training, task frequency, human–machine interfaces, quality of procedures, supervision and management quality, work load, production and time pressure, and fatigue. Such error-inducing factors are called performance shaping factors (PSFs), a term name, now widely used, that was introduced in the early 1980s by human reliability assessment (HRA) analysts who seek to structure and, ultimately, quantify the probability of human failure in safety critical domains and in particular nuclear power production (Hollnagel, 1998; Swain & Guttmann, 1983). On the HRA approach, different types of relevant PSFs are identified and analyzed for a given set of tasks. In fact, the traditionally cited PSFs are tightly related to safety culture insofar as that a "good" safety culture will reflect a shared understanding of the importance and the means to control the factors that have an impact on human reliability.

To put it briefly, although effective safety management consists of identifying the factors that affect the safety of operations and having the means available to implement control mechanisms,

safety culture comprises the mutual awareness of and supportive attitudes directed at controlling risks (Duijm, Andersen, Hale, Goossens, & Hourtolou, 2004). There is, therefore, a growing awareness that applications of human reliability assessment may contribute to a focus for the strengthening of safety culture when developing practices and strategies that help health care staff to control the potentially detrimental effects of PSFs (Department of Health, 2000; Kohn et al., 1999).

DIMENSIONS OF SAFETY CULTURE: WHAT, WHERE, AND HOW WE SHOULD MEASURE?

Dimensions of Safety Culture

A number of dimensions (components or aspects) of safety culture have been proposed, ranging from psychosocial aspects (e.g., motivation, morale, team atmosphere) to behavioral and attitudinal factors regarding management, job, incident reporting, and others. Many of these dimensions have been elicited by applying multivariate analysis techniques such as factor analysis and principal component analysis to questionnaire data. Some dimensions proposed by different researchers are quite similar, although the terms may differ, whereas others differ significantly. The number of dimensions also differs among studies, ranging from 2 to 16 (Guldenmund, 2000). This variation in safety culture dimensions has several sources: first, researchers have employed different questionnaires (so they have different questions to respondents); second, surveys have been made of quite different fields or domains with quite different hazard levels, recruitment criteria, training requirements, regulation regimes (e.g., nuclear power production, aircraft carriers, airline piloting, construction and building industry, offshore oil production platforms, shipping, railways, health care organizations and units); third, when aggregating a group of question items, the choice of a label is essentially a subjective interpretation. However, although the labels of dimensions will often vary, it is clear that similar dimensions (according to the meaning of the labels) are found across the different sets of dimensions proposed by different research groups. At this stage of safety culture research, however, it does not appear possible to infer a limited number of generalized, core dimensions of safety culture, which can satisfactorily match any purpose of application to any kind of profession or domain, from the diverse dimensions that have appeared in the literature.

In his seminal study of Israeli manufacturing workers Zohar (1980) proposed an eight-dimensional model that consisted of (a) the importance of safety training, (b) management attitudes toward safety, (c) effects of safe conduct on promotion, (d) level of risk at the workplace, (e) effects of required work pace on safety, (f) status of safety officer, (g) effects of safe conduct on social status, and (h) status of the safety committee. The eight-dimensional model was aggregated by Zohar into a two-dimensional model: (a) perceived relevance of safety to job behavior and (b) perceived management attitude toward safety. Cox and Flin (1998) identified the following five dimensions, which they called "emergent" factors: (a) management commitment to safety, (b) personal responsibility, (c) attitudes to hazards, (d) compliance with rules, and (e) workplace conditions. Pidgeon and O'Leary (1994) proposed four dimensions to capture good safety culture: (a) senior management commitment to safety; (b) realistic and flexible customs and practices for handling both well-defined and ill-defined hazards; (c) continuous organizational learning through practices such as feedback system, monitoring, and analyzing; and (d) care and concern for hazards, which is shared across the workforce. These four dimensions appear to relate to the dimensions proposed both by Zohar (1980) and by Cox and Flin (1998), and they have broader aspects of safety-related organizational issues such as a concept of organizational learning, which was not overtly included in Zohar's (1980) original factors.

In their study of safety culture in health care, Itoh, Abe, and Andersen (2002) derived nine indices of safety culture: (a) power distance, (b) recognition of communication, (c) recognition of teamwork, (d) recognition of own performance under high stress, (e) stress management for team members, (f) morale and motivation, (g) satisfaction with management, (h) recognition of human error, and (i) awareness of own competence. In their study of health care staff perceptions, Gershon and colleagues (2000) extracted six dimensions from questionnaire responses with a specific focus on blood borne pathogen risk management: (a) senior management support for safety programs, (b) absence of workplace barriers to safe work practices, (c) cleanliness and orderliness of the work site, (d) minimal conflict and good communication among staff members, (e) frequent

safety-related feedback and training by supervisors, and (f) availability of personal protective equipment and engineering controls.

These examples illustrate the variation in factors we have described. In general, the criterion for including a putative dimension as a safety culture factor is that there is evidence (or reason to believe) that it correlates with safety performance. A given presumed safety culture dimension should be included only if a more positive score on this dimension is correlated with a higher safety record. If two comparable organizations or organizational units have different safety outcome rates (e.g., accident and incident rates), we should expect that the high-risk unit has a lower score on the dimension in question. However, using this criterion also means that safety culture dimensions may not directly relate to safety (e.g., Andersen, Hermann, Madsen, Østergaard, & Schiøler, 2004a; Itoh, Abe & Andersen, 2005). In fact, it would be wrong (and naïve) to expect the dimensions of safety culture that have the strongest link with safety outcome to be ones that most directly are about safety. On the contrary, there is evidence that the strongest indicators of safety performance are those that relate to dimensions that have an oblique or indirect link to safety, such as motivation, morale, and work team atmosphere (Andersen, et al., 2004a; Itoh et al., 2005).

Methods of Study and Assessment

Several approaches have been applied to investigating the safety culture of particular organizations: safety audits, peer reviews, performance indicator measures, structured interviews with management and employees, behavioral observations and field studies, and questionnaire surveys. Among these approaches, safety audits use methods that combine qualitative interviews and factual observations of (missing) documentation, (faulty) protections and barriers, actual behaviors, and the like to identify hazards existing in a workplace. Several safety audit tools have been developed consisting of safety performance indicators to determine whether a given safety management delivery system (say, the mechanism to ensure that staff members are trained to operate their equipment safely or the mechanism to ensure that learning lessons are derived from incidents) is fully implemented, or only partially so, or possibly only at a rudimentary level (e.g., Duijm et al., 2004). Audits are particularly useful for estimating the extent to which the organization policies and procedures have been defined and are being followed and, to some extent, how they might be improved. On the behavioral observation (or field study) approach, employees' behaviors and activities are observed during their task performance to identify potentially risky behaviors. However, the most frequent and widespread method for safety culture studies is the questionnaire-based survey technique. This is a useful and, depending on the quality of the questionnaire tool, a reliable method for collecting response data from larger groups, and it is especially time-efficient for large respondents.

In the last couple of decades, a large number of questionnaires have been developed and an even larger number of studies have been carried out to measure perceptions and attitudes of employees in a number of nonmedical domains (e.g., Cox & Cheyne, 2000; Williamson, Feyer, Cairns, & Biancotti, 1997; Zohar, 1980; compare reviews in Davies, Spencer, & Dooley, 1999, and Guldenmund, 2000). Similarly, a number of tools and surveys have been created in health care (e.g., Nieva & Sorra, 2003). Scott, Mannion, Davies, and Marshall (2003) reviewed instruments and tools available to measure organizational culture in health care.

As mentioned earlier, attempts have been made to compare scores on safety culture dimensions with safety-related outcome data. Several methods of measuring safety performance have been suggested. The most intuitive and strongest measure of safety outcome involves the *accident* or *incident rate* of an organization. This type of data can be evaluated repeatedly and regularly for an entire organization and its work units, such as clinical departments and wards, and it may also allow a comparison between work units or organizations in the same domain, for example, hospital wards. At the same time, there are many reasons why we should be wary of using accident data, even within one and the same domain and the same type of tasks. First, such data may be essentially dependent on external factors and may not reflect internal processes. For instance, university hospital clinics may be more likely to admit patients who are more ill and may therefore experience a greater rate of adverse events (Baker et al., 2004). Second, accident data may be of dubious accuracy because of underreporting by some organizations and overreporting by others (Glendon & McKenna, 1995).

Reporting of near misses and incidents may be a useful measure of safety performance, although

its overriding goal is not to derive reliable statistics regarding rates of different types of incidents but to enable organizations to learn from such experiences (Barach & Small, 2000). Thus, Helmreich stresses that one should not seek to derive rates from incident reporting but rather focus on the valuable lessons they contain (Helmreich, 2000b). However, the wide variation observed across, for instance, hospitals and individual departments may have much more to do with local incentives and local reporting culture than with actual patient risks (Cullen et al., 1995). Therefore, when performing comparative studies between organizations or between work units within a single organization, we should be careful in interpreting the incident rate. As noted earlier, different patient profiles may entail that incident rates may not be directly comparable. In addition, there is another source of even greater uncertainty in the interpretation of rates. Thus, the incident rate may be interpreted either as a measure of risk (the greater the rate of reported incidents of a given type, the greater is the likelihood that a patient injury may take place) *or* as an index of the inverse of risk (i.e., as an index of safety), that is, the more staff members are demonstrating willingness to report, the greater is their sensitivity to errors and learning potential, and so, the greater is the safety in their department (Edmondson, 1996, 2004).

Outside health care, however, there are occasionally opportunities for acquiring safety performance data that may be less susceptible to local and random vagaries. Still, most studies that have compared safety culture measures and safety performance have referred to self-reported accidents and incidents. For instance, Diaz and Cabrera (1997), using questionnaire responses of three comparable companies, argued that rank orders of employees' attitudes toward safety coincided with those of employees' perceived (self-reported) safety level. Until recently, a strictly limited number of studies had examined the relation between safety culture measures and accident risk or ratio based on *actual* accident data. Among the small number of studies addressing actual accident and incident rates, Sheehy and Chapman (1987), however, could not find evidence of a correlation between employee attitudes and accident risk based on objective data on accidents. Itoh, Andersen, and Seki (2004), focusing on operators of track maintenance trains, identified a correlation between the train operators' morale and motivation with actual incident rates for each of the five branches belonging to a single contractor of a Japanese high-speed railway. A branch that employed train operators having higher morale and motivation exhibited a lower incident rate. Itoh and colleagues (2004) also found the very same correlation for company-based responses collected from all track maintenance companies working for the high-speed railway. Andersen and colleagues (2004) found that two daughter companies, both of which were involved in the same procedures and regulations, had different lost-time incident rates as well as self-reported incident rates and that the high-rate company showed more negative attitudes and perceptions on 56 out of 57 items on which they showed significantly different responses.

In summary, several methods are available for investigating safety culture in an individual organization or work unit: safety audits, peer reviews, performance indicator measures, structured interviews, behavioral observations, questionnaire surveys, and so forth. Each method has its strengths and weaknesses, its highly useful and less useful applications. Among these methods, some tools involving questionnaire-based surveys can produce safety culture index values that have been shown to correlate with safety performance. It is important to select appropriate methods and tools that match the purposes of safety culture assessment as well as the characteristics of an organization under study. One of the greatest advantages of using the methods mentioned here is their applicability to diagnosing safety status *proactively*, that is, safety culture indices can be measured *before* an actual accident takes place. Moreover, it is well known that only subset of all incidents is reported in health care (Antonow, Smith, & Silver, 2000). Therefore, the methods may serve as an independent means of assessing the risk level of specific organizations and units.

STAFF ATTITUDES TOWARD SAFETY-RELATED ISSUES: HOW EMPLOYEES PERCEIVE THEIR JOBS, MANAGEMENT AND SO FORTH

Safety Culture Perceived by Health Care Staff

In this section, we illustrate characteristics of safety culture in health care based on the results of our questionnaire surveys of Japanese hospitals (Itoh,

TABLE 13–1. Percentage Agreements and Disagreements for Indexes of Safety Culture[a]

Safety Culture Indexes	*Doctors*	*Nurses*	*Pharmacists*	*Total*
Power distance	30%	22%	28%	23%
	60%	60%	59%	60%
Communication	88%	86%	90%	86%
	5%	4%	3%	4%
Team work	58%	65%	55%	64%
	26%	16%	25%	18%
Own performance under high stress	49%	41%	43%	42%
	38%	36%	33%	36%
Stress management for team member	70%	69%	67%	69%
	20%	16%	22%	17%
Morale and motivation	73%	66%	66%	67%
	16%	15%	19%	15%
Satisfaction with management	46%	51%	52%	51%
	40%	29%	32%	30%
Recognition of human error	61%	61%	55%	60%
	26%	21%	29%	22%
Awareness of own competence	58%	45%	40%	46%
	27%	25%	31%	26%

Note. Upper row = percentage agreement; Lower row = percentage disagreement

[a]Adapted from Itoh et al., 2002

Abe, & Andersen, 2002, 2003). We describe health care staff responses and summarize results at the level of organizations (hospitals), specialties and wards, and job ranks or positions. Using multinational data from Denmark and Japan, we also conducted a comparison of health care staff with ship officers (Andersen, Garay, & Itoh, 1999; Itoh & Andersen, 1999). The comparison results are briefly described here.

Most of the safety culture scales contained in the questionnaire used in the Japanese survey were adapted from Helmreich's Operating Room Team Resource Management Survey (Helmreichs & Merritt, 1998), which contains 57 five-point Likert-type items about perceptions of and attitudes to jobs, teamwork, communication, hospital management, and other safety-related issues. As a framework of safety culture analysis, we employed the nine-dimensional model mentioned earlier. Each safety culture index included several items in the questionnaire. We illustrate this by taking, as an example, the index of power distance that contains 12 items. Power distance (derived from Hofstede, 1991) refers to the psychological distance between superiors and subordinate members—a small distance means that leaders and their subordinates have open communication initiated not only by leaders but also by juniors. Representative items of this index are as follows: "The senior person should take over and make all the decisions in life-threatening emergencies"; "senior staff deserves extra benefits and privileges"; and "doctors who encourage suggestions from team members are weak leaders."

A summary of the responses of approximately 600 health care staff (doctors, nurses, and pharmacists) from five Japanese hospitals is shown in Table 13–1 (the mean response rate of this sample was 91%). In the table, the percentage [dis]agreement is defined as the following rate: the nominator represents "strongly agree" and "slightly agree" ["strongly disagree" and "slightly disagree"] responses, excluding a neutral response option from the five-point scale, and hence, the sum of percentage agreement and disagreement is lower than 100% for each index; and the denominator represents the total number of responses for the specific items of each safety culture index. As can be seen in this table, Japanese health care providers have relatively high *morale and motivation*, and they exhibit good awareness of *communication* among team members and within their organization. Their satisfaction with *teamwork* is also relatively high, with nurses' perception of the value of teamwork being the highest. By contrast, respondents' *satisfaction with management* is rather low, and doctors' satisfaction is significantly lower than that of the other two professional groups.

An unexpected result is that all three groups show a relatively small power distance (higher agreement of this index indicates large power distance). Previous studies (e.g., Spector, Cooper, & Sparks,

2001) have shown that the Japanese are around the "upper middle" when compared with other nations in terms of power distance—so, although not at the extreme high end (e.g., Arab countries and Malaysia), the Japanese are not at the extreme low end either (e.g., Denmark and Ireland). The sample results also indicate that a large part of health care staff has realistic recognition of human error (high agreement indicates realistic recognition). That is, all three hospital groups recognize that "human error is inevitable," and they do not agree with the item "errors are a sign of incompetence." By contrast to these items, however, there was a large difference in an error reporting item "I am encouraged by my leaders and co-workers to report any incidents that I may observe" between the three groups. These results appear to point toward a distinction between attitudes that are relatively independent of and those that are influenced by local culture. Views about human fallibility and human limitations appear to be influenced by education, national culture, and possibly professional culture, whereas willingness to report errors and incidents is influenced by respondents' perceptions of their own specific safety management in an organization. In this respect, it may be noted that it is widely recognized that the incident reporting system is better managed for the nursing staff than for doctors and other staff groups.

Most hospital members recognize the need for monitoring colleagues' levels of stress and workload. For instance, more than 90% of respondents agreed that team members should be monitored for signs of stress and fatigue during tasks. By contrast, respondents do not exhibit any great awareness of the effects of stress on their own performance. More than half of doctors and one third of the nurses disagreed with the item "I am more likely to make errors or mistakes in tense or hostile situations." Similarly, only 5% of doctors agreed that their performance is reduced in a stressed or fatigued situation.

Differences Between Clinical Specialties Between Wards

Table 13–2 indicates percentage agreements and disagreements based both on specialties of the doctors (e.g., internal medicine, surgery) and on the types of wards of nurses. Nurses are classified into eight ward groups: internal medicine, surgery, intensive care unit (ICU), outpatient, pediatrics, mixed ward, and operating room (OR). Although the statistical analysis involved rank-based tests (Kruskal–Wallis, Mann–Whitney) to each question item, the aggregated percentage scores for each factor (agreement vs. disagreement) were not tested. When two groups differ significantly (and in the same direction) on all or most items within a given index, they are said to differ significantly on this index. There appears to be only small or nonsignificant differences between doctors' specialties for most safety culture indexes except for power distance and perception of communication. There is an overall trend of differences across specialties in that surgeons have slightly more positive attitudes and perceptions with regard to safety culture; that is, they demonstrate a bit higher morale and motivation, stronger satisfaction with management, better awareness of teamwork, more realistic recognition of human error, and so on. This appears to indicate that doctors belonging to different specialties may develop different types of safety cultures and even local subcultures.

Responses of nurses across the eight wards also appear to show differences in several of the safety culture indexes: communication, stress management for team member, morale and motivation, and recognition of human error. Among the eight ward groups, two stood out as remarkable in terms of responses to these indices. One type consists of nurses working in the operating room and pediatrics. Compared with the other ward groups, these nurses expressed greater agreement with the importance of communication, and they showed a higher level of realistic acknowledgment of their own performance limitations under stress conditions as well as more realistic recognition of human error, and, finally, a relatively lower level of morale and motivation. Nurses working in the internal medicine ward and with outpatients made up the other ward type. By contrast to the first type, these nurses had the highest morale and motivation and expressed greater agreements with stress management for team members but a lower level of appreciation of their own performance limits under stress condition. These results might, in part, reflect differences in tasks and work conditions, for example, more technical work (operating room) versus more clerical work (outpatients) and work with babies and infants (pediatrics) versus work with many elderly patients (internal medicine). Such variations in task characteristics, in turn, may give rise to ward-based subcultures in a hospital.

TABLE 13–2. Specialty- and Ward-Based Comparisons for Safety Culture Indexes[a]

	Speciality-Based Doctors			Ward-Based Nurses						
Safety Culture Indexes	*Physician*	*Surgeon*	*Others*	*Internal medicine*	*Surgery*	ICU	*Outpatient*	*Pediatrics*	*Mixed ward*	OR
Power distance	31%	33%	28%	20%	23%	27%	21%	24%	20%	21%
	57%	60%	61%	62%	59%	57%	61	65%	60%	63%
Communication	86%	90%	88%	87%	84%	83%	88%	88%	85%	91%
	8%	3%	5%	2%	6%	2%	5%	3%	4%	3%
Team work	52%	67%	54%	66%	64%	61%	66%	65%	67%	68%
	27%	20%	31%	14%	16%	14%	20%	22%	14%	15%
Own performance	54%	43%	51%	40%	41%	43%	36%	48%	42%	50%
under high stress	36%	43%	36%	36%	37%	31%	42%	35%	30%	33%
Stress management	66%	70%	72%	72%	69%	71%	71%	70%	68%	66%
for team member	21%	19%	20%	14%	17%	11%	15%	15%	16%	20%
Morale & motivation	68%	77%	73%	70%	62%	62%	77%	63%	60%	62%
	2%	13%	16%	13%	18%	15%	11%	26%	14%	18%
Satisfaction with	37%	53%	46%	55%	50%	47%	57%	53%	50 %	48%
management	51%	34%	36%	27%	28%	33%	32%	34%	27%	34%
Recognition of	57%	62%	62%	65%	59%	53%	61%	61%	61%	68%
human error	30%	23%	26%	20%	22%	24%	23%	26%	18%	21%
Awareness of	56%	66%	53%	49%	43 %	46%	48%	42%	40%	42%
own competence	34%	20%	28%	23%	26%	20%	26%	32%	20%	31%

Note. Upper row = percentage agreement; lower row = percentage disagreement.

[a] Itoh et al., 2003a

Hospital-Specific Cultures

Table 13–3 summarizes hospital-based responses of nurses in terms of mean, maximum, minimum, and range of percentage agreement and disagreement for each index over the five hospitals surveyed. In the table, maximum and minimum values were picked up across the five hospitals for each index, and range of percentage agreement/disagreement was indicated as subtracted value of the minimum from the maximum. Mean values were shown in this table as averaged percentage agreements and disagreements over the five hospitals. Differences across the five hospitals are larger than across wards (the latter reviewed in the previous subsections) for most indices. Results from a recent, comparable survey of approximately 6,000 health care staff responses from 22 Japanese hospitals show similar results: the observed difference across the 22 hospitals is even greater for every safety culture index than in the former five-hospital survey (Itoh et al., 2005). In fact, for most of the safety culture indices, the ranges of percentage agreement and disagreement across the hospitals are more than three times greater than across doctors specialties and nurses wards.

From these survey results, we conclude that there are large variations in safety culture in Japanese hospitals and somewhat smaller variations across specialties and wards. One may speculate that similar findings might be found in other settings. In addition, one may speculate approximately the reasons why hospital differences are greater than ward and specialty differences. At the very least, the latter result appears to indicate that the organizational culture of the individual hospitals plays a greater role than the variation in work and task conditions across specialties and wards.

Multinational and Multiprofessional Comparisons

In this subsection, we review some cultural differences and similarities across professions and across nationalities, comparing hospital safety culture with that of ship officers elicited from similar questionnaire based surveys (Andersen et al., 1999; Itoh & Andersen, 1999). Approximately 2,600 seafarer responses were collected from two Japanese and five Scandinavian ship companies, using an earlier, derivative version of the hospital questionnaire, the Ship Management Attitudes Questionnaire (SMAQ). The SMAQ sample included responses not only from ship officers but also from nonofficer seafarers. In this comparison of identical items from the two different domains, we used only the

TABLE 13–3. Variations of Safety Culture Indexes Across Five Hospitals[a]

Safety Culture Indexes	*Mean*	*Maximum*	*Minimum*	*Range*
Power distance	22%	24%	19%	5%
	60%	63%	59%	4%
Communication	86%	88%	84%	4%.
	4%	4%	3%	1%
Team work	65%	68%	58%	10%
	16%	20%	13%	7%
Own performance under high stress	41%	48%	35%	13%
	36%	42%	31%	11%
Stress management for team member	70%	72%	66%	6%
	16%	17%	14%	3%
Morale & motivation	66%	74%	60%	14%
	15%	21%	11%	10%
Satisfaction with Management	51%	59%	41%	18%
	29%	34%	24%	10%
Recognition of human error	61%	67%	54%	13%
	21%	24%	20%	4%
Awareness of own competence	45%	48%	42%	6%
	25%	31%	20%	11%

Note. Upper row = percentage agreement; lower row = percentage disagreement.

[a]Adapted from Itoh et al., 2003a

subsample of ship officers (approximately 1,500 responses), because this group may be regarded to have a somewhat higher social status comparable to that of health care staff. Table 13–4 shows percentage agreement and disagreement on safety culture indices for ship officer groups as well as for three health care groups using responses to the identical items in the two questionnaires. The entire sets of items in these questionnaires were not identical; the overlapped part was a subset of each questionnaire, and, therefore the percentage agreements and disagreements for health care staff groups, which were calculated from the same response sample, did not coincide with those in Table 13–1. The ship officer sample includes responses from Danish officers in Scandinavian companies and from Japanese and non-Japanese Asian officers.

Before discussing culture differences between health care staff and ship officers, we briefly describe national culture comparisons using ship officer's data. Table 13–4 shows that there are only minor cultural differences between Danish and Japanese officers for most indexes except for morale and motivation. An interesting finding is that the relatively larger differences were observed between Japanese and Asian officers, many of them are Pilipino and Indonesian, for most indexes, although the latter group is also working for Japanese companies, which may follow a Japanese management system. This suggests that a company nationality does not affect a professional culture as much as the nationality of its employees.

With regard to characteristics of professional culture, a comparison of the two Japanese samples shows noticeable differences between health care staff and ship officers in most indexes with a few exceptions. There are only small differences between the two professions for power distance (small distance is perceived by doctors, nurses and officers), for morale and motivation (where doctors and officers are alike), and for acknowledgement of human error (where nurses and officers are alike). For the other safety culture indexes, ship officers have more positive attitudes and perceptions than health care staff. They assign a greater importance to communication during task performance and to stress management for team members than do both doctors and nurses. Moreover, ship officers attitudes about human error are more realistic than that of doctors and are identical to the attitudes of nurses.

Integrating these cross-professional comparisons, we concluded that the safety culture among ship officers appears to be characterized by somewhat greater safety awareness than that of hospital staff. Helmreich and his associates (Sexton, Thomas, & Helmreich, 2000) reached similar conclusions when comparing responses from medical staff and airline pilots, although they found that surgeons and ICU staff were more like pilots than other specialties in their responses about teamwork and error recognitions.

TABLE 13–4. Comparison of Health Care Staff with Ship Officers on Safety Culture Indexes[a]

	Healthcare Staff			Ship Officers		
Safety Culture Indexes	*Doctor*	*Nurse*	*Pharma*	*Japanese*	*Asian*	*Danish*
Power distance	6%	9%	5%	8%	17%	8%
	89%	79%	88%	81%	63%	82%
Communication	86%	85%	86%	99%	80%	96%
	6%	4%	7%	1%	6%	1%
Own performance under high stress	49%	43%	44%	38%	24%	43%
	38%	35%	32%	43%	54%	38%
Stress management for team member	72%	67%	68%	92%	68%	82%
	19%	18%	20%	3%	6%	4%
Morale and motivation	81%	74%	72%	82%	81%	66%
	11%	10%	13%	8%	4%	12%
Recognition of human error	36%	53%	39%	51%	63%	51%
	48%	34%	45%	36%	18%	29%

Note. Upper row = percentage agreement; lower row = percentage disagreement.

[a]Adapted From Itoh at al., 2003a

INCIDENT AND ERROR REPORTING ATTITUDES: HEALTH CARE STAFF ACTIONS AFTER MISTAKES

Learning From Adverse Event Experiences

One of the most important issues in safety culture concerns the ability of an organization or a group to learn from situations when things go wrong (Department of Health, 2000). Therefore, staff attitudes to incident reporting and discussing their own and colleagues' adverse events and errors are vital. It is widely recognized that health care staff members being willing to report errors and incidents contributes to and is an expression of a healthy and good safety culture. Conversely, when health care staff members keep errors to themselves, it is a sign of a poor safety culture (Department of Health, 2000). Only by bringing up errors and other incidents will health care staff have a chance to learn from experience; and conversely, if such experience is kept suppressed, the risk of repeating this type of incident is greater.

Another key to successful learning from adverse events is management's commitment to incident reporting, approach to feedback to "reporters," and analysis of significant events (Department of Health, 2000). Such a commitment includes support to risk managers who have responsibilities for giving personal feedback to the reporting staff members and for sharing information and knowledge about the reported case within an organization.

Staff Attitudes to Error Reporting

In this subsection, we describe results of surveying health care staff attitudes and views about error reporting and related actions, primarily based on results of questionnaire survey in Japanese hospitals (Itoh et al., 2002). To uncover health care providers' error-reporting attitudes, we used a section of the questionnaire used in the Survey of Staff Attitudes to Reporting (Andersen, Madsen, Hermann, Schiøer, & Østergaard, 2002) and collected 550 responses from Japanese doctors and nurses. The data sample is the same as the one mentioned earlier in the chapter, excluding responses from pharmacists (the mean response rate was 91%). The questionnaire includes question items that refer to two fictitious adverse event cases, one in which the patient suffers a relatively severe outcome (resulting in long-term heart problem and little possibility of returning to work), and the other involving a relatively minor injury (no permanent impairment but a 1 week extension of hospitalization). Respondents are asked to imagine that they themselves were the acting doctor or nurse and to indicate the likelihood of bringing up the event with their leader and colleagues (5 questions) and informing the affected patient (6 questions). The questions asked included whether they would "keep secret about the error," "discuss it with colleagues," "report the event to the local hospital system," "inform the patient about the adverse event," or "express regrets to the patient." Respondents indicated their answers on a 5-point Likert scale ranging from definitely yes to definitely no.

Willingness to Report. Japanese doctors' and nurses' attitudes to error reporting for the two

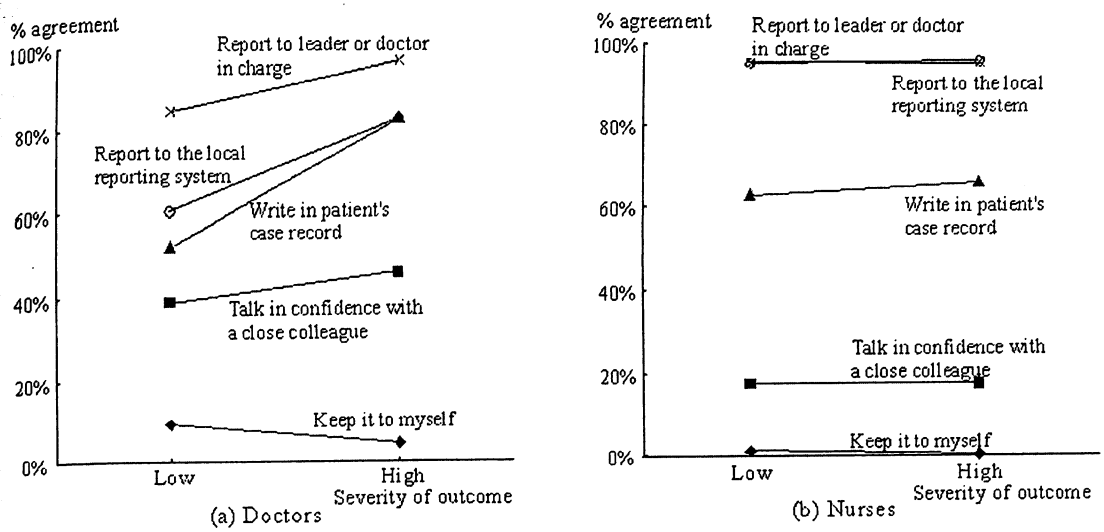

Figure 13–1. Willingness to report incident for low and high severity cases (Itoh et al., 2002).

fictitious cases are depicted in Figure 13–1. As an overall trend, doctors indicated that they would take significantly more positive actions on reporting for the severe than for the mild outcome case. The item, "talking in confidence with a close colleague to get support," is the only one that does not show a significant difference between the two levels of severity. The differences in nurse responses between the minor and the major injury case are minute, however (but because of the large sample size, some of them are nevertheless significant).

As can be seen in Figure 13–1, the attitudes of the nurses toward error reporting are significantly more positive than those of the doctors for almost all items. Nurses' willingness to report errors in the mild case is even higher for most items than those of doctors in the severe case. For the severe outcome case, there is no significant difference between doctors and nurses in entering the event into the patient case record, but doctors are more willing to do so. For the rest of the items, (e.g., "keep secret about the event" and "report the event to the local reporting system"), the nurses' responses are, in the severe case, much more positive than those of the doctors. For the mild outcome case, responses to all the items on incident/error reporting are significantly different between the two health care professional groups: Nurses showed much more positive attitudes to error reporting than doctors.

Reason proposed (Reason, 1997; Reason & Hobbs, 2003) that to be efficient in its pursuit of safety, a safety culture must rely on three interrelated component cultures: (a) a reporting culture—an organizational climate in which people are prepared to report their errors and near-misses, (b) a just culture—an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information, and (c) a learning culture—a willingness and the competence needed to draw right conclusions from a safety information system such as the incident reporting system and they will to implement major reforms when their need is indicated. From the comparison results as well as the results described earlier, we may conclude that the reporting culture surrounding nurses is more mature than that of doctors. Assuming no differences in the just culture and the learning culture between doctors and nurses, the professional culture of the nurses currently may be *safer* than that of the doctors. In addition, considering the other two components of safety culture are interlocked with the reporting culture, the just culture and the learning culture in the nurses' sections might, we may speculate, be better than in the doctors sections.

Interaction With Patient Responses to interactions with the patient showed a similar trend to error-reporting attitudes across the two cases, as

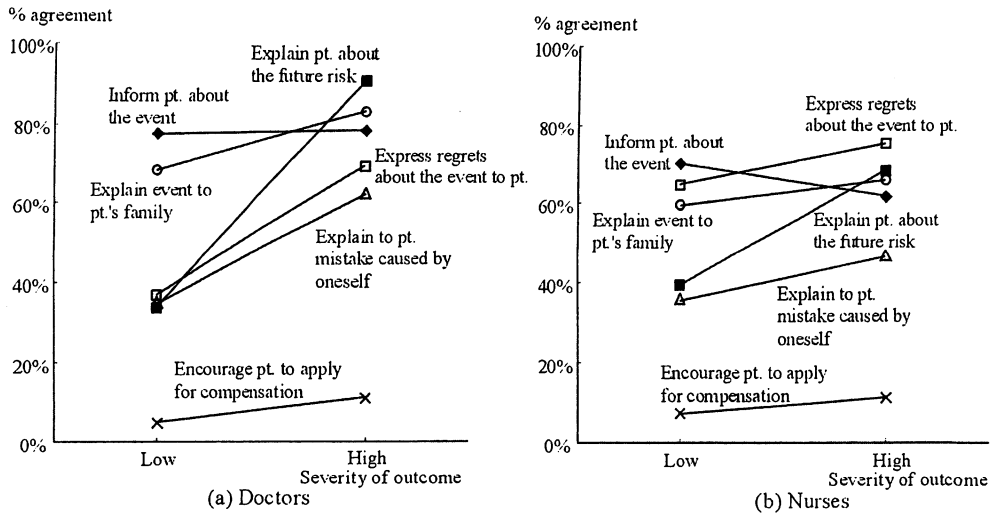

Figure 13–2. Interactions with respect to patient for low and high severity cases (Itoh et al., 2002).

shown in Figure 13–2. For almost all the proposed actions about interaction with the patient, both doctors and nurses provide more positive responses for the severe case than for the mild outcome case. The more severe the outcome of an error, the more likely it is that the consequence will be explained to the patient, that the patient will be told that the event was caused by the doctor's or nurse's mistake, that the event will be explained to the patient family, and that the doctor or nurse will express regret to the patient about the event.

Nurse responses show that they are more willing to apologize to the patient about the event than doctors. For the other actions in relation to the patient, doctors responded more positively than nurses, no doubt because doctors have the primary responsibility for carrying out these acts vis-à-vis the patient when such events occur.

Multinational Comparisons of Reporting Attitudes

Using the same adverse event cases and questions, a similar survey was conducted in Denmark, and we compared health care staff attitudes to error reporting and interaction with patients between Denmark and Japan (Andersen, Itoh, & Peraudeau, 2003). Comparative results of staff attitudes for the mild case between these two countries for some of the questions are shown in Figure 13–3. The overall trend in differences in staff attitudes to error reporting between doctors and nurses in Danish data is qualitatively similar to that of the Japanese results mentioned in the previous subsection but with some slight variations. Like in the Japanese hospitals, the Danish nurses' attitudes to error reporting are more positive than those of Danish doctors. In addition, Danish nurses are more willing to report to a leader or a doctor in charge and to enter the event into the patient case record. By contrast, as for interaction with patients, Danish doctors are a bit more positive than nurses, but only slightly so, just as is the case in Japan. The doctor is more likely to explain about the event and future risk, to explain the event was caused by him or herself, and to express personal regrets to the patient than the nurse. Some of the differences may be because doctors, and not nurses, will be critically involved when an adverse event is to be disclosed to a patient.

With regard to comparisons between the two countries, large differences can be seen both for doctors and nurses in Figure 13–3. Both Japanese doctors and nurses are more willing to submit incident reports to the hospital reporting system, compared with the Danish health care staff who, at the time of the survey, had only a few such systems available (therefore, most respondents indicated that this item is not available). However, for the other actions regarding error reporting and interaction with patients, the likelihood of any given action (except keeping the event secret) by Danish staff far exceeds that of their Japanese colleagues: Danish doctors and nurses are more likely to write

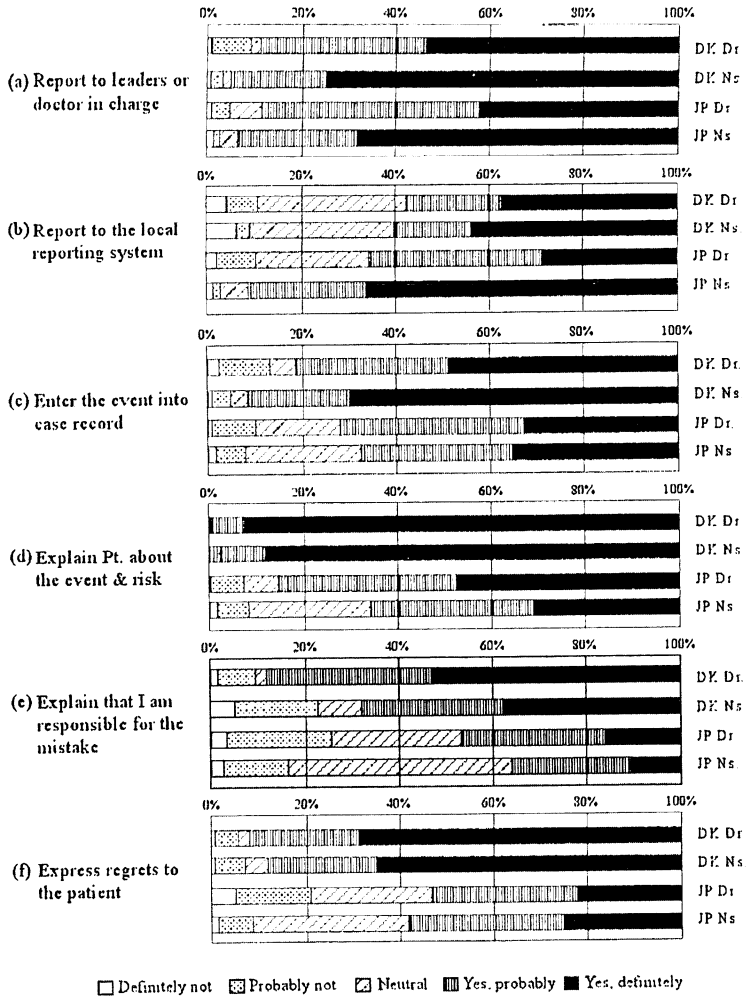

Figure 13–3. Comparison of responses on error reporting between Danish and Japanese health care staff (in mild case) (adapted from Andersen et al., 2003).

the event in the patient case record and more willing to explain to the patient about the event and future risk, to express their regrets, and to acknowledge their mistake than Japanese health care staff.

In summary, the comparative results about health care staff attitudes showed large differences between Denmark and Japan in terms of error and incident reporting and interactions with the patient who suffered an adverse event. Sources of such variations may be caused by a range of very dissimilar factors: for example, to cultural aspects of the specific ward, specialty and organization (e.g., organizational differences in safety culture issues), to differences in national culture, and to differences in safety management structures (e.g., availability of proper reporting system).

CONCLUSION: PERSPECTIVES FOR IMPROVING PATIENT SAFETY

In this chapter, we reviewed the concepts of safety culture and safety climate and some widely quoted definitions and dimensions of safety culture. In addition, we illustrated how some recent survey results of safety culture factors may be correlated to other indicators of safety outcomes. We described that much larger safety culture differences exist across different

organizations or hospitals than across different departments, wards, or specialties within any single hospital. Comparing safety culture related attitudes between Danish and Japanese health care organizations, we also observed large differences between these two countries. The observed differences between health care staff attitudes and perceptions in the two countries should be tied to at least different national, and possibly different organizational cultures. Another determinant of such differences is no doubt tied to institutional, legal, and regulatory aspects, which we have merely alluded to. For instance, an important source of difference in staff attitudes to interactions with the patient between Denmark and Japan may be in part the complaints and compensation systems for medical accidents and incidents. There are no such systems in Japan, although Denmark has a no-fault compensation scheme and has recently introduced a nationwide confidential reporting system (Andersen, et al., 2004a).

The ability to derive and disseminate learning from adverse events depends on acquiring relevant information through incident reporting (Itoh, Seki, & Andersen, 2003). As described in earlier in the chapter, an organization (or a group) will be able to derive learning from negative experiences only if there are both an appropriate institutional framework and a strong local culture that encourages a trustful atmosphere. The institutional framework must provide mechanisms for collecting, providing feedback, analyzing, and implementing and monitoring the possible revisions to procedures and guidelines. Recent initiatives to establish national reporting systems (e.g., the National Patient Safety Reporting System for England and Wales introduced in February 2004, and the Danish national confidential reporting system, introduced in January 2004) have been inspired by experience with confidential reporting in other safety critical domains (e.g., Orlady & Orlady, 1999).

One of the greatest advantages of safety culture assessment is its potential for supporting *proactive* patient safety activities. Results of the survey should be used prospectively and, in combination with a proactive regime, support the identification of points at which a specific local safety culture may need to be strengthened. Equally, survey tools can be used to measure changes over time, including effects of intervention programs within departments or hospitals.

Finally, we would like to stress the importance of the participation and involvement of all members of an organization in safety activities, including frontline staff, technicians, orderlies, leaders in departments, and senior managers. Commitment to safety is required not only by management but by all the members within an organization—as illustrated in the stress on shared norms described in the first section of this chapter. Through such hospitalwide participation, it is possible to tackle safety activities continuously; to build on the experience of such initiatives, their outcomes, the knowledge and techniques involved, and the repeated applications to new cases; and, finally, to help in reinforcing safety awareness of health care practices with frontline staff and management.

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