Caring for Our Caregivers

Safety and Health Management Systems: A Road Map for Hospitals

September 2013

OSHA®

Occupational Safety and Health Administration

U.S. Department of Labor

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Contents

Executive Summary

Why implement a safety and health management system?

Hospital work can be surprisingly hazardous—more hazardous than even manufacturing or construction. According to the Bureau of Labor Statistics, each year more full-time employee days are lost in healthcare than in industries such as mining, machinery manufacturing, and construction, and the incidence rate (the likelihood of getting hurt) in hospitals is also higher (see *Worker Safety in Your Hospital: Know the Facts*, available at www.osha.gov/dsg/hospitals, to learn more about hospital injury and illness rates). Occupational injuries and illnesses can increase your hospital's workers' compensation insurance costs, disrupt staffing and workflow, lead to early exit of experienced staff, and damage workplace morale. There is also growing recognition that the systemic issues that lead to hospital worker injuries and illnesses can compromise patient safety as well.

A safety and health management system (also known as an injury and illness prevention program, or I2P2) is a tool to help turn this situation around: a proven, flexible approach to proactively and continually address workplace safety and health issues.[1] It provides the overarching framework for planning, implementing, evaluating, and improving all workplace safety and health management efforts. By systematically advancing safety throughout the hospital, it maximizes the effectiveness of hazard-specific programs, such as those addressing violence prevention, blood-borne pathogens, and patient handling. The system encompasses *all* workplace hazards, not just those covered by OSHA standards.

Increasingly, hospitals are integrating their *patient safety* and *worker safety* programs and managing them together using a safety and health management system framework. Doing so makes sense, because many of the risk factors that affect patient safety, such as patient handling, infection control, and workplace violence, also affect hospital workers. In addition, the tools used to monitor, manage, and improve patient safety have proven equally effective when applied to worker safety. This includes many of the high reliability organization (HRO) tools that hospitals are using to transform their operational culture.[2]

> "The organizational culture, principles, methods, and tools for creating safety are the same, regardless of the population whose safety is the focus."
>
> –The Joint Commission. 2012. *Improving Patient and Worker Safety: Opportunities for Synergy, Collaboration and Innovation.*

What are the benefits?

A safety and health management system can help you bring a "culture of safety" into your hospital, with potential benefits for both worker and patient safety. With a safety and health management system, protecting safety and health evolves from being an isolated, sporadic activity to one that is integrated into all business and operational processes and activities. Safety and health is not delegated to only a few people–it is distributed across the workforce and backed up by significant management responsibility, commitment, and attention. Everyone takes ownership of the goal of improving the organization's safety and health performance. A safety and health management system helps ensure that hazards are identified earlier, effective controls are put in place, people are adequately trained and empowered, and work processes are designed and carried out in a manner that delivers more consistent safety and health performance.

A safety and health management system can help your hospital realize a wide range of benefits:

- Fewer injuries, illnesses, and infections.
- Reduced costs for workers' compensation claims and lower health insurance premiums.
- Less absenteeism and higher return-to-work rates following injury or illness.
- Improved work practices, leading to increased efficiency and greater patient safety and satisfaction.
- Higher job satisfaction, morale, and employee retention.
- Enhanced reputation.

Hospitals are finding that the practices they adopt under a management system to improve worker safety help them adopt and reinforce practices that improve patient safety as well. They see the costs from injuries and illnesses to both patients and employees decrease. Many of the case studies and best practices highlighted in this publication illustrate this kind of synergistic effect.

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[1] The safety and health management system concept is known by several names, including "injury and illness prevention program" and "occupational safety and health management system."

[2] See, for example, www.ahrq.gov/legacy/qual/hroadvice/index.html.

What is involved?

Almost all successful injury and illness prevention programs include six core elements:

- **Management leadership:** Managers demonstrate their commitment to improved safety and health, communicate this commitment, and document safety and health performance. They make safety and health a top priority, establish goals and objectives, provide adequate resources and support, and set a good example.

- **Employee participation:** Employees, with their distinct knowledge of the workplace, ideally are involved in all aspects of the program. They are encouraged to communicate openly with management and report safety and health concerns.

- **Hazard identification and assessment:** Processes and procedures are in place to continually identify workplace hazards and evaluate risks. There is an initial assessment of hazards and controls and regular reassessments.

- **Hazard prevention and control:** Processes, procedures, and programs are implemented to eliminate or control workplace hazards and achieve safety and health goals and objectives. Progress in implementing controls is tracked.

- **Education and training:** All employees have education or training on hazard recognition and control and their responsibilities under the program.

- **System evaluation and improvement:** Processes are established to monitor the system's performance, verify its implementation, identify deficiencies and opportunities for improvement, and take actions needed to improve the system and overall safety and health performance.

These six elements can be adapted and implemented to fit the needs of workplaces of all different types and sizes, including hospitals, as demonstrated throughout this road map. Your hospital has likely put many of these processes and procedures in place already, as part of efforts to use high reliability concepts to improve patient care. *Safety and Health Management System and Joint Commission Standard: A Comparison* (available at www.osha.gov/dsg/hospitals) shows how patient safety efforts dovetail with this systematic approach to worker safety and health.

How to use this road map

- See **Section 1 (Introduction)** for an overview of the concepts behind a safety and health management system and potential benefits for your hospital.

- See **Section 2 (Core Elements)** for more about the elements of a safety and health management system. Here you will learn why each element is important and what is involved in implementing it. This section highlights best practices and examples of how hospitals are implementing elements of a safety and health management system, and lists resources for additional information.

1. Introduction

How does a safety and health management system work? An overview

A safety and health management system is a proven, systematic approach—used by employers and employees, working together—to finding and correcting workplace hazards before injuries or illnesses occur. It provides an overarching framework for planning, implementing, evaluating, and improving all of a hospital's workplace safety and health management efforts. It integrates and strengthens, rather than replaces, hazard-specific programs such as those covering bloodborne pathogen protection, safe patient handling, and workplace violence prevention. The safety and health management system encompasses all workplace hazards, not just those covered by OSHA standards.

The foundation of all safety and health management systems is the Plan-Do-Check-Act (PDCA)[3] cycle, popularized by W. Edwards Deming (see the box below) and used by many employers to manage their other business processes, such as product quality and environmental protection. All management systems are built on these fundamental concepts of planning, understanding the processes at your workplace, making adjustments where necessary, and continually evaluating outcomes. A safety and health management system incorporates basic PDCA methods within a broader set of core elements.

A safety and health management system both aligns with, and helps hospitals adopt, modern hospital quality improvement practices. The high reliability principles promoted by organizations such as the Joint Commission, the Agency for Healthcare Research and Quality, and the Partnership for Patient Safety are very similar to the principles underlying an effective safety and health management system. This publication highlights ways that the practices hospitals have adopted to meet Joint Commission requirements can be easily adapted to achieve goals for worker safety and health.

The safety and health management system is not a new concept, nor was it invented by OSHA. Several industry consensus standards for safety and health management systems have been widely accepted in the world of commerce and voluntarily adopted by many businesses:

1. The American National Standards Institute (ANSI), the American Industrial Hygiene Association (AIHA), and the American Society of Safety Engineers (ASSE) have published a voluntary consensus standard, ANSI/AIHA/ASSE Z10-2012, *Occupational Safety and Health Management Systems.*

2. The Occupational Health and Safety Assessment Series (OHSAS) Project Group, a consortium of selected Registrars, national standards bodies, professional associations and research institutes, has produced a similar document,

The Plan-Do-Check-Act Cycle
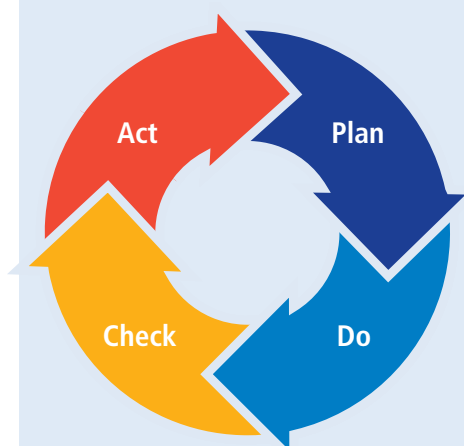
Plan: Establish the organization's commitments, goals, and expectations for safety and health performance; develop an organizational structure and processes to manage and achieve performance objectives; identify and evaluate workplace hazards and risks; evaluate and select control measures to eliminate and reduce identified risks; and determine activities, processes, procedures, programs, and resources needed to achieve objectives.

Do: Implement plans, programs, and procedures throughout the organization in a systematic and controlled manner.

Check: Monitor and measure whether plans are carried out as intended; evaluate whether plans are effective and safety and health objectives have been achieved; and conduct periodic reviews of the suitability and effectiveness of the safety and health management system.

Act: Take needed corrective actions; modify and update the safety and health management system and the organization's goals and objectives as needed; and implement the entire PDCA cycle on a regular and periodic basis.

Adapted from Deming, W.E. 1986. Out of the Crisis. MIT Center for Advanced Engineering Study.

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[3] Some circles, including those promoting healthcare quality, use a modified version of this model known as Plan-Do-Study-Act (PDSA). See www.ihi.org/knowledge/Pages/HowtoImprove.

OHSAS 18001:2007, *Occupational Health and Safety Management Systems—Requirements* (OHSAS Project Group, 2007).

In addition, the International Organization for Standardization (ISO) plans to develop an occupational safety and health management system standard, *Occupational Health and Safety Management Systems—Requirements*. Announced in June 2013 and expected in 2016, the standard will replace country-specific standards, including ANSI Z10 and OHSAS 18001.

What are the core elements of a safety and health management system?

Most successful safety and health management systems have six "core elements," all interrelated, each necessary to the success of the overall system:

- **Management leadership:** Managers at all levels of the organization demonstrate their commitment to improved safety and health, communicate their commitment, and document performance. Managers make safety and health a top priority, establish goals and objectives, provide adequate resources and support, and set a good example.

- **Employee participation:** Employees have unique knowledge of the workplace and must be involved in all aspects of the safety and health management system—for example, setting goals, identifying and reporting hazards, investigating incidents, and tracking progress. All employees understand their roles and responsibilities under the safety and health management system and what they need to do to carry them out effectively. Employees are encouraged to communicate openly with management and report safety and health concerns. Barriers to participation (e.g., language, lack of information, or disincentives) are removed.

- **Hazard identification and assessment:** Processes and procedures are put in place to continually identify workplace hazards and evaluate risks. An initial assessment of existing hazards and control measures is followed by periodic reassessments to identify new hazards and monitor the effectiveness of prevention and control measures.

- **Hazard prevention and control:** Processes, procedures, and programs are created and implemented to eliminate or control workplace hazards and achieve safety and health goals and objectives. Progress in implementing controls is tracked.

- **Education and training:** All employees are provided education or training to carry out their responsibilities under the safety and health management system. In addition, all employees are trained to recognize workplace hazards and trained in the corresponding control measures.

- **System evaluation and improvement:** Processes are established to monitor safety and health management system performance, verify implementation, identify deficiencies and opportunities for improvement, and take necessary actions to improve the safety and health management system and overall safety and health performance.

Section 2 describes each of these core elements in detail, provides examples of ways to implement them, and illustrates how they dovetail with hospitals' ongoing efforts to create a culture of safety for patient care.

Safety and health management systems in hospitals: best practices and examples

Safety and health management system success stories from VPP hospitals

Hospitals participating in OSHA's Voluntary Protection Programs (VPP), which recognize workplaces that implement a comprehensive safety and health management system, report finding numerous synergies and efficiencies from aligning and integrating their patient safety and employee safety programs. Some of these include:

- **Reduced employee *and* patient injuries.** The University Medical Center at Brackenridge in Austin, Texas, has experienced declines in both the total number of recordable employee serious injuries and patient safety events.

- **Reduced workers' compensation costs.** Saint Thomas Midtown Hospital (formerly Baptist Hospital) in Nashville, Tennessee, reported a $600,000 reduction in workers' compensation costs in 2012. As a percentage of payroll, the annual workers' compensation costs for Blake Medical Center in Bradenton, Florida, are 30 percent lower than other hospitals in Florida managed by the same parent company.

- **Increased staff and patient satisfaction.** VPP hospitals report positive correlations between their safety and health management system implementation, higher Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores, and improved employee satisfaction indicators, such as low turnover and improved morale.

For more information

OSHA. 2013. *Facts About Hospital Worker Safety*.

www.osha.gov/dsg/hospitals

Presents hospital worker injury rates, potential solutions, and resources for more information.

OSHA. 2013. *Integrating Patient and Workplace Safety Programs: Lessons from High-Performing Hospitals.*

www.osha.gov/dsg/hospitals

Shows how using high reliability principles to build a safety and health management system in the hospital context can lead to greater effectiveness and lower costs.

The Joint Commission. 2012. *Improving Patient and Worker Safety: Opportunities for Synergy, Collaboration and Innovation.*

www.jointcommission.org/assets/
1/18/TJC-ImprovingPatientAndWorkerSafety-Monograph.pdf

Describes potential synergies between patient and worker safety and health activities. Highlights best practices, benefits and potential cost savings, and structural and functional management systems and processes that have successfully integrated safety and health activities. Presents 10 case studies describing practices that address patient and worker safety simultaneously, and that highlight the benefits and potential cost savings attained through collaboration between employee and patient safety departments.

National Patient Safety Foundation, Lucian Leape Institute. 2013. *Through the Eyes of the Workforce: Creating Joy, Meaning, and Safer Healthcare.*

www.npsf.org/wp-content/uploads/2013/03/
Through-Eyes-of-the-Workforce_online.pdf

A report from two roundtables that brought together clinicians, managers, and scholars to identify conditions that define a safe workplace both physically and psychologically, nurture joy and meaning, and create the necessary conditions for patient safety. Presents case studies of healthcare organizations that are creating cultures of safety and respect through policies and training about conduct, reporting, and response to problems.

OSHA's Voluntary Protection Programs

www.osha.gov/dcsp/vpp/index.html

Created in 1982, OSHA's Voluntary Protection Programs recognize and partner with businesses and worksites that demonstrate excellence in occupational safety and health. To qualify for VPP, an applicant must have in place an effective safety and health management system that meets rigorous performance-based criteria. OSHA verifies qualifications through a comprehensive on-site review process. Using one set of flexible, performance-based criteria, the VPP process emphasizes management accountability for employee safety and health, continual identification and elimination of hazards, and active involvement of employees in their own protection (including union involvement, if applicable).

International Labour Organization. 2001. *Guidelines on Occupational Safety and Health Management Systems: ILO-OSH 2001.*

http://www.ilo.org/public/english/region/afpro/
cairo/downloads/wcms_107727.pdf

The International Labour Organization, a United Nations agency that brings together governments, employers, and workers of its member states, has developed voluntary guidelines on safety and health management systems. The guidelines are designed as an "instrument for the development of a sustainable safety culture within the enterprise and beyond." The key elements of the guidelines are built on the concept of continuous improvement.

ANSI/AIHA/ASSE Z10-2012, *Occupational Health and Safety Management Systems.*

This voluntary consensus standard was published by the American Industrial Hygiene Association (AIHA) following American National Standards Institute (ANSI) requirements. It provides management systems requirements and guidelines for improving occupational safety and health. Experts from labor, government, professional organizations, and industry formulated the standard after examination of current national and international standards, guidelines, and practices.

OHSAS Project Group. 2007. *Occupational Health and Safety Management Systems—Requirements.* BS OHSAS 18001:2007.

This standard specifies requirements for an occupational safety and health management system to help an organization control its risks and improve its performance. The 2007 edition reflects lessons learned from users and increases its compatibility with other international safety and health management system standards and guidelines. A companion document, OHSAS 18002:2000, serves as a guide to implementing OHSAS 18001.

2.   The Core Elements

2.1   Management leadership

What management leadership means

Management leadership means that top administrators and the entire hospital's management team:

- Are fully committed to improving workplace safety and health performance.

- Make safety and health performance a top organizational value.

- Provide sufficient resources to implement the safety and health management system.

- Visibly demonstrate and communicate their safety and health commitment to employees and others.

When managers demonstrate this type of leadership and back it up with meaningful action, significant improvements in an organization's safety and health performance will follow. This includes reductions in overall injury, illness, and fatality rates, as well as other indicators of safety and health performance.

Why management leadership is important

Strong, visible, and sincere management leadership is critical to an effective safety and health management system. In an evaluation involving over 270 safety and health experts, management leadership and employee involvement consistently ranked as the two most important elements of a safety and health management system.[4] Research shows that initiatives aimed at increasing management involvement can lead to measurable and dramatic improvements in safety and health activities overall.[5] Management commitment almost always leads to better worker safety and health, less hazardous working conditions, lower workers' compensation and other insurance costs, improved productivity and efficiency, enhanced employee morale, and reduced turnover.

Management leadership starts the organization on the path to superior safety and health performance and reinforces all the other core elements. This leadership helps set the stage for the establishment of a strong safety and health culture in the organization. Without strong commitment from top management, it is unlikely that other system elements can operate effectively. For example, employees are unlikely to fully participate in a system or embrace their safety and health

responsibilities when management leadership is lacking. In fact, the lack of support from management often signals to employees that the organization is not serious about the initiative. This can discourage employees from participating.

The management leadership core element reflects OSHA's position that responsibility for protecting employee safety and health rests squarely with the employer. This position is consistent with the Occupational Safety and Health Act and with the business principle that management controls the resources of time, budget, and personnel necessary to accomplish organizational goals. When it comes to meeting the organization's safety and health goals management commitment is essential.

What management leadership involves

Articulate a policy

Effective management leadership begins by adopting safety and health as a primary business objective, having status within the organization equal to productivity, profitability, service quality, and patient satisfaction. Doing so requires management to recognize and acknowledge the value of a safe and healthful workplace, and the costs of one that is not safe or healthful. Management's commitment is often communicated and documented in a formal safety and health policy.

Establish goals

An overall safety and health policy can contain broad goals, such as implementing a safety and health management system, maintaining compliance, and achieving continuous improvement in safety and health performance. These broad goals then guide the development of more specific goals and objectives as hazards are identified and priorities for action are established (see Section 2.3).

Management should avoid setting specific goals until a hazard assessment is complete. Often, underlying issues or problems that have remained undetected are uncovered through this process. Problems, or potential problems, that were not readily apparent may come to light through a systematic approach.

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[4] OSHA. 1998. *OSHA Consultation Evaluation Tool Final Report*. Prepared under contract to OSHA. Directorate of Federal and State Programs.

[5] LaMontagne, A.D., E. Barbeau, R.A. Youngstrom, M. Lewiton, A.M. Stoddard, D. McLellan, L.M. Wallace, and G. Sorensen. 2004. Assessing and intervening on OSH programmes: Effectiveness evaluation of the Wellworks-2 intervention in 15 manufacturing worksites. *Occupational and Environmental Medicine*. 61(8): 651-660.

The goals and objectives set following the hazard assessment should be realistic and attainable. They should be aimed at areas of performance that can be measured or verified—so that they can be "checked" in the Plan-Do-Check-Act cycle.

Allocate resources

Management is responsible for providing and directing the resources needed to implement the organization's safety and health management system and control measures, including quick fixes. Although the level of resources will vary with organizational size, complexity, and starting point, they must be sufficient to allow managers and employees to fulfill their safety and health responsibilities. Resource needs often go beyond financial needs to include access to information, personnel, time, training, tools, or equipment.

Expect performance

Management sets and upholds safety and health performance expectations in several ways:

- Holding managers and employees accountable for safety and health responsibilities in the workplace, and giving them the authority to do so.

- Leading by example.

- Communicating to managers and employees about safety and health issues.

- Discussing worker safety metrics, benchmarks, and goals with the board of directors.

Top-level management should decide who will implement each component of the safety and health management system. Management should also give individuals enough authority to carry out their assigned duties effectively. Without authority, employees may not feel empowered or motivated to fulfill their assigned responsibilities. Supervisors or others who lack authority may find it difficult to motivate action.

Authority can be granted formally (e.g., by inserting written responsibilities and authority into position descriptions and performance agreements) or informally via simple verbal direction. Either way, it is important that these authorities and division of responsibility be clearly communicated and understood by all.

In an organization with multiple layers of management, top management also demonstrates its commitment by holding middle managers, supervisors, and employees accountable for the implementation and success of the safety and health management system. This ensures their active involvement and encourages them to become creative safety and health problem solvers.

To lead by example, a manager needs to know the safety and health operating procedures and practices that employees must follow and understand why they are important. He or she also needs to follow any safety and health practices and procedures that employees are expected to follow. For instance, employees tend to take notice when management wears hearing protection even during a brief walkthrough of a high-noise area, such as the hospital laundry or utility room. When managers fail to follow safety and health procedures, the credibility of the entire safety and health management system can be damaged.

Managers demonstrate their commitment by clearly communicating to each employee how he or she is expected to contribute to the safety and health management system and why that contribution is important. An effective system holds managers and employees accountable for implementing their assigned duties and responsibilities, often through formal performance evaluations.

How managers demonstrate leadership

Management leadership can be demonstrated in many ways. For example, managers can:

- Conduct safety rounds and ask individual workers if they have any safety concerns or issues.

- Follow proper handwashing procedures and other standard precautions.

- Lead investigations of any incidents.

- Approve purchases or expenditures that will improve safety, and communicate the reasons for doing so.

- Walk around the hospital and stop to compliment employees who are following safe procedures, such as using patient lifting equipment.

- Keep employees from taking dangerous shortcuts, such as failing to use standard precautions to prevent bloodborne pathogen exposure.

- Halt work immediately to investigate or correct a serious hazard.

- Conduct housekeeping inspections of work areas.

- Ask workers informally about their safety and health concerns.

- Involve contractor and temporary workers in all aspects of the safety and health management system.

- Respond in person to employees' concerns.

- Provide access to occupational health services for any workplace-related injuries and illnesses, including infections.

- Begin meetings with discussions of the safety and health management system and what it is achieving.

- Attend meetings of the safety and health committee (if one is used).

- Become a visible proponent of safety and health management system outside the organization.

- Include safety and health messages and reminders in their public statements, written products, and web page.

These are just a few examples of the many techniques managers can use to demonstrate safety and health leadership—to "walk the talk." The key is for management's commitment to the safety and health management system to be visible, regular, and consistent—making it clear that employee safety and health not only matters but comes first.

Special considerations for worksites with multiple employers

Increasingly, U.S. businesses in all types of industries, including hospitals, are relying on on-site contractors for certain work—in the case of hospitals, housekeeping and environmental services, dietary services, laboratory services, IT services, and facility maintenance and renovation. Some of this work can be hazardous. Many hospitals also work with doctors who are independent contractors with hospital privileges.

In these situations, the safety and health of hospital employees can depend on whether contractor employees are following safe procedures, and vice versa. Such circumstances demand special considerations to ensure that all employees are protected. For example:

- Hospital management can demonstrate a commitment to safety and health by insisting that all contractor employees be trained and follow a single set of safety and health practices and procedures.

- The hospital might require contractors to have their own safety and health management systems in place and keep good safety and health records.

- The hospital needs to establish and implement a procedure for exchanging information with each contract employer about hazards and control measures before work starts and as conditions change. This information should be enough to enable each employer to assess the hazards its workers will encounter and avoid creating hazards to workers on the site. Contract employers may also need to communicate with one another.

- Contract employers need to coordinate their safety and health management systems with host employers to eliminate gaps in protection for employees.

- All employers on the site need to coordinate work operations closely.

Management leadership: best practices and examples

University Medical Center at Brackenridge: a high reliability safety culture starts at the top

Many hospitals are just now opening their eyes to the hazards faced by healthcare workers. UMC Brackenridge in Austin, Texas, admits that it was in the dark about its safety performance in 2005, when a board member asked "How safe are we?" This question prompted a rush to investigate injury and illness rates at similar hospitals. The safety staff was pleased to report back that UMC Brackenridge was "close to being best in class." The board responded: "Well, how safe is the *safest* class? Because that's where we want to be." Receiving such a clear message helped the team to start down its path toward safety excellence.

Now, UMC Brackenridge empowers its associates with tools, resources, authority, and accountability that make it possible for all employees to integrate associate safety into their daily activities, just as they do for patient safety. Empowerment starts with strong messages from top management emphasizing the linkage between associate safety and quality of patient care. To help associates become comfortable intervening, all receive training in a "high reliability" culture of safety. This includes teaching them to handle safety issues with dignity using the "language of care." For example:

- It's not a "near miss"; it's a "good catch."
- "I have a concern."
- "Hey, can I help you find some floor signs?"
- With patients: "We're doing _____ for your safety."

People who show a strong interest in safety are designated as "safety coaches" and receive additional training. Their job is to lead by example and encourage others to speak up.

In response to any good catch, the Chief Operating Officer (COO) may respond with a handwritten note thanking the associate—often later the same day. Associates reporting good catches are also recognized on bulletin board postings.

Recognizing a "Good Catch"

At UMC Brackenridge, the Chief Operating Officer sends a note and a small gift to thank an associate who makes a "good catch" by reporting a safety concern or a near-miss event.

"Felt leadership" at Saint Thomas Midtown Hospital

"Felt leadership" is a concept embraced by safety leaders who believe they can make a profound organizational impact by treating safety as a core business value. Employees who "feel" this leadership through the words and actions of top management come to believe that safety is a paramount organizational concern, on a par with quality, productivity, and financial performance.

At Saint Thomas Midtown Hospital in Nashville, Tennessee, COO Renee Kessler ensures that associates feel safety leadership every day. First, she speaks the language of safety, having taken the time to learn what the safety experts do and the meaning and interpretation of safety metrics such as days away, restricted, and/or transferred (DART) case incidence rates and total case incidence rates (TCIRs). She shares her passion for safety with every new associate as part of orientation, and

she stresses how ensuring a safe workplace is a core value at Saint Thomas Midtown Hospital. Every day, the COO or another member of the senior management team leads a "safety huddle," during which associates share (with management and each other) what is going right and where there could be problems; every other week, senior managers conduct safety walkarounds, making themselves available to ask associates about their concerns or ideas.

As a result, associates describe their management team as "open and approachable" and the working atmosphere they have created as "family-like."

Felt Leadership in Action

Saint Thomas Midtown Hospital's COO leads a daily safety huddle.

Blake Medical Center: visible and accessible leadership

At Blake Medical Center in Bradenton, Florida, Chief Executive Officer (CEO) Dan Friedrich encourages employees to email him with questions, concerns, and suggestions, including questions about safety. Employees may remain anonymous if they wish. Friedrich receives more than 500 of these "Ask Dan" questions every month. He consults his management team, responds to questions personally, and shares his answers with the entire staff.

The CEO also includes safety messaging in his weekly communications to staff. The COO notifies the staff each year when he finds out how much money the hospital has saved by keeping injury costs low. When the hospital is able to purchase new equipment as a result of these savings, he credits the staff for its dedication to keeping the workplace safe.

Open Lines of Communication

Blake Medical Center's "Ask Dan" campaign encourages all employees to share their questions and thoughts with the CEO.

Lima Memorial Health System: leading by example

At Lima Memorial Health System (Lima, Ohio), associates often remark about the family atmosphere. This environment promotes retention and fosters a culture in which employees look out for each other's safety.

Many associates live in the community and their children attend school together; as a result, associates report that they know each other well and tend to be comfortable discussing safety concerns, regardless of the traditional clinical hierarchy. Managers also play an important role by setting the tone for safety. Lima Memorial's previous CEO had a passion for safety, which led him to join OSHA's Voluntary Protection Programs. The hospital's occupational health practice was growing at the time, so protecting the hospital staff seemed like a natural way to "walk the walk." The current CEO shares this passion for safety, and so do other managers. It is not unusual to see managers picking up trash, cleaning spills, and taking pride in making their units safe. Managers also set a positive tone by referring to staff as "associates" and by investigating safety incidents using a "Just Culture" approach, which involves examining processes before blaming individuals. This type of leadership by example promotes a culture of safety throughout the workforce.

Southern Ohio Medical Center: living the values

At Southern Ohio Medical Center (SOMC), a 221-bed acute care facility in Portsmouth, Ohio, safety is one of the hospital's five core values, along with quality, service, relationships, and performance. Safety-related purchases can be made by anyone. They must be based on evidence and accompanied by a business plan, but—assuming the facts make the case— "safety trumps all."

SOMC's Safety Committee is part of the hospital's board of directors and is engaged in high-level decision-making. A Safety Leadership Team that reports to the Safety Committee includes representatives of most departments. The Leadership Team meets weekly to review incidents, discuss safety ideas, and develop proposals for practices and policies to ensure continuous improvement in SOMC's safety record.

> "When we get a requisition for equipment or a facility renovation or some new system or program, we require a justification. If it's safety-related, it's pretty much automatic we are going to fund it. Safety trumps all."
>
> —John Gleckler, Chief Financial Officer

Safety Team at Work

SOMC's Safety Leadership Team meets weekly to review incidents and discuss ideas for continuous improvement.

St. Vincent's Medical Center: understanding the return on investment in safety

Safety managers often struggle to calculate or explain the "return on investment" (ROI) of a safety improvement. This can sometimes inhibit good ideas from being brought forward for consideration. At St. Vincent's Medical Center in Bridgeport, Connecticut, senior executives have an enlightened view of ROI. They emphasize evidence-based decisions (Has another hospital used it? Was it successful?), but when it comes to safety, they trust their safety staff and workforce to make sound recommendations.

In one example, the hospital's occupational health specialist wanted to recommend baseline eye exams to help monitor exposure of associates working with lasers, but was hesitant because of the cost. When the recommendation went forward, however, he was surprised and pleased that it was approved without further discussion.

Managers also understand that great ideas often come from those who work closest to the issue. They encourage suggestions through a "Bright Ideas" program that recognizes and rewards associates who contribute to increased efficiency,

A Bright Idea

Safety managers Joe Laveneziana and Joanne Velardi show off St. Vincent's SOMA bed, which replaced the use of "sitters," prevented patient falls, reduced opportunities for patient violence against associates, and saved the hospital money.

help save the hospital money, or improve safety. One success story from this program was an associate who suggested an alternative to the hospital's use of "sitters," who monitor patients subject to falling, wandering, confusion, aggression, or seizures. This associate had found that hospital beds that come equipped with a safe enclosure could be rented for approximately $50 per day. After review by the Nursing Shared Governance Council, a pilot plan was approved; the successful pilot then led to a house-wide rollout of the bed. Careful selection of patients who benefit from use of the enclosure bed has contributed greatly to a decrease in falls as well as to a significant decrease in the use of sitters. For her efforts, hospital management awarded this associate a $2,000 check, presented in front of her co-workers in a "Publisher's Clearinghouse" style.

Cincinnati Children's Hospital: a passion for safety

Cincinnati Children's Hospital (Cincinnati, Ohio) is recognized as one of the nation's top hospitals for children. It has also become a leader in workplace safety. This drive for safety began in the 1990s with the bold vision of a CEO and chairman who believed in transparency, sharing data, and long-term improvement, particularly as it relates to patient safety and quality of care. In more recent years, hospital leaders have expanded this vision to encompass employee safety. This vision has spawned initiatives that have led to sizable reductions in injury rates.

Cincinnati Children's Hospital designates a "safety officer of the day," and every day begins with two check-in meetings that are attended by representatives from all departments. The agenda always includes a review of recent safety incidents and concerns. As Occupational Safety and Employee

Safety Every Day

At Cincinnati Children's Hospital, safety incidents and concerns are reviewed at daily check-in meetings.

Health Director Alison Muth explained, "Starting the day without these meetings would be like pulling out of the driveway without your seatbelt on."

The leaders of Cincinnati Children's Hospital have promoted safety excellence in several ways:

- Top administrators are driven to create a safe workplace. The CEO sets ambitious safety goals in the hospital's strategic plan, and the Chief of Medical Operations inspires physicians to care about safety, noting the story of a colleague who died from hepatitis contracted through a sharps injury. The hospital has designated a Chief Safety Officer, a pediatrician by training who is passionate about safety.

- For more than a decade, top administrators have emphasized transparency in all things, including data. Workplace safety statistics are broken down by unit and shared with all employees.

- Leaders encourage outside perspectives on safety. The hospital's James M. Anderson Center for Health Systems Excellence uses "improvement science" principles—initially developed in other industries—to improve quality, safety, and productivity. Most of the hospital's safety staff have worked in construction, manufacturing, and other industries that have historically had a greater emphasis on occupational safety and health. Both the current and previous CEOs have run non-healthcare companies and recognize the value of a safe workplace.

Tampa General Hospital: a team of champions

Many of the safest hospitals have "safety patient handling champions." Tampa General Hospital, in Tampa, Florida, is no exception.

The hospital administration supported the development of an injury prevention program in 2000. A full-time physical therapist was hired to evaluate employee injuries and develop hospital-wide programs to prevent injuries. The hospital also initiated the use of "lift teams"—two-person teams who specialize in using equipment to lift and transfer patients. The COO and Chief Nursing Officer have both become staunch advocates for the injury prevention and lift team programs. The COO, a former nurse, understands the daily challenges that nurses face—particularly when it comes to moving patients. She also makes an effort to involve the hospital's Injury Prevention Coordinators in planning new construction and renovations.

Championing Safe Patient Handling

Safe patient handling champions at Tampa General Hospital made this staff of lift teams a reality.

Two other safe patient handling champions are Employee Health Services Director JoAnn Shea and Injury Prevention Coordinator Manon Short. They both have been persistent leaders who have pushed for continual improvement and support their case with solid data. They worked for years to build their case for implementing, expanding, and investing in the hospital's lift teams. Through their hard work and perseverance, they convinced top management to make a sizable investment in staff and equipment—an investment that has since paid huge dividends.

Ascension: lead from the top but encourage innovation

Ascension is the nation's largest Catholic and largest non-profit health system, and the third-largest system (based on revenues), in the United States. Its mission-focused health Ministries employ more than 150,000 associates and 113 operating hospitals. Ascension has been committed to providing "healing without harm" for some time, and has embraced high reliability principles and practices to convert its culture to support its goals in this area. After seeing the impact that an empowered and engaged workforce had on improving patient safety efforts, Ascension recognized this foundation could be used to address workplace safety.

Ascension's leadership was aware of OSHA's VPP and decided to pilot a safety and health management system at three hospitals: University Medical Center at Brackenridge (Austin, Texas), Saint Thomas Midtown (Nashville, Tennessee), and St. Vincent's Medical Center (Bridgeport, Connecticut). Bob Williamson, Director of Associate Safety in Ascension's system office, took a collaborative approach to champion the initiative. He believes that hospitals that have been through HRO have done most of the hard work called for under a safety and health management system. What they need most is verbal support and messaging that employee participation and involvement is the key. That approach proved to be successful. As Stuart Marcus, President of St. Vincent's, puts it: "The key to the culture change was transparency. Once we established that under HRO, it was very easy [to turn our attention to worker safety]."

2.2 Employee participation

What employee participation means

Employee participation in a safety and health management system means that:

- Employees participate in designing, implementing, and evaluating the system, investigating incidents, and making recommendations for improvement.

- The safety and health management system incorporates employees' distinct understanding of workplace hazards and how to protect employees from those hazards.

- The safety and health management system clearly spells out management's responsibilities for supporting employee involvement.

- Employees trust that management will take their concerns seriously. They do not fear reprisal for voicing concerns.

Management leadership and employee participation go hand in hand to build a workplace culture that fosters safety and health. They are widely regarded as the two most critical elements of a safety and health management system.[6,7]

Why employee participation is important

The success of any safety and health management system depends on employee support because:

- *All* employees in the organization play a crucial role in safety and health.

- Employees are a tremendous safety and health resource— they have a distinct perspective about safety and health hazards in their workplace.

- Employees are more likely to support and use a system that they helped to build.

- Employee involvement in safety and health decisions results in better decisions and more effective protection.

There is a clear consensus among employers, employees, and safety and health professionals, in both the public and private sectors, that employee participation saves lives and prevents injuries and illnesses. The more employees are involved in a safety and health management system, the greater the

likelihood of success. After all, who has better knowledge of workplace hazards and possible solutions than the employees who face those hazards during their work? Who has more incentive to design and implement effective safety and health practices than the employees who are likely to be injured? Who can better judge whether the system is working effectively? Active participation empowers employees and gives them a sense of responsibility and ownership in the system that ultimately translates into consistent concern for their own and their coworkers' safety and health.

Employee participation can also have broader organizational benefits. Employees tend to be more satisfied and productive when they are encouraged to offer their ideas and when they see their contributions being taken seriously.[8] Engaging employees in dialogue with management and each other about safety and health can lead to improved relationships and better overall communication. By listening to workers, employers might find that they can obtain more valuable information than they would from hiring expensive safety and health professionals.[9]

What employee participation involves

Overview

The best approach to employee participation in a safety and health management system varies among workplaces, depending on such factors as the nature of the hazards, workplace size and structure, the workplace safety and health culture, past experience with employee participation, available resources, the presence or absence of a union, and relevant OSHA standards and state or local laws. At each workplace, management will need to consult with its employees to determine the best way for employees to participate. At unionized workplaces, union support is critical for meaningful employee involvement. Experience has shown that conditions for employee participation are optimal when:

- Both management and employees are committed to elevating workplace safety and health to the highest priority and to building a culture of safety throughout the organization.[10]

[6] LaMontagne, A.D., E. Barbeau, R.A. Youngstrom, M. Lewiton, A.M. Stoddard, D. McLellan, L.M. Wallace, and G. Sorensen. 2004. Assessing and intervening on OSH programmes: effectiveness evaluation of the Wellworks-2 intervention in 15 manufacturing worksites. *Occupational and Environmental Medicine.* 61(8): 651-660.

[7] Huang, Y.H., M. Ho, G.S. Smith, and P.Y. Chen. 2006. Safety climate and self-reported injury: Assessing the mediating role of employee safety control. *Accident Analysis and Prevention.* 38(3): 425-433.

[8] Huang, Y.H., M. Ho, G.S. Smith, and P.Y. Chen. 2006. Safety climate and self-reported injury: Assessing the mediating role of employee safety control. *Accident Analysis and Prevention.* 38(3): 425-433.

[9] Braun, T., and C. Bauroth. 2007. Evaluate your safety program. *Food Logistics.* September.

[10] Boden, L.I., J.A. Hall, C. Levenstein, and L. Punnett. 1984. The impact of health and safety committees: A study based on survey, interview, and Occupational Safety and Health Administration data. *Journal of Occupational Medicine.* 26(11): 829-834.

- Management and employees can work in an atmosphere of mutual respect and trust.

- Employees are involved in the safety and health management system as broadly as possible from the very beginning.

- Employee participation is active—for example, they develop system goals and objectives, develop rules and procedures, identify and resolve issues, and make presentations at safety and health meetings.

- Employees are convinced that management wants their participation and will take their input seriously.

- At unionized sites, authorized representatives work jointly with managers and employees to develop and implement the safety and health management system.

- Employees are aware of their rights of protection from harassment or retaliation when they get involved in safety and health activities or report safety and health concerns.

At many worksites, contractor and temporary employees work alongside regular employees. Involving contractor and temporary employees in the safety and health management system can ensure not only that they receive the benefits of the safety and health management system but that their insights contribute to its overall effectiveness.

Encourage employees to participate

Employees are likely to participate only if they see that their management is genuinely committed to safety and health and truly values their input. Employees often have a keen sense for management's intentions and cannot be expected to fully participate if they feel their work is merely part of a sham or "window dressing" exercise. Section 1, "Management Leadership," describes how management can demonstrate its commitment to developing an effective safety and health management system.

In addition to demonstrating commitment, managers may need to explicitly encourage employees to participate. They can do this by:

- Reassuring employees that their input is important and valued, and will be considered.

- Providing mechanisms for employees to participate during their working hours. These could include establishing a standing safety and health committee, having an open-door policy for employees to talk to managers about safety and health ideas or issues, and establishing a reporting system for close calls. Management must follow up to avoid discouraging employee input.

Finally, employees should participate not only in designing the safety and health management system but also in implementing it in response to workplace changes and lessons learned.

Involve employees in all aspects of the safety and health management system

Virtually every aspect of a safety and health management system can benefit from employee involvement. For some areas, such as hazard identification, hazard control, and incident investigation, employee involvement can be critical to the program's success. Therefore, management should ensure that employees are encouraged and able to participate throughout all stages and in all aspects of safety and health management system design and implementation.

Employee involvement can take many forms, depending on the situation and needs of the workplace. For example, employees can:

- Report hazards and be involved in finding ways to correct problems.

- Serve on joint labor-management safety committees and other advisory groups.

- Analyze routine hazards in each step of a job or process.

- Document safe work practices.

- Conduct workplace inspections.

- Develop and revise safety rules.

- Participate in injury and close-call incident investigations.

- Train current coworkers and new hires.

- Develop, implement, and evaluate training programs (see "Education and Training").

Give employees access to safety and health information

Where possible, employers should offer employees every piece of information they can use to understand safety and health hazards and risks and identify protective measures. In particular, employers must continually provide convenient access to the most up-to-date information employees need to protect themselves from workplace hazards. This information may include Safety Data Sheets; chemical and equipment manufacturers' safety recommendations; injury, illness, and infection data (aggregated to eliminate personal identifiers), and results of any environmental exposure monitoring conducted in the workplace.[11] This is especially important in workplaces where frequent changes in materials, processes, or procedures may introduce new hazards or increase existing ones.

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[11] For example, results of monitoring for chemicals such as formaldehyde, glutaraldehyde, or xylene, or radiation dosimetry results.

Employers also should consider giving employees access to information they would not otherwise have—information normally considered within the realm of management only—such as results of incident investigations. Sharing relevant safety and health information from these sources fosters trust and allows employees to do their own analyses and back up their recommendations with facts. This gives employees greater confidence to contribute ideas. It also promotes broader consensus on the most important safety and health risks and most appropriate protective measures at a facility. This, in turn, leads to a more effective safety and health management system and greater employee participation in its implementation.

Encourage reporting of safety and health concerns

Employees are often in the best position to notice safety and health concerns—for example, workplace hazards, unsafe work practices, or actual incidents. ("Incident" means an accident, an injury, a serious illness, or a close call.) Whatever the hazard, the safety and health management system cannot operate optimally without employees reporting these concerns. To encourage reporting, management must provide clear mechanisms for employees to voice concerns.

To overcome this barrier, management must foster a culture in which employees understand that management will only use the reported information to improve workplace safety and health and never for any type of retribution. Management can promote this type of culture by, for example, providing a timely response to employee concerns, clearly communicating this response to employees, and involving employees in correcting problems.

Remove barriers to participation

Engaging in prejudicial treatment of employees for reporting safety and health problems is illegal: see Section 11(c) of the Occupational Safety and Health Act. But even without obvious discrimination, some employer practices may discourage employees from fully participating in the safety and health management system. To participate meaningfully, employees must trust the process. They must perceive the safety and health management system's design and implementation as an open process and believe that there will be no retaliation from managers or their peers for voicing or reporting their safety and health concerns. They must feel that all ideas are welcome and will be given due consideration. During incident investigations, for example, employees who perceive the investigation to be a full and open search for the "root cause" (even if that cause points to a management failure) are much more likely to participate and contribute.

Managers need to ensure that employees from all levels of the organization can participate, regardless of their skill level, education, or language proficiency. They also need to ensure that existing programs and policies (such as incentive, drug testing, and disciplinary programs) do not create barriers to participation. For example, an incentive program that awards supervisors or employees a bonus or other rewards for maintaining an injury-free workplace could discourage reporting of injuries or other safety and health concerns if employees perceive that their supervisors or coworkers will retaliate if they report an injury. Employees may be concerned that reporting may jeopardize compensation or performance appraisals for them or others (such as supervisors), or that they will be transferred, demoted, or harassed in some other way. These types of programs should be reviewed and modified or discontinued if they send the wrong message to employees. However, incentivizing activities that strengthen employee participation in the safety and health management system (e.g., involvement in safety and health committees, reporting good catches) can send the right message to employees and should be considered.

Employers may face particular challenges when trying to engage workers who feel marginalized when it comes to workplace issues. In a hospital environment, for example, service and support staff may be hesitant to engage with medical and administrative staff. Acknowledging hierarchical relationships that may exist, and their potential to undermine both patient and worker safety, is a starting point. Encouraging professional staff to initiate and engage support staff in discussions around safety and health issues will help. Recognizing those who do step forward and participate or contribute will send the message that the organization cares and wants to hear from everyone.

Finally, employers should authorize sufficient resources to facilitate participation—for example, by holding safety and health meetings during an employee's regular working hours.

Employee participation: best practices and examples

St. Vincent's Hospital: looking out for each other

St. Vincent's Medical Center in Bridgeport, Connecticut, promotes the HRO concept of "200 percent accountability," which teaches associates to watch out for each other. An exemplary incident showed management that the message was getting across: an administrative clerk, responsible for verifying timesheet information, noticed that an associate was working excessive hours and was concerned for the associate's health and safety (as well as possible effects on others, including patients). Even though it was not her responsibility to do so, she reported her concern to the safety team. The safety team intervened to assist the associate.

Joanne Velardi, Director of Occupational Health, Wellness, and Rehabilitation, recounted a similar incident: "We had a secretary pull a physician aside and say she was concerned for patient safety because she saw him enter a room without washing his hands. He was so surprised he wrote a letter to management asking she be recognized for caring so much that she would stick her neck out like that."

Speak Up for Safety

A poster at St. Vincent's Medical Center reminds associates to voice their safety concerns.

Saint Thomas Midtown Hospital: a few good catches

Many hospitals have adopted electronic systems that allow employees to report patient injuries, worker injuries, and close calls (or "good catches"). However, simply having these systems does not guarantee that employees will use them. At some hospitals, employees may be reluctant to report an incident or have a concern that they feel as if they are reporting into a vacuum—especially if they reported previous concerns that were never investigated or addressed. Worse, some employees may fear that reporting an incident could lead to punishment.

Saint Thomas Midtown Hospital (Nashville, Tennessee) has promoted reporting through a concerted effort to acknowledge and reward its associates for reporting, involve them in finding solutions, and dispel the misconception that incident reporting is a punitive process. Safety managers respond to every report promptly and provide progress reports on efforts to fix problems. When an associate is injured or involved in a "good catch," Saint Thomas Midtown Hospital typically involves him or her in investigating the incident and improving

Making Reporting Routine
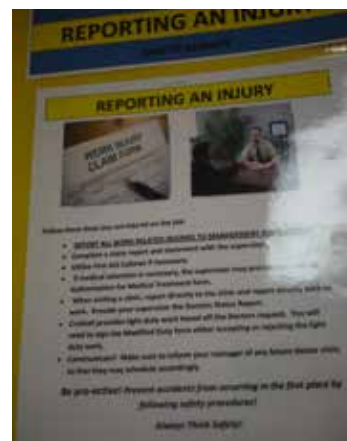
Saint Thomas Midtown Hospital encourages associates to report every injury and "good catch."

processes to prevent future occurrences. In addition, every associate who submits a "good catch" is entered into a monthly drawing to win a prime parking space and a bowl of candy.

Issues that Saint Thomas Midtown Hospital has addressed through this system include:

- Compressed gas cylinders found unsecured.

- Contaminated sharps sent to sterile processing without safety devices engaged.

- Slick/wet floors (workers now barricade the area they are working on and do one side of the hallway at time, allowing safe passage through hallways).

- Tangled/dangling cords that present a trip or electrical hazard (these have been tied up by maintenance).

- Bed/sequential pressure device pump cords plugged in across walkways, creating a trip hazard (these are now plugged in at the head of the bed, eliminating the hazard).

Blake Medical Center: a team approach

At Blake Medical Center in Bradenton, Florida, 28 employees serve on the committee that oversees the hospital's occupational safety efforts. These employees collectively cover all the hospital's major units and departments, so that every group of employees has a liaison on the committee. Having such a large committee helps to spread the work and reduce the burden on any one person. Blake conducts a careful quarterly inspection of the entire hospital and grounds, and by delegating pieces to dozens of people who know their own departments well, the center has been able to run these inspections efficiently and effectively.

All but three of the committee members are front-line staff (i.e., people who work directly "on the floor"). Blake's safety managers make a concerted effort to rotate one-quarter of the committee seats every year to ensure a continual supply of fresh ideas and perspectives.

Strength in Numbers

Blake Medical Center's safety team incorporates staff from every major department, ensuring "eyes and ears" throughout the hospital.

Lancaster General Hospital: breaking barriers

Lancaster General Hospital in Lancaster, Pennsylvania, uses a variety of methods to engage all employees in its "culture of safety" and to overcome the hierarchical barriers that are often found in hospitals.

At Lancaster General, physicians are engaged as partners in safety and serve on safety-related committees, including the Environment of Care Committee. In addition to the safety persons in the Employee Health and Safety Department, the hospital has a full-time safety officer who coordinates safe practices with surgeons and other operating room staff.

Lancaster General is also part of the growing number of hospitals that have implemented "no passing zones": clearly marked areas where *all employees*—from orderlies to physicians—are obligated to respond to patient fall alarms. An employee may not simply pass through one of these zones. The effect: quicker response times, fewer patient falls, more satisfied patients,

and a flatter hierarchy where physicians and other staff work together with a sense of shared duty and mutual respect.

Employees participate in a wide range of decisions and initiatives at Lancaster General. The hospital has engaged nurses, housekeepers, and other staff in testing and evaluating new bed options, including mattresses that assist with repositioning patients. Front-line employees have also provided input in redesigning the hospital's bariatric unit (for obese patients) with lifting equipment, special toilets and safety bars, and a room with unique features for bariatric patients. Front-line staff help with root cause analysis and suggest process improvements, and all employees may submit facility-related work orders, including safety-related concerns.

Implementing Recommendations from the Front Line

With input from front-line caregivers, Lancaster General Hospital has remodeled some patient rooms with special equipment to safely care for bariatric patients. Above: lift equipment into a bariatric bathroom.

2.3   Hazard identification and assessment

What hazard identification and assessment means

In identifying and assessing hazards, an organization:

- Provides access to and makes use of all available sources of information on hazards and potential hazards in the workplace.

- Combines this information with the results of workplace inspections, job hazard analyses, injury and illness investigations, input from workers, and other techniques used to identify hazards.

- Assesses and prioritizes hazards, taking into account the effectiveness of current controls.

- Continually monitors for and responds to the introduction of new hazards.

The prioritized hazards are addressed using the strategies described under the next core element, Hazard Prevention and Control.

Why hazard identification and assessment is important

Under the General Duty Clause of the Occupational Safety and Health Act, employers are required to keep employees "free from recognized hazards that are causing or are likely to cause death or serious physical harm." To fulfill this obligation and meet several OSHA standards, management needs to consider whether its facilities, equipment, materials, or work processes could expose employees to recognized hazards. Failures to identify or recognize hazards are a frequent "root cause" of workplace injuries and illnesses, which can have serious business and other consequences. To protect employees' safety and health, there must first be an active, ongoing effort to identify and assess hazards.

The results of hazard identification and assessment provide a critical foundation for other parts of the safety and health management system. In particular, identifying hazards and understanding their characteristics is essential to making smart decisions about preventing, eliminating, or controlling those hazards (see Hazard Prevention and Control). Awareness of hazards and their characteristics also helps structure employee education and training programs (see Education and Training).

Effective hazard identification and assessment requires the active cooperation of management and employees. Although

management is responsible for controlling hazards, workers have a critical role in identifying and assessing workplace hazards, because of their knowledge and familiarity with facility operations and processes. Cooperation between workers and employers in identifying and assessing hazards is the foundation of an effective safety and health culture, which is at the heart of a successful safety and health management system.

What hazard identification and assessment involves

Overview

To identify and assess hazards, an organization:

- Reviews its information on hazards present and then, typically, conducts a walkthrough of the workplace to identify, confirm, and document all hazards.

- Analyzes hazards to understand their source, nature, and seriousness; the number of employees who may be exposed to them; and the frequency of the exposures.

Hazard identification and assessment is most effective with a systematic approach—that is, when the organization implements processes to become aware of workplace hazards and evaluate each hazard's nature, including its seriousness relative to others.

Collect information about workplace hazards

Every organization has some information already available about what types of hazards are present and which employees might be exposed. As a first step, it is helpful to collect, organize, and review the available information. Table 2-1 describes examples of sources for potentially relevant information.

Observe workplace hazards

Ideally, an initial hazard identification and assessment exercise will encompass the entire worksite. When planning this activity, it is important to include ancillary activities, such as facility and equipment maintenance, purchasing and office functions, and activities of on-site contractors. Common mechanisms for these exercises include facility walkthroughs or worksite inspections, often using checklists that highlight "things to look for." Table 2-2 provides suggestions of things to check for during the walkthroughs.

Table 2-1. Examples of Information Sources for Hazard Identification and Assessment

Source	Description
OSHA	OSHA provides many forms of assistance in identifying and assessing hazards. Its website (www.osha.gov) contains hazard information bulletins, eTools, standards and guidance documents, and other hazard identification and assessment information. In addition, OSHA regional and area offices offer advice on the identification and control of hazards. OSHA's On-site Consultation Service offers free and confidential hazard identification advice to small and medium-sized businesses (www.osha.gov/dcsp/smallbusiness/consult.html).
Employee safety and health concerns	Employees have firsthand knowledge of the hazards at their workplace. Any prior or recent concerns about safety and health conditions, whether formal or informal, point to potential safety and health hazards. Talking to individual employees can often reveal hazards and solutions. Employees' day-to-day experience with work practices gives them a valuable insight.
National Institute for Occupational Safety and Health (NIOSH)	NIOSH also provides resources through its website (see www.cdc.gov/niosh/topics/healthcare/ for information about hospital-related hazards) and programs such as its free Health Hazard Evaluation (HHE) program.
Centers for Disease Control and Prevention's (CDC's) National Healthcare Safety Network	CDC's National Healthcare Safety Network (www.cdc.gov/nhsn/) is a healthcare-associated infection tracking system that provides facilities with data needed to identify problem areas, measure progress of prevention efforts, and ultimately eliminate healthcare-associated infections. The network also allows healthcare facilities to track blood safety errors and healthcare process measures such as healthcare personnel influenza vaccine status and infection control adherence rates.
Equipment and machinery manufacturers	Owner and operator manuals typically include warnings of hazards that may be present during operation and instructions, as well as precautions for safely operating the equipment or machinery.
Chemical manufacturers	Chemical manufacturers, importers, and distributors are required to provide downstream users with Safety Data Sheets (SDSs, formerly known as Material Safety Data Sheets or MSDSs). An SDS summarizes information about health hazards and provides instructions on how to safely handle and use the chemical. Chemical suppliers sometimes supplement SDSs with additional important safety and health information.
Trade associations, insurance carriers, manufacturers, and government agencies	Some trade associations and insurance carriers publish safety and health material in magazines or newsletters. Some manufacturers, as well as government agencies such as CDC and the Consumer Product Safety Commission, issue safety and health warnings and hazard alerts directed toward particular products, work practices, or hazards.
Workplace injury and illness information	Data and reports on injuries, illnesses, infections, and fatalities in the workplace provide direct evidence of the presence and seriousness of hazards. Most employers are required to maintain logs and summaries of "recordable" occupational injuries and illnesses and to report incidents to OSHA (OSHA Forms 300, 300A, and 301). Incident investigations can uncover previously undetected hazards and ineffective control measures. In serious cases outside authorities may conduct their own investigations. In any event, the employer should conduct such an investigation either in-house or using third-party experts.

Source	Description
Aggregated results of medical screening, medical surveillance activities, and employee exposure data	These results can alert employers to hazards posed by chemical, physical, and biological agents. Use of aggregated results is important to maintain the confidentiality of employee medical information.
Project planning	Project hazard analysis at initiation and at critical stages of a project evaluates the sequence, procedures, and people responsible for safety and health.
Disaster preparedness scenarios	Conducting a "what-if" analysis of natural and man-made disasters can help identify hazards that have a low probability of occurrence, but that may have disastrous consequences. Examples include explosions that could be caused by flammable chemicals or combustible dust, hazards that may be created by strong weather phenomena, or incidents related to a criminal or terrorist act.

Many hazards can be identified using common knowledge, common sense, and available tools. For example, hazards such as broken stair rails, tripping hazards, and frayed electric cords can be easily identified and their seriousness readily understood. For more subtle hazards, such as chemical exposures, excessive noise levels, and confined spaces, employers may need time to learn how to identify and assess these hazards.

Workplace inspections are a core tool used to identify and assess workplace hazards. Many employers, particularly larger ones with more complex hazards, also use tools such as employee exposure monitoring and job hazard analysis (JHAs) (see For more information).

In addition to conducting a comprehensive initial hazard identification and assessment, it is critical to set up mechanisms to anticipate new hazards and to ensure that they are also evaluated. Changes to existing processes or the introduction of new materials or processes often create new hazards. Ideally, such changes will be evaluated for potential hazards before they are made in the workplace, and this evaluation will become part of the hospital's standard operating procedures. Examples of the types of changes that should trigger additional hazard reviews are listed in Table 2-3, below.

Assess identified hazards and prioritize them for control

Employers must establish and implement a plan to control hazards in accord with an applicable OSHA standard or if they are causing or likely to cause death or serious physical harm. Once identified, hazards must be assessed to prioritize them for control. Assessing hazards involves reviewing all applicable standards and regulations, available information and observations about the hazards to fully understand how employees are exposed, the level of risk that the exposure presents, and the consequences of this exposure. This understanding is essential for immediately implementing effective controls or, for hazards that the employee cannot control immediately, providing interim controls to protect employees.

For some hazards, permanent controls (e.g., redesigning a process, installing new equipment, or evaluating alternative products to eliminate a hazard) may take time to design, procure, and fully implement.

Employers must prioritize hazards so that those presenting the greatest risk can be dealt with first. This means considering three factors:

- **How severe is the injury or illness that could result from the hazard?** Hazards that could cause a severe, life-threatening, or debilitating injury (such as death, dismemberment, or permanent or long-term disability) or serious illness (such as hepatitis or occupational cancer) should be rated highest. Hazards that could cause temporary illnesses and injuries (such as skin rashes or strains and sprains) can be considered "moderately severe" if they might result in one or more days away from work, or of "minor severity" if they would likely not result in lost time.

- **How likely is the injury or illness?** Hazards associated with an operation that is repeated many times per day have a higher likelihood of occurrence than those associated with a less frequent operation. Similarly, a situation in which one mistake can cause a serious injury has a higher likelihood of injury than one in which several simultaneous errors must occur for an injury to result. Likelihood can be assessed as very high, probable, not likely, or remote.

- **How many employees are exposed to the hazard?** When two hazards are equally serious and equally likely to occur, the hazard to which more employees are exposed should receive the highest priority for control.

Table 2-2. Examples of Hazards to Look for When Inspecting Hospitals

Type of Hazard	Description
Chemical agents	Hospital workers might be exposed to chemicals such as ethylene oxide, glutaralde-hyde, formaldehyde, waste anesthetic gases, antineoplastic and antiviral drugs, latex, cleaning products and pesticides and mercury. Safety data sheets (SDSs) provide a good basis for developing a list of toxic chemicals in the workplace. When many chemicals are present, hazards of the following types of chemicals should be deter-mined first: chemicals that are (1) volatile; (2) handled or stored in open containers; (3) used in processes where employees are likely to be exposed through inhalation, ingestion, or skin contact; or (4) flammable and stored or used in a manner that poses a fire or explosion hazard.
Biological agents	These include bacteria, viruses, fungi, and other living organisms that can cause acute and chronic infections by entering the body through ingestion, inhalation or breaks in the skin. They also include exposure to blood or other body fluids or to clients or patients with infectious diseases (e.g., MRSA, staph, HIV, HBV, HCV, influenza, tuber-culosis). Hospital workers can be exposed to bloodborne pathogens from blood and other potentially infectious materials if not following universal precautions.
Physical agents	These include excessive levels of ionizing and nonionizing electromagnetic radiation, noise, vibration, illumination, and temperature. Sources of physical hazards to work-ers include lasers, x-rays, magnetic resonance imaging, ultraviolet radiation, electrical equipment, compressed gases, and glassware.
Equipment operation and mainte-nance/electrical safety	Each piece of equipment, such as anesthesia machines, portable x-ray machines and laser systems, biological safety cabinets, and exhaust ventilation systems, will be inspected to ensure that all safeguards necessary to protect employees are in place and effective. Exposure can occur when there is lack of maintenance to any electrical equipment, abuse, and lack of understanding of the equipment and/or its controls. Oxygen-enriched atmospheres and water can contribute to hazardous conditions.
Fire protection	Fires can occur in operating rooms, kitchens, and other areas of the hospital. This part of the inspection would include, for example, making sure that working fire extin-guishers are readily available, that flammable liquids and gases are safely handled and stored, and that employees can reach emergency exits.
Physical environment	This involves inspecting the facility for hazards such as trips and falls. Hospital work-ers might be at risk of injury due to improper footwear; wet or slippery floors due to weather or cleaning or in food preparation areas; outdoor walking surfaces; and stairways and steps.
Work and process flow	The flow of materials and work can be an important guide to potential hazards. For example, transfer of surgical instruments by hand increases the risk of sharps injuries, while hands-free transfer using a tray substantially reduces the risk of injury. Simi-larly, distance between use and disposal of needles (e.g., the need to walk across a patient's room to dispose of needles) increases the risk of injury.
Work practices	Work practices can be a source of hazards. For example, inappropriate practices in lifting and repositioning patients, handling materials in supply rooms and laundries, and installing and moving equipment can result in back and repetitive motion injuries. Work practices resulting in fatigue and psychological stress (rotating shifts, extended work hours, tolerance for bullying, lack of support following tragic patient outcomes) can affect patient as well as worker safety and health. Inadequate work practices to address workplace violence can leave employees and patients vulnerable. Poor plan-ning, inadequate training, lax oversight, and other management system failures can lead to unsafe work practices.

Table 2-3. Examples of Changes in the Workplace That Trigger Hazard Assessment

Change	Response
A new chemical is introduced	Review the chemical's toxic and physical properties; see its SDS for any handling, storage, or disposal procedures, as well as any dangerous interactions or incompatibilities with other chemicals and materials in the process.
New equipment is purchased and installed	Examine the safety and health portion of the manufacturer's literature to ensure that the equipment and its installation will not adversely affect employee safety and health.
A work practice involving equipment posing a significant hazard is changed	Evaluate the proposed change to determine if it could increase the likelihood or severity of an incident.
Maintenance activities change the facility or equipment	Conduct a job hazard analysis in consultation with the maintenance supervisor. Break down the steps in the operation, identify where hazards could arise, and incorporate appropriate precautions.
New safety and health information suggests an unidentified or uncontrolled hazard	Thoroughly investigate any information from injury or illness reports, workers' compensation claims, or close-call reports that suggests that a new hazard exists.

Hazard identification and assessment: best practices and examples

AnMed Health Medical Center: analyzing slips, trips, and falls

Slips, trips, and falls are a leading cause of injury in hospitals, and not only among patients. Staff and visitors also fall victim to slippery floors and other hazards that can lead to serious injuries. AnMed Health Medical Center in Anderson, South Carolina, convened a Slips, Trips, and Falls Subcommittee to evaluate the concerning trend of incidents in this category. The group analyzed the data by department and looked at the causes of the incidents. They determined that injuries were highest in the environmental services and food and nutrition departments, and these were often due to slips on wet surfaces, rather than trips or falls. To eliminate slips in those areas, AnMed Health bought slip-resistant shoes for employees working in these departments. Floor cleaning is planned and managed to minimize risk through use of wet floor signage, caution tape, and modified practices such as cleaning only one half of a hallway at a time and keeping the area to be cleaned to a manageable size.

Slip-Resistant Shoes to Prevent Falls

After assessing the data on slips, trips, and falls, AnMed Medical Center saw the need to focus on wet floors in environmental services and the nutrition department. Slip-resistant shoes are part of the solution.

Blake Medical Center: the power of data

Blake Medical Center (Bradenton, Florida) and its parent company, HCA, collect high-resolution data on every injury and close call at the hospital. These data feed into a detailed "dashboard" that allows the hospital to make informed decisions and optimize how to spend its safety dollars. As HCA's Chief Safety and Security Officer Tim Portale explains, "There aren't many decisions made at HCA that don't have metrics and data behind them."

For example, Blake's safety team tracks exactly when and where falls occur. This level of precision has led to targeted interventions such as painting parking lot bumpers yellow, which produced a notable decrease in parking lot falls. By tracking close calls associated with patient violence, safety managers were able to identify which departments had the greatest need for crisis prevention training, and then they provided the full eight-hour training for employees in these units.

Blake has also implemented higher-resolution coding of injury claims so they can understand exactly which tasks are leading to injuries. With careful attention to these data, Blake's safety team discovered that about 40 percent of patient management injuries resulted from shifting a patient up in bed. They addressed this problem by purchasing beds that can move, lift, and recline in more directions.

A Targeted Investment in Safety
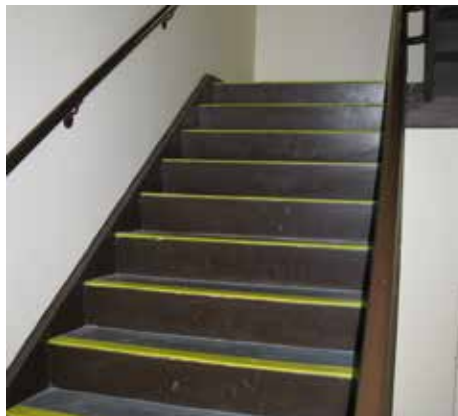
Painting stair treads yellow was one of the simple but effective safety solutions that Blake Medical Center discovered by analyzing exactly where patients, visitors, and staff were tripping and falling.

Lancaster General Hospital: on the lookout

When it comes to identifying workplace hazards, Lancaster General Hospital in Lancaster, Pennsylvania, realizes the value of friction-free reporting. Hospital safety staff are using technology to make it easy to report and communicate information about actual or potential hazards. For example:

- Staff conducting "environment of care" rounds are instructed to use their smartphones to capture photos of any safety concerns they encounter and send them to the safety staff. This has increased the number of observations being reported.

- Housekeeping staff are being alerted to infection issues in patients' rooms through an automated paging system. The system lets staff members know, before they enter the room, about any infection concerns and any special precautions that they should take.

- All staff members, including physicians, have been trained to recognize patient fall alarms. In fact, most hallways are designated as "no passing zones," signaling that employees are expected to respond to any fall alarm that may be sounding.

Everyone Pitches in for Safety

Lancaster General is part of the growing number of hospitals that have implemented "no passing zones" where all employees are obligated to respond to patient fall alarms. The result: quicker response times, fewer patient falls, more satisfied patients, and a "flatter hierarchy" where physicians and other staff look out for each other's safety.

Southern Ohio Medical Center: getting to the root

Southern Ohio Medical Center (SOMC) in Portsmouth, Ohio, has 2,300 employees, including a full-time safety manager. For every worker injury reported, the safety manager conducts a mini-root cause analysis. Workers tend to report injuries not to place blame, but due to a commitment to continuous improvement. Lost-time injuries receive a full root cause analysis, including staff interviews and consultation with one of the hospital's two staff ergonomists if necessary. The risk analyst makes a point of circling back to the affected workers after the analysis is completed to address any outstanding issues and to provide any needed training.

SOMC's occupational medicine physician sees all injured employees as soon as possible. If workers are so injured that they cannot return to their units, the hospital's safety services find somewhere else in the hospital for them to work, to keep them engaged and on the job.

St. Vincent's Medical Center: getting the word out

Staff at St. Vincent's Medical Center in Bridgeport, Connecticut, have learned firsthand the value of communicating about patient and associate safety close calls. During a recent high reliability training session, the trainer described a medical error that had led to the death of a patient. A new nurse realized that she had nearly made the same error only a few weeks later. Had she heard of this event sooner, she believes she would have recognized the potential for error and avoided it.

St. Vincent's publicizes incidents to ensure that associates learn from them. Below is a "Safety Alert Communication" that was distributed and posted on bulletin boards throughout the hospital.

Communicating Safety Concerns

St. Vincent's Medical Center
Safety Alert Communication
February 15, 2011

Situation
- Last week, there were 4 reported sharps injuries at the Medical Center in a 6 day period.
- In comparison, there were 18 sharps injuries in calendar year 2010, about 1-2 per month.

Background
- Although we have gone many weeks without an employee lost time injury, sharps injuries can be potentially serious events. We are working to add 'days since last needle stick/ sharps injury' to the Source home page.

Assessment
- A thorough apparent cause analysis investigation was completed including staff involved, their managers and the occupational health/ OSHA VPP team, which revealed that practicing HRO behaviors could have prevented each of these injuries.

Recommendation
- Verify & Validate: Verify that safety feature available on sharps have fully engaged before transporting or discarding a needle. Complete a visual check and listen for the 'click.'
- STAR: Make sure your fingers are not in the path of a needle when holding soft tissue for an injection.
- Utilize Each Other: If a patient is restrained or appears agitated, obtain assistance of a co-worker to help secure the patients limb and assure that they won't 'jump.'

St. Vincent's Medical Center distributed this "Safety Alert Communication" and posted it on bulletin boards to inform associates about a safety concern.

For more information

Hospital eTool

www.osha.gov/SLTC/etools/hospital/index.html

This OSHA tool focuses on some of the hazards and controls found in the hospital setting. It describes standard requirements as well as recommended safe work practices for employee safety and health.

Checklists

www.osha.gov/dts/osta/otm/otm_vi/otm_vi_1.html

The "Hospital Investigations" section of OSHA's Technical Manual, listing hospital-specific hazards to workers.

Job Hazard Analysis

https://www.osha.gov/Publications/osha3071.pdf

JHA is one of the most widely used tools to identify and assess hazards in the workplace. It focuses on the relationship between the employee, the task, the tools, and the work environment.

Hazard Analysis Methodologies

www.osha.gov/SLTC/etools/safetyhealth/mod4_tools_methodologies.html

The "Hazard Analysis Methodologies" section of OSHA's Safety and Health Management System eTool describes other techniques useful in hazard identification and analysis. It also identifies sources of more information on these techniques.

European Agency for Safety and Health at Work. 2011. *Occupational Health and Safety Risks in the Healthcare Sector—Guide to Prevention and Good Practice.*

https://osha.europa.eu/en/legislation/guidelines/sector_specific/occupational-health-and-safety-risks-in-the-healthcare-sector-guide-to-prevention-and-good-practice

Presents technical and scientific knowledge about the most significant risks in healthcare (especially biological, musculoskeletal, psychosocial, and chemical risks), and describes practical instruments to help employers identify employee safety and health risks in healthcare facilities.

2.4 Hazard prevention and control

What hazard prevention and control means

Under this core element, organizations take several steps to prevent and control workplace hazards. On an ongoing basis, they:

- Identify and evaluate control options for workplace hazards.

- Select effective and feasible controls to eliminate, reduce, or contain these hazards.

- Implement these controls in the workplace.

- Follow up to confirm that these controls are being used and maintained properly.

- Evaluate the effectiveness of controls and improve, expand, or update them as needed.

Why hazard prevention and control is important

Effective prevention and control of workplace hazards is critical to protecting employee safety and health and avoiding workplace incidents. Prevention and control allows employers to minimize or eliminate safety and health risks and liabilities as well as to meet their legal obligation to provide employees with a safe and healthy work environment. Hazard prevention and control reduces costs, improves efficiency, and boosts product or service quality. Prevention and control can also help improve an organization's relationships with its stakeholders and enhance its image as a responsible organization.

What hazard prevention and control involves

Overview

Hazards can only be prevented or controlled after they have been identified. Therefore, most hazard prevention and control takes place after workplace hazards have been systematically identified and assessed (see Hazard Identification and Assessment). If the hazard identification process finds serious hazards that are not yet controlled, employers should implement interim controls without delay and investigate further options during the hazard prevention and control process.

Hazard prevention and control is an ongoing process. Prevention and control measures are periodically assessed, and changes or updates are made as needed to ensure that these measures continue to be effective in light of changing control technologies or changing workplace conditions.

Effective control techniques are often easy to identify and implement for common, well-understood workplace hazards. However, the best control options for more serious and complicated hazards may not be self-evident. In such cases, employers often use interim controls until they have identified,

implemented, and selected more permanent control options. Where possible, the chosen hazard control methods should address root causes and be effective both upon implementation and in the long term.

Identify control options and select controls

Hazard prevention and control begins with gathering information to understand how *all* identified workplace hazards can be prevented and controlled. For many hazards, several control options are usually available and it is valuable to examine the pros and cons of each. Prevention and control information can be obtained from many sources, including OSHA standards and technical guidance, industry trade and professional associations, safety-related publications, and equipment and service vendors and suppliers. Employees often provide valuable input; they may have seen or heard of control measures being used elsewhere, and they may be able to suggest unique solutions based on their familiarity with the facility, equipment, and work processes.

Once employers understand available options, they can choose the most effective and feasible measures for their workplace. This involves considering questions such as:

- What safety and health risks exist in the workplace?

- Where and how do these risks occur?

- What types of emergencies could arise, and what safety and health risks would they pose?

- What do federal and state standards require?

- What are appropriate risk reduction goals?

- What risk control technologies are available?

- How cost-effective are these technologies?

- What internal standards does our organization have?

- What are current best practices within our industry?

- How do employees perceive the intervention?

Where appropriate, employers sometimes consult with qualified safety and health professionals, including specialists in OSHA's On-Site Consultation Service (www.osha.gov/dcsp/smallbusiness/consult.html) to gain more information and perspective as they consider these types of questions and examine options.

At a minimum, organizations must implement all hazard prevention and control measures required by applicable OSHA standards and the General Duty Clause. This would include, for example, controls to prevent the spread of infectious diseases required under OSHA's bloodborne pathogen standard (1910.1030). Where possible and appropriate, employers are encouraged to implement additional safety and health

measures that go beyond the OSHA requirements. According to OSHA—and to widely accepted safety and health principles—hazard prevention and control measures must be chosen according to the hierarchy described below. Engineering controls are the most effective because they reduce reliance on human factors to achieve protection. Consider other types of controls, in the order listed, to provide additional protection when engineering controls alone are insufficient.

The hazard prevention and control hierarchy

- **Engineering controls.** Engineering controls redesign the work process to eliminate hazards entirely or reduce them to a minimum. Strategies include eliminating the process, process step, equipment, or substance that is creating the hazard; substituting a less hazardous process, equipment, or substance; or using physical barriers (such as enclosures or guards) or ventilation to reduce employee exposure to the hazard. For example, engineering controls effective in controlling exposure to glutaraldehyde in hospitals may include general ventilation, local exhaust ventilation (at point of release), local exhaust hoods (capture, convey, and exhaust), or ductless fume hoods (capture and filter).[12]

- **Safe work practices.** Safe work practices are appropriate when engineering controls are not feasible, not completely protective, or temporarily suspended (e.g., during maintenance). Safe work practices include those described in both general and process-specific OSHA rules (e.g., for hazard communication, bloodborne pathogens, and laboratory chemical hygiene).

- **Administrative controls.** Administrative controls include a wide range of measures to reduce employee exposure to hazards: physical conditioning programs, exercise or stretching breaks, use of additional relief personnel, and rotating employees. These controls are normally used together with others that more directly prevent or control exposure to the hazard.

- **Personal protective equipment (PPE).** The term "PPE" refers to both equipment and clothing. Use of PPE is appropriate when the engineering and administrative controls described above cannot completely eliminate hazard ex-

posure during normal operations or maintenance. PPE may also be appropriate for controlling hazards while engineering and work practice controls are being installed. To be effective, PPE must be carefully selected to match the work environment and hazard, and much of it (e.g., respirators) must be fit tested for individual users. PPE also must be maintained to ensure its continued effectiveness. Involving employees in PPE selection can improve compliance with PPE use policies. For specific OSHA requirements on PPE, see for example OSHA's standard, Part 1910.132 Subpart I.

There may be times when no single one of these methods is effective in fully protecting employees. In such cases, a combination of control methods, such as engineering controls and supplemental PPE, is used.

Select controls to protect employees during emergencies

Hazard prevention and control includes planning to protect employees during foreseeable emergencies, such as fires and explosions, chemical releases, hazardous material spills, unplanned equipment shutdowns, natural disasters, weather emergencies, medical emergencies, and episodes of workplace violence.

Some workplaces may already have formal written emergency response plans, as required by authorities such as local fire and emergency response departments, state agencies, the U.S. Environmental Protection Agency, and OSHA. OSHA regulations under §1910.38 and §1910.39 establish requirements for Emergency Action Plans and Fire Prevention Plans, respectively.

Following good safety and health management system practice, it is recommended that all workplaces have an emergency plan in place—even when not required to by law—to ensure that emergency responders and employees know what to do and have adequate skills to respond to an emergency. (See www.osha.gov/SLTC/emergencypreparedness/index.html.)

Regular drills are needed to train employees in proper procedures during emergencies. Drills also provide a way to test the emergency plan and to make sure that it is effective at mitigating hazards and moving employees out of potential danger zones. After each drill or actual emergency, the plan's effectiveness should be reviewed. Any needed changes, revisions, and updates to the plan should be made in response to these reviews or to changing circumstances within the workplace.

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[12] See https://www.osha.gov/Publications/glutaraldehyde.pdf

Implement controls according to the priorities established during hazard identification and assessment

Once hazard prevention and control measures have been selected, they need to be implemented. The first step is to develop a written implementation plan. Implementation plans typically specify, for example:

- What hazards need control?

- What measures will be implemented?

- In what order?

- Who will implement them?

- By when?

- Should a written operating procedure (e.g., standard operating procedure, or SOP) be developed?

- What employee training is needed?

- When and how will implementation be confirmed?

- When and how will effectiveness be evaluated?

- When and how will routine inspections be conducted to ensure that hazard prevention and control measures remain operational?

- When and how will preventive maintenance be conducted?

In more advanced safety and health management systems, a written plan helps ensure that managers and employees have a road map for effective implementation. It also provides a framework that management can use to track progress.

When resources are limited, employers may not be able to implement all permanent controls at once. In these cases, employers should, where feasible, implement measures on a "worst-first" basis according to the hazard ranking priorities established during hazard identification and assessment. In other words, measures that protect employees from the highest priority hazards are implemented first, followed by controls for other hazards, in order of decreasing priority. Interim controls must be implemented as necessary to protect employees while permanent controls are not in place. Employers are also encouraged to rapidly implement all measures that are easy and inexpensive, regardless of the level of hazard they control.

Track progress, verify implementation, and evaluate effectiveness

In an effective safety and health management system, implementation will be tracked and verified. For example:

- Have all control measures been implemented according to schedule?

- Have engineering controls been properly installed and tested?

- Have employees been appropriately trained?

- Do all employees understand the controls, including safe work practices and PPE use requirements?

- Are these controls being used correctly and consistently?

Regular inspections and routine preventive maintenance will be needed continually to ensure that the control measures for preventing hazards remain effective.

- Regular inspections are important to confirm that (1) engineering controls are operating as designed and have not been removed or deactivated and (2) work practices, administrative controls, and PPE use policies are being observed.

- Routine preventive maintenance of equipment, facilities, and controls helps provide ongoing prevention of incidents due to equipment failure. For example, maintaining the moving parts of machinery such as patient lifts ensures that a part does not fail and injure a patient or employee.

Hazard prevention and control: best practices and examples

Lancaster General Hospital: fighting infection

Hospital-acquired infections (HAIs) are a concern for both patients and staff. Lancaster General Hospital in Lancaster, Pennsylvania, was looking to reduce its HAI incidence when it became aware of a new technology that could provide automated room disinfection. The system involves a robotic pulsed xenon laser that can be wheeled into a room and will effectively disinfect 100 percent of the surfaces in the room in under 15 minutes. At more than $80,000 each, the units are expensive, but Lancaster General calculated that if it could reduce SSI and MRSA cases by 40 percent, the hospital could return a net savings of more than $500,000 per year. This translated to a payback period of fewer than 6 months. The three units purchased run 10 or 12 hours per day and have been well received by both staff and patients.

Tampa General Hospital: dedicated to lifting with care

Tampa General Hospital (Tampa, Florida) became a national leader in safe patient handling by developing a dedicated employee injury prevention and lift teams program. Lift teams—two-person teams who specialize in using equipment to lift and transfer patients throughout this 1,000+ bed hospital—have been in place for more than 10 years, and have grown from six to 22 full-time-equivalent employees.

Some two-person teams are scheduled for specific units, working their way through the unit and repositioning patients according to each one's needs. Other teams are available on demand; they carry wireless tablet computers to receive and prioritize lift requests throughout the hospital. Response times can be as short as 5 minutes, which means nurses and assistants feel confident paging a lift team instead of taking matters into their own hands. Caregivers have enough patient responsibilities to worry about, so a dedicated lift team literally takes a load off their backs.

Lifting with Care

Dedicated lift teams at Tampa General Hospital have meant fewer patient injuries, a reduction in lost work days, and lower workers' compensation costs.

Having dedicated lift teams not only helped Tampa General to overcome barriers related to lift use and accessibility, but also contributed to a 65 percent decrease in patient handling injuries, a 90 percent reduction in lost work days, and a 92 percent reduction in workers' compensation costs per dollar of payroll. These benefits far outweigh the costs of equipment, team member salaries, and training. Patients and their families appreciate the lift teams too. Lift team members are friendly faces who get to know each patient during his or her stay, carefully explaining exactly what they are going to do, and they use the equipment efficiently and with confidence. Patients of all sizes say this approach treats them with dignity.

The lift teams reflect a broader culture of identifying and controlling hazards at Tampa General. As Employee Health and Workers' Compensation Manager Marisa Martinez explains, "We don't want [to wait for] people to report injuries; we want to help them before they get to that point." The hospital's Injury Prevention Coordinators provide job site assessments (e.g., examining workstations and conducting push-pull testing with heavy carts) and advise staff on ergonomically safe work practices.

Cincinnati Children's Hospital: addressing unique hazards in pediatrics

As a hospital specializing in pediatrics, Cincinnati Children's (Cincinnati, Ohio) has taken steps to address several hazards that may be heightened when working with young patients. For example:

- Children pose special concerns related to violent behavior. Cincinnati Children's sees many challenging patients, including some whose medical issues are compounded by severe psychological issues. A young person who does not understand a situation or cannot verbalize discomfort might instinctively lash out at a caregiver. To reduce the number of injuries from violent patients, Cincinnati Children's has implemented PPE (Kevlar sleeves), behavioral teams, and mental health training for many staff. These interventions have reduced injuries (more than 200 days without an OSHA-recordable injury related to patient aggression) and reduced lost time and staff turnover within the hospital's behavioral health facility.

Reducing Injuries From Patient Aggression

A caregiver wears Kevlar sleeves to reduce the risk of injury.

- Cincinnati Children's has a policy stating that employees may not lift patients without mechanical assistance. Algorithms help determine which equipment and tools to use and when to use them. Ceiling lifts are installed in nearly every patient room, and a two-person lift team is available with portable equipment and a variety of slings. These interventions are necessary because many young patients exceed the recommended 35-pound weight limit for manual lifting. Cincinnati Children's also sees adult patients who are receiving continuing care for pediatric conditions.

- Needlesticks and other sharps injuries can occur when a child squirms out of position—for example, to avoid receiving a shot. To reduce this problem, Cincinnati Children's implemented a policy allowing parents to provide a "comfort hold" for their child, while trained staff must provide a "stability hold" when sharps are involved.

Southern Ohio Medical Center: averting violence

To reduce hazards associated with workplace violence, Southern Ohio Medical Center (SOMC) in Portsmouth, Ohio, put in safety alert systems. The hospital trains workers to identify signs of potentially violent behavior, and the hospital is immediately notified if a patient with a history of violence returns. In some cases, SOMC will send "no trespassing" letters to patients who have shown a history of violence during prior visits and are therefore allowed to only enter the facility for treatment.

St. Vincent's Medical Center: putting ideas into action

There is never a shortage of good ideas when it comes to safety. This is especially true when your staff is encouraged to solve problems and empowered to take action. At St. Vincent's Medical Center in Bridgeport, Connecticut, hospital staff engagement led to many improvements in safety and health:

- The proliferation of electronic equipment in hospitals means that cord management and safety has become an issue. Loose, dangling cords can cause trips and other types of injuries. After raising awareness among the staff, St. Vincent's now made it standard practice to tie up a cord or call for help when cord management gets out of hand.

- When injuries in the hospital's supply and distribution room were becoming a concern, the staff formed a team, reorganized its shelving and aisle system, and bought safer step stools. As a result, the department has significantly reduced incidents of injury.

- To increase hand washing, each department was asked to evaluate the current location of hand wash dispensers and identify any that should be relocated, or locations where additional dispensers were needed. This analysis resulted in dispensers being more readily available and more conveniently placed.

- Mobile patient handling equipment (such as lifts) operates on rechargeable batteries. The batteries are heavy and must be lifted onto chargers that are plugged into the wall. By lowering the outlets, the hospital was able to minimize lifting.

Tying Up Loose Ends

Associates at St. Vincent's Medical Center have suggested practical safety solutions, such as tying loose cords and positioning a recharging station to minimize lifting of heavy batteries.

For more information

Hospital eTool

www.osha.gov/SLTC/etools/hospital/index.html

This OSHA tool focuses on some of the hazards and controls found in the hospital setting. It describes standard requirements as well as recommended safe work practices for employee safety and health.

2.5   Education and training

What safety and health management system education and training means

Education and training are essential elements of a safety and health management system. They provide all employees with the knowledge and skills required to perform their work safely and meet the organization's safety and health goals. An effective education and training program:

- Ensures that employers, managers and supervisors, and employees have the knowledge and skills needed to work safely and avoid creating hazards that could place them or others at risk.

- Enhances awareness and understanding of workplace hazards, and how to identify, report, and eliminate or control them.

- Provides specialized training, where needed, to employees whose work involves particular hazards or to those with specific roles in managing or operating the safety and health management system.

- Includes periodic checks to assess whether training is effective, timely, up-to-date, and applicable based on the current roles and responsibilities of managers, supervisors, and employees.

Why safety and health management system education and training is important

An organization that does not adequately train its workforce can encounter significant costs as well as an assortment of business risks, including an unsafe workplace.[13,14] Inadequate education or training is frequently a root cause of workplace accidents, incidents, and injuries. Ensuring that employees—including supervisors and managers—have the knowledge and skills to work safely helps the organization minimize the possibility of incidents that can lead to injury, illness, damage to equipment and facilities, loss of production, and lost time.

Training can help spread knowledge about safety and health across the workforce, and gives employees the tools they need to identify and address potential problems before they arise. Training can bring breakthroughs in understanding that, in turn, lead to improvements in safety and health performance as well as better processes, products, and productivity.

By training employees in safety and health management system processes, programs, and procedures, an organization will be better able to ensure that they are:

- Aware of the organization's safety and health goals.

- Familiar with individual roles and responsibilities under the safety and health management system.

- Capable of recognizing, controlling, and mitigating hazards found in the workplace.

Education and training provide tools that make the safety and health management system work more effectively. Employees and managers receive training that maximizes their ability to take a systematic look at safety and health within their organization and to work toward eliminating on-the-job injuries, illnesses, fatalities, and other costs associated with poor health and safety performance. More specifically, an effective safety and health education and training function can play an important role in:

- Reducing occupational injury rates, the severity of injuries, days away from work, and employee healthcare costs.

- Reducing employee concerns about on-the-job safety and health.

- Reducing employee absenteeism and turnover.

- Decreasing workers' compensation and general liability insurance premiums.[15]

- Increasing employees' skill and motivation, which can bring increased product quality and productivity.

- Improving compliance with OSHA standards, many of which contain specific training requirements.

What safety and health management system education and training involves

Overview

Some education and/or training is essential for everyone in the workplace, including managers, supervisors, and non-supervisory employees; contractors and temporary employees; and even visitors who may encounter hazards during their time spent on site.

- To promote workplace safety and health and enforce safe work practices, supervisors need to understand workplace hazards and controls.

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[13] Godkewitsch, M. n.d. The dollars and sense of corporate training. *Training.*

[14] Rose, J. 1995. It's time to launch a win-win program. *Occupational Health and Safety.* June.

[15] Horrigan, T.J. 1979. The effects of training on turnover: A cost justification model. *Training and Development Journal.* July.

- Managers need to understand their responsibilities for implementing and running the safety and health management system.

- Managers, supervisors, nonsupervisory employees, contractors, and temporary employees all need to understand their roles and responsibilities in the safety and health management system.

- Contractors, temporary employees, and visitors may need instruction related to the hazards or risks they could encounter during their time in the workplace and the necessary protective measures.

Provide safety and health management system awareness training

All employees need overview training on the organization's safety and health policy, goals, basic operations and functions of the safety and health management system, hazard recognition and avoidance techniques, and emergency response procedures. All employees should know and understand the principles behind the system, their roles and responsibilities under the system, and the means used to communicate safety- and health-related information in the workplace. The frequency and timing of training will vary based on the size and nature of the organization. This training should also be provided to contractors and temporary employees.

Train employees on their specific roles in the safety and health management system

Some employees have specific roles in the safety and health management system, such as inspecting the workplace for hazards, conducting safety audits, selecting and instituting hazard controls, and investigating incidents. These employees must know how to carry out their responsibilities and follow any internal or external (that is, legally mandated) procedures. Their training should emphasize how their actions directly impact the effectiveness of the safety and health management system. For example, an employee who is designated to receive reports of hazards must know what to do with those reports and how to respond to them. In many cases, this employee would also need to know who should be assigned responsibility for instituting control measures. As a safety and health management system evolves, a more formal process may be instituted for determining the training needs of employees responsible for developing, implementing, and maintaining the safety and health management system.

Train employees on hazard identification and controls

Through training, employees should be made aware of and able to recognize the hazards they may encounter while at work. These include hazards specific to their job as well as more general workplace hazards. Employees should also understand the measures that the employer has taken to control those hazards, why these controls are important, and why they must remain in place and be obeyed. For example, if employees are not made aware of the hazards of noise exposure (e.g., in a hospital laundry or on a heliport), it is unlikely that they will use a control (e.g., hearing protection).

Provide job-specific training

In an effective safety and health management system, efforts are taken to define training needs for specific jobs and to ensure that these needs are met. Job-specific requirements can be satisfied through a combination of education, experience, and training. After training, employees should be observed as they work to ensure that the safe work practices and other required procedures are consistently carried out.

Regardless of the type or size of the workplace, the goal is to give employees the training, knowledge, and skills they need to implement the safety and health management system and perform their jobs safely. Employers should make sure to recognize the training needs of employees who have English as a second language, physical limitations, or other special needs, and adjust the training materials or delivery methods accordingly.

Education and training needs, training methods, and the content of training programs differ from workplace to workplace. Choices depend on the distinct features of an organization's safety and health management system, the type and complexity of the work performed, the type and extent of hazards in the workplace, and the characteristics of the employees themselves.

Education and training: best practices and examples

University Medical Center at Brackenridge: speaking out for safety

UMC Brackenridge in Austin, Texas, realized that getting everyone to practice high reliability safety behaviors would not come easy. After all, it would require associates to be prepared to speak up and say to a colleague, or even a superior, "Excuse me, I have a concern." Even though 100 percent of associates had received high reliability safety training, the hospital realized that it would need to do more. To help drive this practice throughout the organization, the hospital identified a select group of associates who showed a passion and interest in safety. These employees became "Safety Coaches" and were given additional training to equip them with the skills to create alignment and build consensus. The Safety Coaches meet regularly to discuss situations, share ideas, and learn from each other. UMC Brackenridge credits its Safety Coach initiative with fostering an environment where every employee is empowered to intervene in a non-threatening, non-judgmental manner, and to question any other employee about a behavior, process, or procedure.

The Power of a Personal Example

In this video, associate Betty Thornhill, RN, describes how a needlestick injury has impacted her life, and provides advice to her colleagues.

UMC Brackenridge believes that when it comes to getting a message across, there is nothing more effective than a story told firsthand by a colleague. The hospital uses past incidents as a teaching tool, through videos that feature injured hospital employees. In one video, a nursing aide tells the story of how she injured her back trying to catch a patient who was about to fall. The injury forced her to abandon her 24-year nursing career. In another case, an operating room nurse revisits the day she was stuck by a needle during surgery. She describes the fear and anguish she experienced first as she scrubbed the site and later as she awaited the results of testing. The test confirmed that she had contracted hepatitis C, requiring her to undergo treatment, endure pain and fatigue, and submit to long-term monitoring of her liver function. According to Darryl Jordan, vice president of risk management for the Seton Healthcare Family (to which UMC Brackenridge belongs), these video testimonials are effective and powerful because they convey a real feeling of "it could happen to me."

AnMed Health Medical Center: staff talent to motivate safety

AnMed Health employees take pride in writing, producing, and starring in worker safety training videos. Employees respond better when they see familiar faces; they find this form of training efficient and effective.

Break a Leg!

AnMed Health employees star in a safety training video.

Saint Thomas Midtown Hospital: breaking down language barriers

Saint Thomas Midtown Hospital in Nashville, Tennessee, was challenged to ensure that its safety training would be understood by all its environmental services staff, who speak 17 different native languages. To address this challenge, they set up a buddy system that pairs bilingual associates with those who have some difficulties in English. The system has worked well. "Previously, we had employees who would nod and say they understood, but we never really knew for sure," said Environmental Services Supervisor David Cope. "Now those same employees are asking questions through their buddies. We know they want to learn, and now they have the help they need."

Lima Memorial Health System: reinforcing safety awareness

Whenever a new associate joins the team at Lima Memorial (Lima, Ohio), safety specialist Pam Lawrence provides orientation training that stresses the importance of staying safe. "Your best asset here is your body," she explains. "You need to protect it." Lawrence also explains Lima Memorial's culture of reporting *every* safety-related incident or concern, including close calls.

To make these messages stick, however, hospitals need to provide frequent reminders and refresher training. Lima Memorial is part of a growing number of hospitals that go beyond computer-based learning to run "safety fairs" that make safety visible, engaging, and fun. Lima Memorial's safety fair includes videos, demonstrations, handouts, and challenges to raise awareness of safety issues—for example, "guess the weight of the laundry bundle."

Don't Let Safety Scare You!

Lima Memorial's Halloween-themed Safety Expo raises awareness of safety issues in an engaging manner.

In addition to running awareness events, many of the safest hospitals have safety managers who are highly visible, well known, outgoing, and approachable. Lima Memorial's safety team fits this description well. Lawrence's rounds cover every shift, so she gets to interact with every associate. Associates have grown accustomed to hearing "You've gotta report that!"

Southern Ohio Medical Center: oriented toward safety

Orientation for new employees at Southern Ohio Medical Center (SOMC) in Portsmouth, Ohio, includes a half-day safety curriculum that covers the hospital's safety culture, error prevention, ergonomics, safe patient handling, and employee health and wellness. Nurses' orientation is a full week, and safe patient handling training fills a full day. Residents, too, receive training on these topics.

D-Day (Development Day) is an organization-wide, mandatory annual refresher training for all workers and is based on the hospital's core values, of which safety is one. Workers take safety refreshers and are tested on their knowledge. SOMC also requires annual driver safety training for anyone who drives for the hospital.

Training for Safe Patient Handling

At Southern Ohio Medical Center, safe patient handling training fills a full day.

St. Vincent's Medical Center: training to minimize the risk of violence

Most hospitals experience occasional incidents of aggressive or violent patient behavior and are adopting strategies to both prevent such episodes and to de-escalate them when they occur. The threat of violence is elevated at St. Vincent's Medical Center in Bridgeport, Connecticut, because the hospital frequently treats "forensic" patients from nearby correctional institutions. Some of these patients are known to be violent, but all such patients must be considered a threat because they may view the hospital as an escape opportunity. Joe Laveneziana, St. Vincent's director of safety and security, has implemented a multi-pronged strategy to minimize risk to employees, patients, visitors, and the community:

- St. Vincent's has established protocols that must be followed before any forensic patient can be sent to the hospital for treatment. These protocols have been arranged with local correctional institutions and include an exchange of information about the patient, his/her condition, medications, and precautions to be taken. Where necessary, additional security support is put in place in advance of the patient's arrival.

- Patients enter the unit through a locked vestibule system. All patients are required to disrobe and change into hospital attire while being observed by trained staff through a one-way mirror.

High-Tech Badges Help Protect Workers from Violent Patients

Associates at St. Vincent's Medical Center wear badges with alarms that will alert the security office if they feel threatened.

- Staff identification badges in the unit feature an automatic paging alert. A staff member who feels threatened can simply tear off their card to activate the alert. The alert goes directly to the nearby security office. The security office can also page all unit employees with situational updates or instructions on what to do if an incident occurs.

- Staff on the unit undergo extensive training, including training on managing aggressive behavior, incident de-escalation, and active shooter response. Drills are held frequently to test procedures and evaluate training effectiveness.

Tampa General Hospital: education to break through barriers

Tampa General Hospital's dedicated lift team program has contributed to a 65 percent decrease in patient handling injuries, 90 percent fewer lost work days, and a 92 percent reduction in workers' compensation costs per dollar of payroll. Why has it been so successful? Education and training plays a big role, explains Injury Prevention Coordinator Manon Short. "A huge barrier to program success is compliance in using the equipment, as nurses just don't feel comfortable using it," says Short. "The lift team staff take time to educate the staff on the use of the equipment to make them more comfortable and help alleviate the fear associated with using the equipment."

In addition, says Short, all new employees are responsible for attending a three-hour hands-on safe patient handling class. The hospital also provides extensive training to 80 unit-based staff members who act as daily champions in their units. These "LIFT experts" (**L**eaders **I**n **F**acilitating **T**ransfers and repositioning) are required to attend quarterly classes. This program is part of the clinical ladder program at Tampa General Hospital.

2.6   System evaluation and improvement

What system evaluation and improvement means

System evaluation and improvement is one of the most important—and often neglected—elements of an effective safety and health management system. It involves:

- Activities and processes to determine whether a safety and health management system is operating as intended and achieving the organization's goals.

- Identifying and correcting deficiencies.

- Continually improving safety and health management system performance.

Effective system evaluation and improvement involves several critical management processes and activities. These include:

- Monitoring and measuring to track whether workplace safety and health conditions are improving and goals are achieved.

- Monitoring injury and illness experience to identify problem areas.

- Conducting inspections to determine if controls, processes, and other elements in the safety and health management system are being consistently implemented.

- Investigating safety and health management system deficiencies.

- Ensuring that effective corrective and preventive actions are promptly chosen and implemented.

- Evaluating the safety and health management system as a whole and by its components to determine whether it operates and functions effectively.

- Top management review of the safety and health management system's effectiveness and its continued ability to meet the organization's evolving needs.

Why system evaluation and improvement is important

System evaluation and improvement is critical to ensure that a safety and health management system is effective. By implementing these processes, programs, and procedures, an organization will have a high degree of assurance that its safety and health management system is operating as intended, achieving stated goals and objectives, reducing employee safety and health risks, and continuously improving. System evaluation and improvement also provides a mechanism to identify implementation problems, correct deficiencies, and improve the system.

All safety and health management systems encounter problems and inconsistencies, especially in their early stages. For example, the implementation process often reveals weaknesses that could not be anticipated during the system's design phase. Further, a system needs to be refined in response to changing workplace conditions and to capitalize on opportunities to improve its performance.

System evaluation and improvement also offer opportunities for management to demonstrate leadership and responsibility. When employees see that their organization's leaders care enough about their safety to conduct periodic inspections and evaluations, honestly communicate the results, and take steps to improve the system, they will be more likely to trust the organization's leadership and participate in the safety and health management system.

What system evaluation and improvement involves

Monitor safety and health management system performance

To monitor the effectiveness of a safety and health management system, organizations often track various measures (or indicators) connected with safety and health. These include lagging indicators, such as the number and severity of injuries and illnesses; levels of employee exposure to a workplace hazard; employee opinions about the safety and health management system's effectiveness; and the amount paid out in workers' compensation. Also useful are leading indicators, such as the level of employee participation in safety and health management system activities; the number and frequency of management walkthroughs; and the amount of time taken to respond to employee reports of hazards. Changes in these types of measures after a safety and health management system is launched can indicate that the safety and health management system has helped improve workplace safety and health. Organizations can also track administrative measures associated with safety and health management system implementation. These measures include, for example, the number of deficiencies in the safety and health management system noted during an inspection, the number of employees who have completed required safety and health training, and the number of days needed to take corrective action after a workplace hazard is identified or an incident occurs.

Indicators can be both quantitative and qualitative. However, care must be taken to select indicators that are measurable and that reflect the safety and health management system's

goals and areas of interest or concern to management or employees. Where appropriate, organizations should document their monitoring activities and results.

Investigate incidents

Incidents provide the clearest indication of where the safety and health management system is inadequate. Investigating them thoroughly will improve safety and health management system performance and provide a road map to avoiding fatalities, injuries, and illnesses associated with similar incidents in the future. The purpose of the investigation must always be to identify the root cause of the incident (see the box above).

Effective investigations require thinking ahead *before* any incident occurs. Develop a clear plan and procedure so you are ready to begin the investigation immediately. The plan should cover such things as what types of incidents need to be investigated; who needs to be involved; lines and means of communication; materials, equipment, and supplies needed; and reporting forms and templates. Earmark and have available supplies that are to be for investigation use only, such as a digital camera, barrier tape, a tape measure, and notepads.

Those involved in the investigation need to remain objective and open-minded throughout the process. Where possible, investigations should be conducted by a team that includes both management and employee representation. Ideally, those involved will be familiar with, but not directly involved in, the operations that led to the incident.

After an incident, the immediate first steps are to provide first aid and emergency care for the injured worker(s) and to take any measures necessary to prevent others from being injured. Emergency response plans should already cover what to do in a medical emergency (see Section 2.4). Once these immediate needs are taken care of, the investigation should begin promptly, under the supervision and direction of qualified personnel or responding authorities.[16] The basic steps in an incident investigation are:

1. **Report as required.** Determine who needs to be notified, both within the organization and outside (e.g., authorities). Understand what types of incidents must be reported, and what information needs to be included. If the incident involves hazardous materials, additional reporting requirements may apply.

2. **Isolate witnesses.** Eyewitnesses to the incident will be a critical source of information. Where possible, prevent witnesses from discussing the incident with each other until you have had a chance to interview them individually (see below).

3. **Preserve the scene.** The condition of the workplace at the time of the incident needs to be documented. Avoid any disturbance to the site until investigators have had a chance to go over it.

4. **Collect physical evidence and make observations.** Document the condition of the workplace at the time of the incident, including where it occurred and the physical placement and configuration of key elements of the scene (equipment, location and position of the injured employee, location of other employees, proximity to doorways, etc.). Photos, videotape, measurements, and sketches or scale drawings may be effective tools for documenting the scene. Take samples of any materials such as liquids, dusts, etc., that are suspected of being involved, and label the containers to indicate the time and location of the sample collection.

5. **Conduct interviews.** When it is appropriate to do so, and as soon as possible, the injured employee(s) should be interviewed and their statement(s) taken. Eyewitnesses should also be interviewed as soon as possible. Put the interviewee(s) at ease, and reassure them that the objective of the interview is to find facts and determine what needs to be fixed, not to assess blame. Use open ended questions to elicit more information.

6. **Collect and review other information.** Depending on the nature of the incident, records related to training, maintenance, inspections, audits, and past incident reports may be relevant to review.

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[16] If outside authorities need to be called in, then steps 4 though 7 should be left to them.

7. **Assemble and analyze information.** Once all the relevant information has been collected and assembled, the investigation team should evaluate the information with a view to determining (a) the logical chain of events that led up to the incident (e.g., what happened?), (b) the apparent cause(s) that led to the incident, (c) the root cause(s) of the incident, and (d) corrective action recommendation(s) that will prevent a similar incident in the future.

As well as investigating all incidents resulting in a fatality, injury, or illness, you should promptly investigate any close call (a situation that could have resulted in death, injury, or illness). Close calls are caused by the same conditions that produce more serious outcomes, and signal that some hazards are not being adequately controlled, or that previously unidentified hazards exist.

Verify implementation and operation periodically

Workplace inspections. The Hazard Identification and Assessment element of this road map addresses the importance of ongoing and periodic workplace inspections to identify new and emerging hazards and associated risks. The Hazard Prevention and Control element addresses how organizations can design and implement control measures to reduce employee hazards. To ensure that hazards are brought under control once these measures are implemented, all hazard control measures need to be systematically and periodically inspected. These inspections determine whether controls are actually followed and effective in reducing hazards. In a well-functioning safety and health management system, organizations establish inspection procedures and schedules for all control measures, periodically conduct inspections, and document the results.

Compliance evaluation. Achieving compliance with applicable safety and health regulations is an important goal for any safety and health management system. Compliance also establishes a good foundation for developing and improving a safety and health management system. Organizations need to periodically evaluate whether they comply with safety and health laws, regulations, and other requirements.

Corrective and preventive action. An organization also needs to periodically conduct "systems-level" evaluations of its safety and health management system. This is done to ensure that the overall safety and health management system is operating as intended, is effective in reducing identified hazards and risks, and is achieving the organization's safety and health goals and objectives. Whenever a problem is identified in any part of the safety and health management system, it is critical for the organization to take prompt action to correct the problem and prevent its recurrence. Often, a tracking system is developed to document the actions taken and their effectiveness in addressing the deficiency.

Identify opportunities to improve the safety and health management system

System evaluation. The procedures described in the first two sub-elements address activities related to evaluating and improving safety and health management system components. These activities are essential but not sufficient to ensure the safety and health management system's effectiveness.

When conducting a systems-level evaluation, organizations should go beyond an inspection or workplace audit. They can do this by proactively questioning whether the safety and health management system core elements have been adequately implemented and are effective in protecting employee safety and health. For example:

- Has management demonstrated its leadership effectively?

- Have all hazards been identified? If not, is there a plan to do so over time and is the plan being followed?

- Are the identified hazards being adequately controlled?

- Are employees consistently following safe work practices?

- Are management and employees fulfilling their responsibilities under the system?

- To what extent are employees participating in the system? For example: Are employees identifying potential hazards? Are they using the reporting system?

- Are there any barriers to employee participation? For example, are employees reluctant to report hazards because they receive mixed signals from their supervisors or managers about the importance of such reporting?

- Have injuries and illnesses continued to occur? Are incidents and close calls being investigated?

A safety and health management system needs to be evaluated in its entirety at least once a year. This can be done as a single annual evaluation of the entire system, or as a series of evaluations of all the various system components conducted during the course of a year. The scope and frequency of systems evaluations will vary depending on the complexity, maturity, and nature of the safety and health management system and the types of hazards and risks it must control. In addition, the safety and health management system needs evaluation when operations change significantly (such as changes in raw materials, equipment, key personnel, or work practices) or management has reason to believe that the sys-

tem or any part of it is ineffective. For example, a workplace undergoing many process changes or experiencing rapid turnover may need more frequent evaluations to ensure its effectiveness. Similarly, an increase in incidents in one area of a facility would suggest that an evaluation is warranted.

Management review and improvement. At least once a year, top management performs a formal, comprehensive review of the entire safety and health management system to determine how effectively it is meeting the organization's safety and health goals. During this process, top management considers the entire system and the results of all inspections and other internal evaluations. Top management may also seek input from employees, supervisors, and other stakeholders on how well the safety and health management system is working and opportunities for improvement. This systems-level review often results in identification of:

- Opportunities to refine, fortify, and improve the safety and health management system.

- New and revised goals and objectives for safety and health.

- The types and quantity of resources needed to effectively implement the safety and health management system.

- Needed changes to the organization's safety and health policy.

- New and revised roles and responsibilities for implementing the safety and health management system.

Through this annual review, top management demonstrates and reaffirms its responsibility for, and commitment to continuously improve, the safety and health management system and employee safety and health performance.

System evaluation and improvement: best practices and examples

Saint Thomas Midtown Hospital: performance improvement with safety

Hospitals conduct annual program evaluations and develop goals as a condition of Joint Commission accreditation. Saint Thomas Midtown Hospital (Nashville, Tennessee) saw this annual process as an opportunity to integrate worker safety into an existing system for self-improvement. Each year, Saint Thomas Midtown's safety manager proposes a set of safety goals, which is reviewed and approved by the hospital's Environment of Care committee, quality committee, and top administrators. These goals include both near-term and "stretch" objectives. For example, one of the hospital's "stretch" goals is *zero needlesticks*.

Saint Thomas Midtown Hospital embraces continual improvement in many ways, including safety. The chief operating officer recognizes that healthcare requires continual innovation and "doing more with less," and the chief financial officer oversees a series of lean initiatives to minimize waste and optimize processes. Applying lean principles to safety, Saint Thomas Midtown discovered case carts being returned with sharps and heavy boxes stored on high shelves in the hospital's distribution center. Improvements included new procedures and reconfigured shelving.

Tampa General Hospital: finding safer ways to move patients

Tampa General Hospital (Tampa, Florida) has become known for its innovative "lift teams"—dedicated two-person teams that specialize in using equipment to lift and transfer patients throughout this 1,000+ bed hospital. These lift teams have contributed to a 65 percent decrease in patient handling injuries, a 90 percent reduction in lost work days, and a 92 percent reduction in workers' compensation costs per dollar of payroll. Tampa General continues to look for new ways to increase use of the lift teams and make them even more effective. By focusing on continual improvement, Tampa General has fine-tuned its patient lifting program to the point where it sustains itself, and where employees see it as a reliable and indispensable part of the workplace. Many of the best suggestions for improvement come from lift team members themselves. For example:

- Over time, Tampa General has expanded the number of lift teams and expanded the hours the teams work to 24x7 to provide more reliable coverage. They studied call volumes to optimize lift team staffing by time of day.

- One team member devised a computer-based system to allow nurses and assistants to request a lift team. Each team now carries a wireless tablet computer to receive and prioritize these requests.

- Lift team leaders recognized the importance of keeping equipment in good repair and maintaining an inventory of slings and other components, so they added these duties to the lift team's job description.

- Team members are empowered to devise new techniques to deal with complex lifting situations.

Lift Teams on Call

Lift team lead Barry Nichols uses a wireless tablet to track and prioritize requests for assistance with lifting, repositioning, and transferring patients. A lift team member devised this paging system to improve response times and make it easier for caregivers to request a lift team instead of trying to move patients manually.

Cincinnati Children's Hospital: applying the science of improvement

For years, some of the world's most successful manufacturers have embraced "lean" principles, total quality management, and similar concepts to drive improvements in quality and to reduce waste. Healthcare organizations have begun to follow their lead. Some hospitals have also adopted high reliability principles, which have emerged from commercial aviation, nuclear power, and other industries with exceedingly low tolerance for failure.

Cincinnati Children's Hospital (Cincinnati, Ohio) has become a leader in applying these types of quality, process, and safety management principles to healthcare. In 2010, Cincinnati Children's established the James M. Anderson Center for Health Systems Excellence, which uses "improvement science" to identify ways to make hospitals safer for patients and employees alike. Analysts and consultants within the Anderson Center review data, conduct exercises such as the Rapid Cycle Improvement Collaborative to identify problems and solutions, and provide training to hospital staff.

Using high reliability principles, Cincinnati Children's was able to reduce serious patient safety events by 80 percent. Applying similar principles to worker safety, the hospital implemented a more comprehensive risk planning program and took steps to reduce workplace injuries associated with patient handling, sharps, patient violence, and other hazards. These improvements resulted in an 83 percent reduction in lost time days in just three years.

Top administrators at Cincinnati Children's have created an environment where employees at all levels strive for continual improvement. Dr. Steve Muething, Vice President of Safety, notes: "There's never a discussion here about 'that's good enough.'" Administrators set annual and five-year strategic goals, including goals for continued reduction in worker injury rates.

For more information

OSHA provides several tools to help employers and employees evaluate their safety and health management systems:

Hospital Safety and Health Management System Self-Assessment Questionnaire

www.osha.gov/dsg/hospitals

An Excel-based tool to help a hospital assess its implementation of the key elements of a safety and health management system, and identify areas for improvement.

Safety and Health Management System eTool, Module 3: Conducting a Safety and Health Checkup

www.osha.gov/SLTC/etools/safetyhealth/mod3.html

An online tool to help an employer evaluate management leadership, employee involvement, worksite analysis, hazard prevention and control, and safety and health training.

Safety and Health Management System eTool, Module 4: Safety and Health Program Checkup

www.osha.gov/SLTC/etools/safetyhealth/mod4_tools_checkup.html

A brief questionnaire to help an employer see how a safety and health program measures up.