

Best Practices

IN EMERGENCY SERVICES

P R E S E N T S



Safety Management Systems in EMS

AN IMPLEMENTATION GUIDE

By Michael Greene, Blair Bigham
and Daniel Patterson

Lead author Michael Greene, R.N., MBA, MSHA, is a senior associate at Fitch & Associates. He has served in numerous front-line and leadership positions throughout his career, working in volunteer and paid search and rescue and as a paramedic, county EMS director and air medical/critical care transport director. He is the author of numerous articles and chapters on EMS and air medical transport topics. He can be reached via e-mail at mgreene@fitchassoc.com or by phone at 816-431-2600.

Blair Bigham, ACP, MS, EMT-P is an associate scientist at St. Michael's Hospital and the University of Toronto, where his research focus is on time-sensitive disease intervention and patient safety in EMS. He is also a practicing advanced care paramedic in both land and rotor EMS. Blair can be reached at bighamb@smh.ca.

Daniel Patterson, Ph.D., MPH, EMT-B, is an EMS researcher and assistant professor in the Department of Emergency Medicine at the University of Pittsburgh School of Medicine. He is also a principal investigator at the Emergency Medical Services Agency Research Network (EMEARN), a network of EMS agencies assembled by academic and industry leaders for research purposes. The overarching goal of EMSARN is to improve quality, safety, and performance in EMS nationwide. He can be reached at pattersond@upmc.edu.

Best Practices in Emergency Services is published by the National Emergency Services Institute (NESI) © 2012 .

Best Practices in Emergency Services is a membership benefit of the The National EMS Management Association. For more information visit emergencybestpractices.com or nemsa.org.

Best Practices Staff

Publisher
Jacob Knight

Editor in Chief
Keith Griffiths

Editor
Carole Anderson Lucia

Art Director
Robyn Bowman

Safety Management Systems in EMS

An Implementation Guide

Editor's note: Safety for the EMS patient, the provider and the public has emerged as a national priority. Safety Management Systems provide a framework at the organizational level. The newsletter *Best Practices in Emergency Services* commissioned three of the leading experts in this area to write a series of 12 columns on the topic. We present the series here as a special report.

Part 1: The Battle for Zero	4
Part 2: Intro to Safety Management Systems: The Bricks and Mortar	5
Part 3: What's the State of Your Organization's Safety Culture? Measure It!	6
Part 4: Policy: The First Pillar of a Safety Management System	8
Part 5: Risk Management: The Second Pillar of a Safety Management System	9
Part 6: Safety Assurance: The Third Pillar of a Safety Management System	11
Part 7: Safety Promotion (and, yes, storytelling).....	13
Part 8: Safety Management Systems: Leadership and Commitment Above All	14
Part 9: Striving for Excellence in Patient Safety	16
Part 10: The SMS and Gap Analysis: Let the Journey Begin Safety	17
Part 11: Management Systems: On Teamwork and Conflict	19
Part 12: Safety Management Systems: The Value of a Life	20

Part 1: The Battle for Zero

Our peers in helicopter emergency medical services (HEMS) have been catching a lot of flack in the media recently, due to several high-profile incidents and government investigations. Maybe you've been thinking, *Thank goodness it's them, not us.* But what are you doing to achieve the safest environment for your staff and patients?

You may find my opinion harsh or even critical, but I don't see much activity at the grassroots level in making ground EMS operations safer. There seems to be an intense focus on "the box," meaning the area behind the ambulance cab, but not much activity out of (and beyond) the box. Where are the vision, the commitment, the tools and the passion to meet our guiding mission, "First do no harm"?

Did I catch you stifling a yawn? Yes, I'm talking about day-in, day-out safety manuals; policies and procedures; documentation; reporting; risk management; hazard identification; and continual improvement. Do you delegate these tasks to others, place them on your management agenda once a month or once a quarter, and recite the mantra "safety first" but shudder when you wake to the phone ringing at night? If so, you're not alone.

Bringing a painful lesson home

I was yawning the night of Sunday, Dec. 14, 1997, after a long day of skiing with friends and enjoying a rare evening at home alone, with my wife and kids visiting out-of-town relatives. I was just getting into bed when the phone rang at 9:31. On the other end of the line was my communications specialist, who, voice wavering, said, "We have a helicopter down." Tragically, EMS helicopter N771AL struck wires on takeoff from a multi-casualty accident scene in Littleton, Colo., impacting the frozen ground upside-down at an estimated 23 G. Two medical crew members, flight nurses Leslie Feldmann and Beth Barber, along with pilot Pete Alblplanalp and a critically injured patient, died instantly. In the blink of an eye, lives were lost, and lives changed.

While most were celebrating the holidays that December, AIR LIFE Denver, along with an outpouring of the EMS community, wept publicly, attended funerals, consoled grief-stricken family members and privately wondered, *Are we safe?* My own river of tears carried the crushing weight of responsibility for lives lost on my watch. Had I put safety first? Could I have done something differently? Concern for the safety of my program and team became overwhelming. Could I face a wife, husband, parent, child or the community at large and

My own river of tears carried the crushing weight of responsibility for lives lost on my watch. Had I put safety first? Could I have done something differently?

say I had done everything in my power as the steward of the service to develop, maintain, promote and ensure the safety of the lives entrusted to me? Had I been honest that the baseline risk in EMS transportation isn't *zero*? (Emphasis added.) Thus began my quest for answers to these difficult yet imperative questions.

Think it only happens to the other guys?

Do you think this can't happen to you, your service or your community? Do you assume this is a HEMS issue only? Do you believe ground EMS is safer? I think not. Even a cursory review of recent news headlines would suggest otherwise:

- "Ambulance involved in fatal accident": CBS Philadelphia, Oct. 10, 2010.
- "Police say ambulance driver fell asleep before head-on crash": Floyd County, Ga. (WRCB), Oct. 14, 2010.
- "Ambulance carrying accident victim hit on I-95": Greenwichtime.com, Oct. 17, 2010.
- "Massachusetts ambulance, vehicle crash left Taunton man dead: 3 hurt": Justicenewsflash.com, Oct. 27, 2010.

In fact, according to a 2002 report in *Annals of Emergency Medicine*, the transportation fatality rate for EMS workers is nearly five times that of other U.S. workers. That same report found that in the 10-year period from 1988 to 1997, there were more than 350 fatalities and 23,000 injuries to people involved in ground ambulance crashes. And a Canadian study concluded that the fatality rate in ground EMS was 1.7 per million ground miles traveled, higher than HEMS at 0.4 per million air miles traveled. Enough said?

The Association of Air Medical Services (AAMS) has developed a goal of "zero errors of consequence" in air medical transport, coined Vision Zero. A worthy vision no doubt, but how does that translate to the everyday, sometimes mundane safety activities at our organizations? How does the "vision" allay the fears of a family member when his or her loved one leaves for work each day?

Enter the concept of a high reliability organization (HRO). An HRO is an organization that has succeeded in avoiding catastrophes in an environment where normal accidents can be expected due to risk factors and complexity. In other words, an HRO is an organization that conducts relatively error-free operations, over a long period of time, making consistently good decisions, resulting in high-quality, reliable operations.

Sound too good to be true? Well, if the goal is a high reliability organization, then the "how" is through the development of a safety management system (SMS). In the toolbox of the HRO, an SMS is a coordinated, comprehensive set of processes designed to direct and control resources to optimally manage safety, which takes unrelated processes and integrates them into one coherent system, facilitating proactive hazard identification, promoting a safety culture (attitudes, behavior, ownership), and providing a systematic way to control risk and to provide assurance that the risk controls are effective.

Thanks to the foresight of editor in chief Keith Griffiths, Best Practices published a series of safety columns, written

by myself and safety experts Daniel Patterson, Ph.D., assistant professor in the Department of Emergency Medicine at the University of Pittsburgh School of Medicine; and Blair Bigham, MS, a Toronto ground and air paramedic and an internationally recognized investigator/researcher for the University of Toronto who has been involved with a variety of safety-based studies.

Specifically, this series will help you transform your

organization into an HRO through SMS development. Each month, we will help you build your own SMS, pillar by pillar, starting with a solid foundation and ending with a roof to weather the safety storms.

Got your attention? Then stay tuned! 

— Michael Greene, R.N., MBA/MSHA

Part 2: Intro to Safety Management Systems: The Bricks and Mortar

Sometimes I sleep during air travel, especially at the end of the day after crossing multiple time zones. Not so on a recent return to my home airport: Before boarding, it was announced that a diversion to an alternative airport was possible due to fog at our destination. My fellow passengers openly complained about another night away from their destination, while I cringed at the thought of a “bonus night” in a hotel bed.

The captain left the cockpit to address the possible diversion face to face with the cabin full of grumbling holiday travelers. “Here’s the story,” he said. “To land at our destination, visibility—ceiling and distance—must be at certain minimums per FARs (Federal Aviation Regulations), the rules and procedures we follow. Now I won’t bore you with the details, but here’s the bottom line: I want to make it home to my family, and you to yours. That’s my goal, regardless of our destination this evening.”

Rules, policies and procedures, along with a good dose of attitude, behavior and ownership, got me safely home to my family. Most aboard that flight did not consider the magnitude of what had occurred; they simply, and instinctively, trusted the system and the crew. Passengers expected a safe flight home—and that’s what they got.

Do we think our patients expect any less than a safe transport to the hospital? Without thinking or verbalizing it, the general public expects their EMS organization—its policies and procedures, staff and culture—to deliver. Figuratively and literally, the public expects EMS to be highly reliable and safe. And how do we make sure we fulfill that expectation?

Building a strong safety foundation

Last month I introduced the concept of a high reliability organization (HRO) and the toolkit of an HRO: a safety management system (SMS). The design of an SMS is like that of a house: a strong foundation (the organization’s safety culture);

four corners or pillars (policy, risk management, assurance and promotion); the internal contents (11 elements of SMS); and a roof (leadership).

While SMSs are designed around the “four pillars” concept, I believe a truly effective SMS can only be built on a solid safety culture, shielded and insulated by leadership, and connected and supported by the four pillars. In other words, culture and leadership deserve (and demand) special emphasis.

Now let’s start at the top and work our way down.

The roof (aka leadership): What does a roof do? It shields, protects and insulates the occupants and contents of the house. This, too, is the fundamental job of leadership: To protect employees and the organization from harm. An SMS requires unwavering commitment on the part of leadership, in addition to a commitment to safe system design and a “just (open) culture.”

At a recent conference, I asked a group of 50 or so EMS leaders if they give their employees “stop work authority” if conditions are unsafe or “timeouts” if workers are fatigued, key elements of leadership in an SMS. The response was mediocre at best. This is indeed unfortunate and means that our EMS workers continue to demonstrate risky behavior, such as working beyond the point of fatigue and falling asleep at the wheel. My advice to this group and you: Don’t let tragedy become your wake-up call.

Holding up the “roof” of the SMS are four pillars: policy,



In any SMS, safety activities are systematic, meaning they are applied consistently throughout the organization; proactive, in that they are based on hazard identification and risk control; and explicit, in that safety activity is documented and transparent to all.

risk management, assurance and promotion. Each pillar contains key elements that define the overall system.

The first pillar: An SMS must have written, accessible policies and procedures in place: the first pillar. These policies must explicitly describe responsibility, authority, accountability and expectations within the organization. All job descriptions must include these elements. Key safety personnel are identified and described with commensurate scope and authority. Emergency preparedness and response is preplanned, known to all staff and practiced through regular emergency drills. And the most important aspect to safety policy, documentation and record keeping? Documentation. As the old proverb says, “The job isn’t done until the paperwork is done.” Documentation captures organizational knowledge, activity and behavior consigned not only to posterity, but also as evidence to an accrediting organization or a legal inquiry.

The second pillar: Risk management, the second pillar, is deliberate early recognition and management of potential problems. Risk management is a formal system of hazard identification and management and fundamental in controlling an acceptable level of risk. A risk management system describes operational processes across department and organizational

boundaries; identifies key hazards and measures them; methodically assesses risk; and implements controls to mitigate that risk. A fatigue risk matrix and assessment, periodically applied during a work shift, is an example of risk management.

The third pillar: With policies, measurements, assessments and controls in place, the organization must incorporate regular data collection, analysis, assessment and review to ensure that safety goals are achieved—assurance, the third pillar of an SMS. Key elements within safety assurance are safety performance management (monitoring, audits, evaluations, investigations, RCA, employee reporting, data analysis, assessment, and preventive and corrective actions), a defined change management process and continual improvement.

The fourth pillar: To promote safety—the fourth and final pillar—an organization must train and communicate safety as a core value. Safety promotion begins early with employee recruitment and selection, and continues from Day One with explicit competencies, training and personnel expectations in regard to safety. New employees must be socialized into the safety culture early on. Safety is then promoted through communication and awareness.

Don’t forget, a safe workplace culture is the foundation of an SMS. Culture is the undercurrent or underpinning that defines an organization and “how things get done around here ... or over there.” The importance of having a workplace safety culture cannot be overstated. The literature is replete with the message that safety can only exist within a strong culture. Daniel Patterson, one of my co-authors, has said, “You’ll never get all EMS staff to drink the ‘SMS Kool-Aid’ without a strong safety culture.” Safety culture is a, if not *the*, vital component of an SMS. 

— Michael Greene, R.N., MBA/MSHA

Part 3: What’s the State of Your Organization’s Safety Culture? Measure It!

Those of us with a few years under our belts probably remember our early days in EMS, when the thrill of a good call far outweighed any concern of safety issues. Young, immortal and reckless, many of us were—let’s face it—the safety manager’s worst nightmare. And where is your organization’s safety culture today, given the youth, mindset and adventure that each day in EMS brings? It may be high time you gave it some serious thought.

What is a safety culture?

Safety culture has been described as the shared beliefs that

For more information about safety research in EMS or safety surveys, or to listen to safety podcasts, visit emsarn.org.

an organization’s employees hold relative to workplace safety. Personally, I like how Terry Mathis of ProAct Safety described it in the October 2010 edition of the EMS Agency Research Network (EMSARN) podcast series: Safety culture is not only the actions and what we do when we’re being watched at work ... but also the reason why we behave in a particular way. Said differently, behavior is the foundation of a successful safety management system (SMS), based on shared beliefs that safety is a priority.

Ask any engineer or architect how to build a sturdy, long-lasting bridge, building or highway—the answer you’ll undoubtedly get is to start with a strong foundation. Similarly, the “weight” of an SMS is built on, and supported by, a positive and proactive foundation of safety culture.

I operationalize safety culture by thinking about first impressions, recalling the first few days of work at prior and

current places of employment. I think about the way the workplace appeared on the outside. Was it run-down or well-kept? Was the inside neat or messy? I think about how I was greeted by employees: Were they nice? Did they smile, and were they generally in good spirits? Did the representatives of the organization look me in the eye or avoid such contact?

We all do it: We have gut reactions in which we establish long-lasting opinions of new acquaintances or new places based solely on first impressions. They stick with us. They shape our thinking, perceptions and, yes, our behavior.

For instance, I believe that if an organization is lax in its appearance, it may lead to a culture of low expectations and thus lower employees' defenses against error, adverse events and accidents. In contrast, an organization that values adherence to protocols and communication with patients, partners and leadership—one that values a kept and tidy station and ambulance—I believe those standards impact employees' behavior and beliefs to be positive, thwarting the threats to poor safety outcomes.

Safety culture vs. safety climate

While the terms “safety culture” and “safety climate” are used interchangeably, their meanings differ slightly. Safety culture references deep-seated patterns, core beliefs and behaviors, while safety climate refers to the current perceptions (status) of safety in the workplace.

Surveys are the most common way to measure safety culture and safety climate. Their utility is analogous to the oil-stick in our car's engine: Periodically we need to check the oil in our car. Low levels indicate a potential problem; oil levels at or slightly above the full line indicate that the engine is most likely working properly. Safety culture surveys serve as an “oil-stick” check of the overall workplace engine.

As an investigator, I am not too concerned with how different people define or describe safety culture or if they prefer to use the term safety climate. What worries me is measurement—the oil stick. To gain reassurance that our workplace is working properly, we need reliable and valid measurement. To compare and contrast our measurements over time or to other organizations, we need reliable and valid measurement.

Does the proposed tool for measurement actually measure what it is intended to measure? If not, the tool is not valid and of no use to anyone! Can the survey tool be used over and over again in different settings and produce a set of measurements as intended? If yes, then the tool is reliable.

In 2007 we set out to develop the EMS Safety Attitudes Questionnaire (EMS-SAQ) to measure safety culture in the EMS setting. First, we evaluated the multitude of published safety culture survey tools. Surveys were developed for the hospital, long-term care, ambulatory care and other settings. We focused our attention on the ICU version of the questionnaire, as it had been widely used and had positive indicators of reliability and validity, and data for benchmarking EMS against other settings was readily available.

Next, our team developed and tested a pilot version of the EMS-SAQ in three EMS agencies. This first study was designed to test acceptance of the survey among EMS personnel, answer questions about feasibility in administering, and test the psychometric properties of reliability and validity. The results: The tool is easy to administer, EMS personnel interpreted the survey items with no trouble, and psychometric analyses determined the tool is reliable and valid in the EMS population.

We conducted additional psychometric tests in a second study that was primarily focused on establishing benchmarking data for EMS agencies. That study was recently published in the *Prehospital Emergency Care Journal* and identified wide variations in safety culture scores.

While prescriptive safety culture interventions can be employed following the survey, there are no known evaluations of interventions based on EMS-SAQ scores. Ideally, safety interventions should tie back to the elements of your SMS. Several hospital-based safety programs have been researched, implemented and validated. If you are interested in these, head to the Internet and use the key words “comprehensive unit-based safety program,” or CUSP, to find more information.

Regardless of the specific interventions, the first step toward a culture of safety is strong leadership.

A few take-away points

1. Start with a strong foundation for your SMS: Find out what your safety culture looks like.
2. A positive safety culture requires strong leadership.
3. Don't worry about how you define or describe safety culture. There are many useful descriptions and definitions.
4. Surveys are the most commonly used tools for measuring safety culture in any organization.
5. Be wary of tools untested in the EMS setting. The ambulatory care setting is different from the ICU, which is different from the long-term care environment. Questions developed for these settings are specific to the workers, actions and behaviors in those environments.
6. We have tested the EMS-SAQ in more than 80 different EMS organizations. Test after test reveal positive psychometric properties of reliability and validity.
7. An EMS-specific CUSP has not been developed or published. Be the first!

Finally, remember that the safety culture of a workplace is the foundation for good or bad behaviors among workers and contributes to safe or poor outcomes for patients and providers. One cornerstone of any safety program should be confidence in reliable and valid measurement. 

—Daniel Patterson, Ph.D., MPH, EMT-B

Part 4: Policy: The First Pillar of a Safety Management System

(Or ... No Policy Pain, No SMS Gain)

What a pain. It's just paper-pushing, pencil-whipping BS! Have you ever uttered these words when writing a new policy or documenting an organizational practice? Chances are you have—maybe even something a bit more colorful.

As a safety advocate and consultant, I often see organizations operate by “common practice.” The premise goes something like this: *We don't have a policy or procedure for that; it's a common practice.*

More often than not, common practice is the tacit (implied but not expressed) guideline for organizational activity, as opposed to explicit written documentation of corporate philosophy that leads to policies and procedures and drives organizational behavior. Often the common-practice argument becomes a convenient reason not to capture institutional knowledge and experience on paper. (I can just hear a collective sigh as you read these words.) In regard to patient care documentation it's been said, “If it isn't written down, it wasn't done.” The same rule applies with a safety management system (SMS): *It needs to be written down.*

Why is it necessary to have so much documentation? The answer is fairly straightforward: An SMS must include policies and procedures that explicitly describe responsibility, authority, accountability and expectations. Documentation should answer simple questions like: “Who is responsible for [insert duty here]?” and “What do we do if ...?”

Before we explore specific elements of policy-making, I'd like to introduce the simple idea of “P to the fifth power,” or P⁵. A model developed by Fitch & Associates, P⁵ is a template for organizational processes.

- **Philosophy** P⁵ begins with philosophy. For example, an organization's safety philosophy may be safety first; zero errors of consequence; accidents and injuries are preventable; or the classic *first do no harm*.
- **Policies and procedures** Philosophy is translated into actionable policies and procedures (e.g., risk assessment, fatigue management, stop-work authority). These documents, paper or electronic, define and guide expectations for behavior in the organization.
- **Practice** The preceding P's (philosophy, policies and procedures) are demonstrated within the organization by the observable practice of the employees. Safety audits, random spot checks or “leadership by walking around” are good tools for observing what people in the organization actually do.
- **Paperwork** As always, the job isn't done until the paperwork is complete. In other words, documentation must be completed of the actual practice or behavior in following the policies and procedures that codify the safety philosophy.

P to the Fifth Power

As shown above, P⁵ is a circular or closed-loop approach to all organizational activities, a process many accrediting bodies use to evaluate the extent to which a standard or standards are achieved. I'd hypothesize that P⁵ is the organizational equivalent of the Krebs cycle: It's how an organization lives, breathes and acts.



Necessary elements of a safety policy

1. Keep it simple One might argue that having to write policies and procedures is the major cause of lactic acidosis in safety leaders. But it doesn't have to be painful—in fact, the simpler, the better. The best safety manual isn't one that creates muscle strain when you lift it to the top shelf, where it will sit and gather dust; it's the type that staff members can (and do) quote in a few simple words, like “Our policy is to make a full stop at intersections.”

The U.S. Forest Service (USFS), a visibly large and bureaucratic organization, documents its “Safety Management System Guide and Aviation Safety Plan” in a scant 73 pages! And it's quotable: “Our number one job is to protect our most valuable resource—our employees.” The principles outlined by the USFS codify the safety philosophy across hundreds of employees, over thousands of square miles, as evidenced by a December 2010 SAFECOM Survey Report that found 82 percent of federal, state and vendor respondents agreed with the statement, “Safety is a core value in the Federal land management aviation program.”

2. Identify and recognize key safety leaders and managers

The sentinel 2000 Institute of Medicine report, “To Err is Human,” stated, “Safety should be an explicit organizational goal that is demonstrated by strong leadership on the part of clinicians, executives, and governing bodies.” Yet five years later, safety researcher Donald Berwick, now administrator of the U.S. Centers for Medicare and Medicaid Services, implied that few health care leaders have made safety a priority or committed resources toward safety improvement.

What commitments to safety leadership and improvement have you and your organization made? Formal or informal, you need to

have safety leaders in your organization. The take-home message, if you want to value your SMS, is to empower your staff and managers by calling them out, formally and informally, with responsibilities, rewards and credit where due for supporting safety.

3. Make documentation and record-keeping a priority *Argumentum ad nondocumentus*, the argument that policies, behaviors or practices don't need to be written down because "it's always been done that way," is most organizations' Achilles heel. I don't mean to rant here, but I do intend to repeat this message: *Documentation is the greatest area for improvement in virtually any organization*. Furthermore, it's absolutely essential, for without it the organizational Krebs cycle fails.

I can almost guarantee that without comprehensive organizational documentation you'll feel the pain at some point, be it through a governing body, an accrediting organization or legal action. With today's technology and information systems, comprehensive documentation should be an *Argumentum ad nonignorantiam* (a no-brainer).

4. Include a specific emergency response plan Winston Churchill was quoted during World War II as saying, "He who fails to plan is planning to fail." In the crusade for safety, a specific emergency response plan (ERP) provides an organization with a plan that addresses what to do in an emergency, and who is responsible for each action. Stated differently, an ERP is bringing the future into the present so you can do something about it now. An ERP isn't just about accidents or incidents; it should address utility failures, natural disasters, influenza outbreaks, bomb threats, workplace violence—in other words, it should be a "what do we do if" guide.

A high-reliability organization operates on a continuum from day-to-day routine, to once-in-a-year or once-in-a-lifetime events. This element of your SMS goes beyond what you engage in daily regarding safety management; it's an insurance policy, a "Plan B" when extraordinary events exceed the organization's capacity.

Don't believe it works? Consider this

It may be difficult to believe that this first pillar of an SMS can lead to a system that will improve safety, but I am mindful of a World Health Organization-sponsored study on morbidity and mortality following the introduction of a simple checklist. The Safe Surgery Saves Lives Study Group hypothesized that a surgical checklist would reduce complications and deaths associated with surgery. The results: "The rate of death was 1.5% before the checklist was introduced and declined to 0.8% afterward ($P=0.003$). Inpatient complications occurred in 11.0% of patients at baseline and in 7.0% after introduction of the checklist ($P<0.001$)." The conclusion: "Implementation of the checklist was associated with concomitant reductions in the rates of death and complications..." This example illustrates safety management in action and the power of P⁵!

So far, my colleagues and I have shown you the blueprint of an SMS and laid the foundation for a strong SMS through safety culture assessment and development. This month, we've helped you understand the elements of the first pillar of an EMS: policy. Now the heavy lifting—and leading—is up to you. 

— Michael Greene, R.N., MBA, MSHA

Part 5: Risk Management: The Second Pillar of a Safety Management System (Or ... how to develop a healthy obsession with risk management)

Dave Richter is obsessed with checklists. One could say he's a control freak, and obsessive-compulsive about safety.

Common in the English lexicon, the phrase *obsessive-compulsive* is defined as "often used in an informal or caricatured manner to describe someone who is meticulous, perfectionistic, absorbed in a cause, or otherwise fixated on something or someone." Yes, that's Dave. After 20-plus years of working and flying with him on air medical missions, I'm OK with his obsessive-compulsive disorder (OCD).

Dave knows his pre-flight checklist is the outcome of decades of risk management in aviation. And I knew that because it was on his checklist, my helicopter wasn't lifting off until I gave Dave an affirmative response that the cabin, seat belts and doors were secure. I trusted Dave with my life because I saw this OCD behavior during preflight walk-around, safety checks, maintenance run-ups, all phases of flight—heck, even in his written documentation. So in honor of Dave, I'd like to weave some of his character traits into the definition of risk management.

Risk management, from an OCD perspective, is the deliberate *and meticulous* early recognition and management of potential problems. Risk management is a formal system of hazard identification and management, fundamental in controlling an acceptable level of risk. *Fixated on safety*, a risk management system describes operational processes across departmental and organizational boundaries; identifies key hazards and measures them; methodically assesses risk; and implements controls to mitigate those risks. More than a system, risk management is *a cause to be pursued and perfected*.

While EMS is not free of risk, the risk that does exist can be

mitigated, managed, lessened and in some cases avoided altogether. In this pillar of a safety management system, we will explore strategies, steps and tools for your safety toolbox.



A look at risk management strategies

At a 50,000-foot view, there are three basic risk management strategies: reactive, proactive and predictive (see illustration above). The reactive strategy—responding to events that have already occurred—is probably the most common approach to safety issues. Reacting to a safety issue is a necessary response, but not one that prevented the incident in the first place.

Being proactive is, by definition, actively identifying hazards, yet how much of a leader’s time—your time—is spent looking around your organization? Management by walking around (MBWA) definitely has its benefits in your safety program. Popularized by business guru Tom Peters, MBWA is an essential element of risk management, as it allows you to see, hear and feel the safety issues facing the organization. MBWA gives you a view of the 96 percent of the iceberg below the surface.

Predictive risk management takes the proactive approach a step further by analyzing processes and the environment and forecasting future risks. Let me use change as an example of predictive risk management. Have you ever gotten a great deal on a disposable supply for your organization, say IV catheters, which was just too good to pass up? As a leader I might say, “This is just a small change. IV cath can’t be that much different, and it saves big bucks.” But as a frontline caregiver, I may see the newest and greatest—albeit cheapest—brand of IV cath as a challenge because of the idiosyncrasies of that device when time, efficiency, effort—and, yes, lives—mattered. (Is this reminding you of the change over to needle safety devices?) A predictive risk management approach would employ management of change principles—identification, request, need, education and implementation—through which the change is fully processed.

The steps and tools of risk management

The International Organization for Standardization has developed standards (ISO 3000) to provide principles and generic guidelines on risk management. Visit iso.org for more information.

At the ground level, risk management involves the following steps and tools:

Step 1: Identify the hazards A hazard is anything that can cause harm, such as sharp objects, chemicals and uncontrolled accident scenes. OSHA categorizes workplace hazards into five types: materials, equipment, environment, people and system (MEEPS). The first three categories contribute to only 3 percent of all workplace accidents, according to a major workers’ compensation insurer, leaving 97 percent attributable to people (employee behaviors) and systems. The take-home message, when assessing hazards in your workplace: Look at system weaknesses and human factors for the biggest return on a safer workplace.

Step 2: Evaluate the risks Risk is the chance, high or low, that someone could be harmed by a hazard, including an indication of the degree of seriousness of harm. The best way to describe and assess risk is through the use of a risk matrix (see table below). In utilizing the risk matrix, probability is your estimation of the likelihood of an event; severity is your approximation of the result. The tool gives the organization an opportunity to qualify risks as extreme, high, moderate or low.

Step 3: Decide on precautions or controls The goal of a precaution or control is to reduce the probability or severity of the risk. The best example of a precaution in EMS is the use of personal protective equipment and universal precautions during patient care. Others include needleless systems, driver alert systems or break-away shore power lines. Checklists are also excellent process controls. In fact, the World Health Organization’s surgical checklist has been credited with a reduction in patient morbidity and mortality on a global scale!

RISK ASSESSMENT MATRIX					
Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L
E-Extremely High H-High M-Moderate L-Low					

Step 4: Implement controls and document your findings Implementation of controls can be one of the most challenging steps because it affects the workforce, who may be resistant.

Implementation of precautions and controls goes to the heart of good change management, especially education on the previous three steps. Don't neglect documentation, either, to demonstrate if controls and precautions are being successful and cost beneficial, and ultimately making the workplace safer.

Step 5: Supervise, review and update if necessary Few organizations stay the same. EMS is no exception—new procedures, new equipment and new staff all call for supervision,

review and updates to risk assessment and management.

As I finish this column, a final thought occurs to me: Dave Richter doesn't manage risk from his desk in the hangar. He is in the trenches, using his senses, knowledge and risk management toolbox to minimize risk in a high-risk prehospital environment. So get out, walk about, *obsessively and compulsively* find the hazards, assess the risk and control it. **BP**

— Michael Greene, R.N., MBA, MSHA

Part 6: Safety Assurance: The Third Pillar of a Safety Management System

Have you given blood recently? You should, if just to visit a blood bank as part of your safety management system (SMS) program development. There you'll find a shining example of processes that demonstrate all the elements of the third pillar of an SMS, assurance.

Blood banks practice meticulous and comprehensive data collection, analysis, assessment and review to ensure blood-product safety goals are achieved. And if you've gotten blood recently, you can be assured that the blood you received is safe. Just like in EMS, lives are at stake, and an error can have disastrous—if not fatal—consequences, so blood banks take assurance seriously.

To build the third pillar of your SMS, safety assurance, the organization must incorporate regular data collection, analysis, assessment and management review to ensure that safety goals are achieved. This pillar comprises three elements:

- Safety performance management
- Change management
- Continual improvement

The time-tested management adage, you can't manage what you don't measure, applies to the base of the pillar. Under the second pillar, hazards are identified using the MEEPS acronym (materials, equipment, environment, people, systems), then precautions and controls are implemented. In this phase of an SMS, those hazard and control measures are going to be quantified and gauged to provide assurance that safety is being achieved.

Safety performance management consists of monitoring, audits, investigations, root cause analysis, employee reporting, data analysis, and preventive and corrective actions. While each of these elements could consume an entire issue of *Best Practices*, two deserve special emphasis here: monitoring and employee reporting.

Monitoring and employee reporting

Monitoring of your SMS requires a commitment on the part of leadership and staff that safety is first and foremost. It implies metrics; documentation; analysis; and regular, timely reporting. Monitoring requires transparency and constant communication on who, why, how, when, where and what is being monitored; a closed-loop process; and “top-of-mind awareness.” This level of monitoring, feedback and communication provides an answer to the question, *How do you know you are safe?* and the metrics to support the statement.

Employee reporting is absolutely critical to the success of an SMS. Remember the “Iceberg of Ignorance,” in which 100 percent of problems are known to the rank and file, yet only 4 percent to top management? Leadership must create a process for event or near-miss reporting to capture the 96 percent of the iceberg under the water.

I learned a painful yet profound lesson about employee reporting in the days and months that followed the tragedy that I opened this series with—a fatal helicopter crash at my service. Staff on the front line had experienced and talked among themselves about the tendency of the pilot to operate the aircraft differently than his peers. Behind the scene, leadership had been working on the aviator's performance through feedback, training and regular auditing. Yet while leadership had a limited set of eyes on the performance, the staff continued to experience and discuss the behavior that may have contributed to this accident.

Leadership failed to “connect the dots” because we had not created a safe, timely and dynamic process or culture for employee reporting. Mind you, we had paper incident reporting and safety reviews, but the system was perceived as a “tattle-tale” practice with potentially punitive outcomes. This example takes us back to the point that an SMS must be built on a strong foundation of a safe and just culture. I encourage both an internal, non-punitive reporting system, as well as participation in state or national event reporting.

Internal and national event reporting

An internal reporting system serves multiple functions. It allows errors to become the design for system protections, it may provide an early warning of potential issues, and it gives

leadership and safety managers the opportunity to connect the dots. It's important to encourage and capture positive events as well, because you may discover a best practice applicable to the entire organization. For example, not so long ago, one staff member reported "the fastest turnaround time ever during a transfer!" because the communications specialist had requested a fax cover sheet and medical record when the call was requested. Safety issue, no—best practice, you bet! We captured and spread this best practice throughout the organization because we encouraged event reporting of the good, along with the bad and ugly.

State and national EMS event reporting systems have been designed around the process, and success, of NASA's Aviation Safety Reporting System (ASRS). Founded in 1976, the ASRS was designed primarily to support the Federal Aviation Administration in its mission to eliminate unsafe conditions and prevent avoidable accidents in the national aviation system. The ASRS model has been emulated worldwide inside and outside aviation. In maritime, rail and highway transportation industries, as well as the Veterans Health Administration, safety reporting systems have been developed and implemented.

The EMS Voluntary Event Notification Tool (EVENT) is an anonymous, non-punitive and confidential system that has been developed to help improve the quality and reliability of care provided to patients by EMS personnel. Like ASRS in the aviation industry, the goal of EVENT is to improve the systems and processes of emergency medical care by identifying situations where a patient was potentially harmed, could possibly be harmed or when a close call occurred. Primarily designed to improve patient safety, the model allows the EMS industry to learn from our collective mistakes, errors and near misses.

Management of change

Solid change management processes ensure the system adapts to change while ensuring that the safety, health and environmental risks are controlled. Management of change is a structured approach to transitioning individuals, teams and organizations from a current state to a desired future state. It is an organizational process aimed at empowering employees to accept and embrace changes in their current business environment. A simplified model for change management is illustrated at right.

Without sounding cliché, change happens, and often, so it is imperative that as leaders we manage and welcome it. I can

Remember the "Iceberg of Ignorance," in which 100 percent of problems are known to the rank and file, yet only 4 percent to top management? Leadership must create a process for event or near-miss reporting to capture the 96 percent of the iceberg under the water.

Phases of a Change Management Cycle



think of no better statement on change than said by the character Haw in Spencer Johnson's fabulous book, *Who Moved My Cheese?* Haw's "handwriting on the wall" said, "Be ready to change quickly *and enjoy it again and again*—they keep moving the cheese."

Continuous improvement

The final element under the third pillar of SMS is continuous improvement (CI). CI is an ongoing effort to improve products, services or processes. Among the most widely used tools for CI is a four-step quality model—the plan-do-check-act cycle, also known as the Deming Cycle or Shewhart Cycle. Other widely used methods of continuous improvement are Six Sigma, Lean and Total Quality Management.

CI also goes by the name *Kaizen*. This method became famous in the book *Kaizen: The Key to Japan's Competitive Success* by Masaaki Imai. Key features of Kaizen that I find advantageous in an SMS are:

- Improvements are based on small, rather than radical, changes.
- The ideas come from the talents of the existing front-line workforce.
- Small improvements are less likely to require a major capital investment.
- Employees are continually seeking ways to improve performance.

This method also encourages staff to take ownership and can help reinforce teamwork, thereby improving employee motivation.

All said, it doesn't matter which method of CI you prefer, only that your SMS is continually improved!

Yes, you'll find all this at your local blood bank; in fact, you'll find a great treasure trove of resources on safety assurance from clinical lab associations and accrediting bodies.

With gratitude to St. Mary's Hospital & Regional Medical Center's Blood Donor Center in Grand Junction, Colo.

— Michael Greene, R.N., MBA, MSHA

Part 7: Safety Promotion (and, yes, storytelling)

The fourth pillar of a safety management system

The author Barry Lopez said, “The storyteller is the person who creates the atmosphere in which wisdom reveals itself.” I couldn’t agree more, and when working at a helicopter EMS service, I would tell a story—several stories, in fact—at every new employee orientation. During the first hour, the first day of every staff member’s employment, I promoted safety and set the tone for the organization’s culture. I told stories of the successes, challenges and mistakes that team members made—that I made—and how the organization learned from those mistakes. Here’s one of the stories I liked to tell:

Jules was a tenured member of the team who took a break from EMS to earn a master’s degree and try a stint in leadership. She was a great student, leader and manager, but even the banker’s hours, higher pay and 12-step program couldn’t cure her EMS addiction.

When she returned to EMS, she received an abbreviated orientation and field training because, as the field training officers explained, “She was our preceptor when we started and she taught us. What can we teach her?!” Jules was respected as kind and compassionate and an extremely safe team member.

Fresh out of re-orientation, she ran a call on a motor vehicle accident where she and her partner, “Iron Man,” transported a critical trauma by air to the regional trauma center. While conducting a “hot” offload with the helicopter still running, the locking mechanism on the stretcher jammed, resisting the combined efforts of Jules, Iron Man and the pilot to get the patient out of the helicopter. In an effort to release the stretcher, Jules climbed into the cockpit of the idling aircraft and inadvertently rolled the throttle, causing a momentary “run up” of the engine. The pilot calmly reached across the patient and returned the throttle to idle while Jules, wide-eyed and red-faced, exited the aircraft.

Within hours of this incident I heard stories of the aircraft leaping up into the air with Iron Man clinging to his life holding one skid, the pilot frozen in disbelief, as the helicopter spun overhead, out of control, the trauma surgeon armless and the aircraft crashing to the ground à la an episode of the TV show “ER.”

I pause here in the story to ask, “What do you think happened with Jules after the incident was reported to leadership?” “Fired” is the most common answer I received, but that wasn’t the outcome of this error, nor was it a case of “blame-shame-retrain.”

I go on to ask, “Who reported this incident?” and then tell the orientees that Jules did, adding that I didn’t have to fire

her because she immediately offered her resignation—though (pausing for effect in my story) I refused to take it. Yes, I tell them, she did get the rest of the day off, and there was a comprehensive investigation with processes and procedures instituted to prevent future occurrences, but what she did, anyone else could have done. Terminating her would have done more damage to our carefully cultivated safety culture than the damage that occurred when the embellished stories of Jules “piloting” circulated among her peers.

The basics of safety promotion

The International Helicopter Safety Team’s safety management system (SMS) toolkit lists the following methods of promoting safety:

- Publish a statement of management’s commitment to the SMS.
- Management should demonstrate their commitment to SMS by example.
- Communicate the output of the SMS to all employees.
- Provide training for personnel commensurate with their level of responsibility.
- Define competency requirements for individuals in key positions.
- Document, review and update training requirements.
- Share “lessons learned” that promote improvement of the SMS. (This is where effective storytelling comes in.)
- Have a safety feedback system with appropriate levels of confidentiality that promotes participation by all personnel in the identification of hazards.
- Implement a “just culture” process, as first championed by David Marx, that ensures fairness and open reporting in dealing with human error.

The first and possibly most important step in promoting a safe culture is the establishment of justice. In other words, you want to establish a just culture that includes a system of shared accountability in which the organization is responsible for safe system and process design, and employees are responsible for safe choices and behaviors. This shifts an organization away from a “blame” culture. Why? Because to design safety, the organization needs feedback from users (employees). To give feedback, employees need trust. An organization can establish this trust through a consistent and fair approach to managing employee behaviors.

Let’s admit it, we’ve all made mistakes in EMS: drug errors, failing to remove a shore power cord, mislabeling something—simple human errors, even when trying to do our best. Not only do humans make mistakes, but we drift away from safe behaviors. I liken drift to practical joking (or worse, hazing) between individuals where as the jokes go on, perceptions of risk fade, each tries to “one-up” the other and then, as Mom said, someone gets hurt. A strong safety culture will anticipate and catch human error and drift, then design systems, processes and barriers to prevent them. Occasionally individuals place self-interest before others where they knowingly create

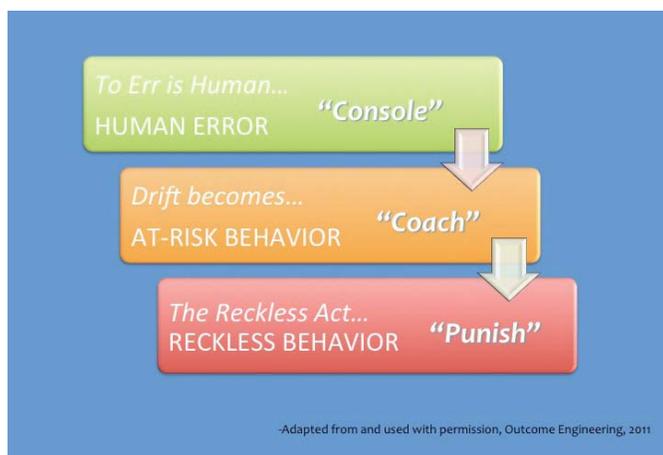
an unsafe situation. Reckless behavior, unlike the first two, is addressed with a strong remedial or punitive response.

Assume, for the sake of argument, your organization has designed the perfect system and process for safety. Beyond safe choices, employees, staff, the “humans in the system can be expected to exhibit the three behaviors listed above; human error, at-risk (drift) or reckless behavior. Outcome Engineering of Plato, Texas defines these three behaviors as follows:

- Human Error: an inadvertent action; inadvertently doing other than what should have been done; slip, lapse, mistake. Product of current system design and behavioral choices
- At-Risk Behavior: a behavioral choice that increases risk where risk is not recognized, or is mistakenly believed to be justified. A choice, risk believed insignificant or justified
- Reckless Behavior: a behavioral choice to consciously disregard a substantial and unjustifiable risk.

Your response as the leader depends on your analysis of the behavior, and the “prescribed or suggested” just culture response. A simple design for “justice” is illustrated below.

Establishment of a Just Culture



The benefit of this approach to managing behavior is that the process is up-front and transparent to the staff, which helps to achieve trust. Risks become identified, reckless behavior isn’t tolerated, and ultimately the organization is safer. The

To design safety, the organization needs feedback from users (employees). To give feedback, employees need trust.

implementation of a safe and just culture in aviation has been credited with a significant decline in aviation accidents, incidents and deaths over the past 30 years. In practical terms, today you are three times more likely to be involved in a motor vehicle crash, and 1,000 times more likely to be involved in a medical error, than in an aviation-related incident due in part to this cultural shift.

Another best practice in safety promotion is to involve employees’ families and/or significant others in the safety program. Police, fire and EMS agencies have recognized the importance and upside to promoting safety through formal and informal demonstrations or presentations on the SMS.

I recently learned of a law enforcement agency that presented an eight-hour course on stress recognition and management to family members of new police recruits during the academy and field training period as part of its safety promotion plan. I’ve had family members attend emergency vehicle operations training alongside staff. There is a profound (albeit unquantifiable) effect on a staff member’s driving after being strapped in the patient stretcher during a run around the obstacle course in an ambulance operated by one’s spouse or teenaged driver!

So what happened to Jules? Well, Jules, Iron Man and the pilot took this incident with the seriousness and attention it deserved, standing in front of their peers to explain the incident and new safety measures, thus stifling conjecture or rumors. Jules suffered the kidding, ribbing and joking with grace while promoting safety with a vengeance. In the end she received greater respect for her humility, transparency and humor than she may have received under a less just and trusting approach. I still chuckle at the memory of the program’s aviators having her stand up at a staff meeting to present her with a Photoshopped pilot’s license with big red letters spelling “REVOKED.”

So what are your stories? Use them to create the atmosphere and wisdom for safety promotion in your organization! 

— Michael Greene, R.N., MBA, MSHA

Part 8: Safety Management Systems: Leadership and Commitment Above All

An effective and successful safety management system (SMS)

requires leadership, plain and simple. To quote the Institute for Healthcare Improvement’s Guide to Patient Safety, “Leadership is the critical element in a successful patient safety program and is non-delegable.”

As we’ve discussed, leadership is the roof in the organizational house of SMS, held up by the four pillars—policy, assurance, risk management and promotion—built on a strong foundation of safety culture. To continue the metaphor, the

roof—leadership—shields, protects and insulates all that lays inside. As part of this, the leadership has two primary roles: design safe systems and manage employee behaviors.

Drawing on a field study of eight hospitals, researchers at Stanford University and the University of Pennsylvania have found that strong safety leadership requires six actions:

1. Setting and communicating a clear, compelling safety vision
2. Valuing and empowering personnel
3. Engaging actively in the effort to improve patient safety
4. Leading by example
5. Focusing on system issues
6. Continually searching for improvement opportunities

Data from this same study suggest that substantial variation in these key safety behaviors exists among senior hospital leaders. Let us—you—in EMS leadership change that! But how?

Developing a vision of the future

A leader must develop a vision of the future to serve as the guide for current activity, as well as a strategy to achieve that vision. The vision should not be a solitary or individual perspective, but a broad organizational visualization conceived by many. (The greater the participation, the broader the buy-in.)

When developing this vision, keep in mind that successful visioning, alignment and commitment require good communication, facilitation and coalition building—and that inspiration, motivation and enthusiasm are key to successful implementation. In fact, according to a 2008 study, inspirational motivation by the health care leader is a primary predictor of job satisfaction, organizational commitment and workplace empowerment. Top-of-mind awareness can be achieved by daily safety topics, safety items leading meeting agendas and timely feedback on safety issues.

Leadership fosters and nurtures the growth and development of a safety culture. According to Kilmann, Sexton and Serpa, culture is the invisible force behind any organization, a social energy that moves people to act. Soon the culture is embedded within the organization and may be difficult to recognize, as it becomes deeply ingrained in everyday routines. As my co-author and noted safety expert Daniel Patterson and others have said, a strong safety culture is exemplified by what people do when no one is watching.

As has been widely reported, three leadership processes support the creation of a safety culture in a high reliability organization: migrated distributed decision making (MDDM), management by exception (MBE) or negotiation, and fostering a sense of the big picture. MDDM gives local control of decision-making, the point where the event is occurring. MBE allows for the quick identification of a problem—and solution—and an environment where senior leadership doesn't have to make all decisions while providing checks and balances. The big picture helps the staff make decisions in context of the whole organization, not just the individual department or

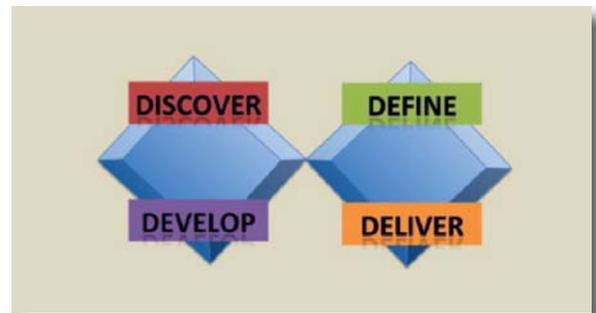
team.

Leadership and safety culture have additional benefits to the organization. The following characteristics have been identified in high reliability organizations:

- People are helpful to, and supportive of, one another.
- People trust one another.
- People have friendly, open relationships emphasizing credibility and attentiveness.
- The work environment is resilient and emphasizes creativity and goal achievement, providing strong feelings of credibility and personal trust.

Approximately 80 percent of medical errors are system-derived, so good people simply working harder will be insufficient to overcome the high complexity inherent in EMS. Errors will occur; the key is to design systems so that harm does not reach the patient. James Conway, former executive vice president and chief operating officer of the Dana-Farber Cancer Institute, has said, “Our systems are too complex to expect merely extraordinary people to perform perfectly 100 percent of the time. We as leaders have a responsibility to put in place systems to support safe practice.” So add a healthy dose of system evaluation and design skills to your leadership toolbox.

I highly recommend the “double diamond” model developed at the Design Council as a simple, graphic way of describing a design process.



While not directly developed for safe system design, it offers a simple yet effective approach. Divided into four distinct phases—discover, define, develop and deliver—it maps the divergent and convergent stages of the design process, showing the different modes of thinking that designers use. Thinking as a system designer, use the following steps developed by the Design Council (adaptations for our market are in italics).

Discover The first quarter of the double diamond model marks the start of the project. This begins with an initial idea or inspiration, often sourced from a discovery phase in which user (*safety*) needs are identified. These include: market-user research (*risk assessment*), information management (*documentation*) and design research groups (*empowered workforce*).

Define The second quarter represents the definition stage,

in which interpretation and alignment of these needs to business objectives are achieved (*risk analysis*). Key activities during this stage are project development, project (*risk*) management and project sign-off.

Develop The third quarter marks a period of development in which design-led solutions are developed, iterated and tested within the company. Key activities and objectives during this stage are multi-disciplinary working groups, visual (*Walk-Rounds*) management, development methods and testing.

Deliver The final quarter represents the delivery stage, in which the resulting product or service is finalized and launched in the relevant market. The key activities and objectives during this stage are final testing, approval and launch, targets, evaluation and feedback loops (*continually searching for improvement opportunities*).

It all sounds like safety management leadership to me. So lead on!

— Michael Greene, R.N., MBA, MSHA

Part 9: Striving for Excellence in Patient Safety

“If you want to achieve excellence, you can get there today. As of this second, quit doing less-than-excellent work.”

I think the noted businessman Thomas J. Watson Sr. was dreaming when he made this proclamation, at least where health care workers are concerned. Alas, while a noble goal, it is easier said than done.

Over the past several months, my colleagues and I have been guiding you through the steps necessary to making your organization excellent. We’ve never suggested that you should have a perfect safety record, only that you strive for safety excellence. This is an important distinction, because perfection is not always a realistic goal.

Human involvement precludes the perfect delivery of services, be it in health care, aviation or widget manufacturing. This fact is rarely acknowledged by those whose job it is to help (and sometimes save) others. Faulty widgets can be replaced, but life and limb? Nope. When a patient dies in our hands—*or by our hands*—the result can be devastating. That’s why patient safety deserves special consideration in EMS: When things go wrong, the patient suffers. And since no one enters the EMS profession to hurt someone, the provider suffers, too.

Even in a just culture, where providers feel comfortable bringing forward their mistakes without fear of retribution, admitting that they did a disservice to a patient is a tough pill to swallow.

5 steps to reducing patient safety threats

EMS providers are a proud bunch, and admitting mistakes doesn’t come easily. If they fear discipline, they are unlikely to report errors for fear of decertification, termination or medical director chart reviews. Even in a just culture, where they feel comfortable bringing forward their mistakes without fear of retribution, admitting that they did a disservice to a patient is a tough pill to swallow. In an environment where providers work in mostly unsupervised field settings, most patient safety problems stay in the dark.

But here’s where it gets tricky: EMS providers may not even recognize serious patient safety threats. When I say “patient safety threat,” what comes to mind? Giving the wrong medication? Overdosing a patient? Messing up your joule calculation for a pediatric cardiac arrest? Dropping a stair chair? Yep, all of these can affect patient safety. However, the most problematic patient safety threats may not even be recognized.

According to a recent article by Linda Atack and Janet Maher, decision-making and clinical judgment are the top issues facing EMS providers and their patients. Faced with years of scope creep, where new drugs and devices have been added to provider scope with minimal schooling in the foundations of medicine, providers may not be well equipped to make accurate differential diagnoses. This could lead to an inaccurate impression of the patient’s condition and result in poor treatment decisions.

Addressing these gaps in knowledge may not be as daunting a task as it seems. But first, we as an industry need to better understand the health problems of those who call us, so we can best understand how to safely treat them. This requires a level of study that has not been considered for most of our patients but is of the utmost importance. After all, only 10 percent of our patients receive a medication and even fewer receive complex interventions, but 100 percent of them receive a “diagnosis.” (I know we can’t call it that, but our patient impression guides our treatment choices, destination selection and “sign off tolerance.”)

But don’t despair! While much of patient safety is in the dark, there are steps you can take *today* to reduce the risk of

someone getting sicker by calling 911.

1. Brush up on patient safety. This is a relatively new concept in medicine and a very new concept to EMS. A link to a nice summary report can be found at www.patientsafetyinstitute.ca.
2. Allow your staff to anonymously report adverse events that affected a patient's care, as well as near-misses that could have led to poor outcomes. A simple online survey tool can be used, asking, "What happened?" and "How can we as an organization prevent others from doing the same thing?"
3. Encourage reporting. Front-line staff need to know that a blame-and-shame culture has no place in your organization. Even more important, your middle management—the supervisors who interact with your staff out on the street—need to get on board. Be forewarned: They may be resistant and express concern about collective agreement red tape, applying support consistently or dealing with "bad apples." They may also be deep-rooted in past

practices of punishment.

4. Praise those who come forward. It takes remarkable courage to admit error, especially in the EMS environment. Highlight staff who come forward as being exceptional, professional, brave and caring.
5. Close the loop. When people make errors and admit to them, the best reward they can receive is to know that lessons have been learned from their mistakes. Highlight system improvements based on the information learned from adverse events or near-misses. This will positively reinforce the behavior and encourage more reporting.

Remembering that our providers are human and will make mistakes is only half of the equation; considering their feelings when harm has been brought to a person they intended to help is the other half. As you move forward in improving your EMS system, place the patient on a pedestal. After all, they are the reason we aim for excellence when we show up to work each and every morning (and seven nights a month). 

— Blair L. Bigham, ACP, MS, EMT-P

Part 10: The SMS and Gap Analysis: Let the Journey Begin

Alice: I was just wondering if you could help me find my way.

Cheshire Cat: Well, that depends on where you want to get to.

Alice: Oh, it really doesn't matter, as long as ...

Cheshire Cat: Then it really doesn't matter which way you go.

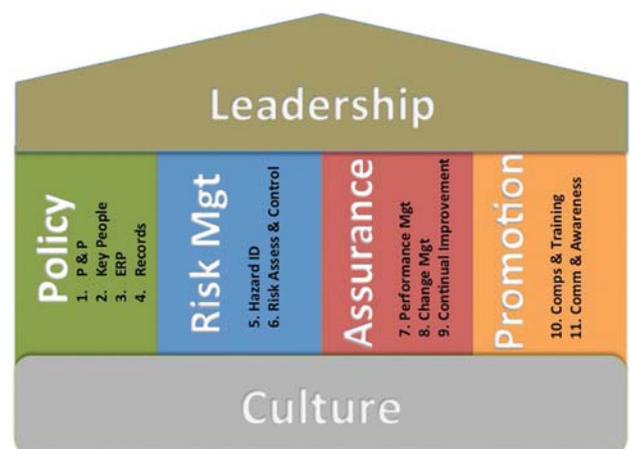
Safety Leader: If only for a simple map and compass ...

When it comes to designing a safety management system (SMS), it matters where you are going and where you want to get to. One way to help you figure that out is to use gap analysis, which is a tool that helps organizations compare actual performance with potential performance. At its core are two questions: *Where are we* (current state)? and *Where do we want to be* (future state)?

Over the past several months, my co-authors and I have described the concept and elements of an SMS. We have laid the groundwork, presented compelling arguments, told stories and given personal examples—all to inspire you toward the ultimate goal of having a safe high reliability organization (HRO). Now, through gap analysis, you'll discover the starting point—the current state of your organization—en route to building your SMS.

Using a map and compass analogy, we are going to use the four pillars, the roof, the foundation and the 11 elements to "triangulate" your organization's current state. The gap analysis will fall under six general headings: leadership, culture, policy, risk management, assurance and promotion. The standards under each category are essentially the 11 elements in greater detail, as we've discussed in previous issues.

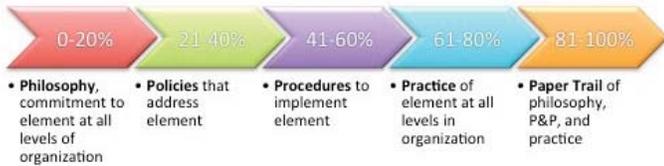
Triangulate Your Current State



Of course, we'll need a tool for measurement and a scale to measure the distance—and progress—toward the goal. Our recommended scale draws on the "Five P" model that we've talked about earlier and is based on a percentage scale of 0

to 100. Using this scale, you and your project team will grade your organization on each SMS element. Let's say you have an emergency response plan (element 3 under the Policy pillar) but you lack key paperwork of the plan in practice—so you might score your organization at 81 percent compliance with that element. Or maybe you feel your competencies and training on SMS (element 10 under Promotion) are top-notch—so you score yourself 100 percent.

The Five P Model



Next we take these components and build a spreadsheet where we'll document the gap analysis. I prefer an electronic document, but pencil and paper will suffice. The figure on page 9 illustrates the layout of the working document: five columns, starting with the standard or element. Next is a rating of where the organization stands against the standard (using the percentage scale). The third column is designed for comments and notations about existing policies and procedures, or items needed to meet the standard (to be built into an action plan). The fourth column should list the manager/leader who is responsible and accountable for this element (the "go to" for documentation). Finally, the fifth column is where the due date or timeline for needed items is noted.

I don't want to go on a rant here, but the last two columns are vital to the success of your SMS development and implementation. Individuals must be responsible and accountable for the standard, even if it's 100 percent complete. Accountability ensures that the mind, eyes, hands and heart are on the policy, procedure or process ... because, after all, it's all about ownership and commitment. But let's not forget about the importance of deadlines. We all need them, as they provide motivation and boundaries and ensure progress toward a goal.

The next step is the actual analysis. A team approach to this step will promote buy-in to your fledgling SMS, create an organizational commitment and reduce potential fear of the process, so name a project team. Remind the team that gap analysis does not mean looking for individuals at fault or creating blame. Rather, it is a means of strengthening the organization by examining systemic factors in its current state and building a better, safer future. I also emphasize that this analysis is more than likely to discover and highlight

best practices within the organization, as well as gaps.

Here are some additional guidelines related to your gap analysis team:

1. Select champions and skeptics alike to participate on the team. Both bring value to the process, balance to the analysis and different perspectives on the current state.
2. Use the rating scale and definitions to objectify and de-personalize the scoring.
3. Some gaps may be identified as underlying structural issues that need to be addressed. Root cause analysis may be employed to determine key factors for improvement.
4. Gaps call for action plans, but remind the team not to get bogged down in problem-solving or implementing solutions during this phase. Implementation of an SMS is admittedly a fluid process, but it is critical to have a clear snapshot of the current state of the organization to plot a path to the goal.
5. Keep the gap analysis timeline tight to maintain team enthusiasm and motivation.

With a clear picture of the organization's present location, now is the time to chart a route to the future and begin to close those gaps. Equipped with a map, starting point (current state), ending point (future state) and compass (HRO), the project team should be reassembled to develop the SMS action plan. Using the document produced for the gap analysis, any standard or element falling below 100 percent is introduced to the project team for deliberation, development and agreement on actionable steps. All tasks are assigned, timelines established, and marching orders issued!

Now for a reality check. You may be asking yourself, *Who's going to pay for all this?* Honestly, cost always comes up because there is inevitably some thing, equipment or software that the project team views as the silver bullet. The easy answer is that the organization may need to provide capital funds for needed improvements; the not-so-easy answer is that it truly is a cost-benefit question for you and your organization. But before I preach about safety at any cost, let me propose that no

Layout of the Working Document

SMS Gap Analysis and Project Plan	% Complete (scale below)	If YES, list policy or describe practice, If NO, description of required changes, Include a vision or wish list item for future (current state, required, future)	Manager	Due Date
-----------------------------------	--------------------------	---	---------	----------

SMS Pillar: POLICY				
1. Safety Policy				
Is there a safety policy in place?				
Do safety policies represent and codify organizational safety philosophy?				
Are safety policies translated into actionable safety procedures?				
Is the safety policy approved by the Accountable Executive?				
Has the organization based its safety management system on the safety policy?				
Does the safety policy state the organization's intentions, management principles and commitment to continuous improvement in the safety level?				
Is the safety policy reviewed periodically (annually at a minimum)?				

single issue should deter you from the goal. There are countless ways to “skin the (Cheshire) cat.” A fully integrated, satellite-based, automated, live incident reporting system may be nice, but a simple paper process may suffice. Don’t let simplicity deter you from a fully functional, albeit low-tech, solution if it meets the goal.

One final note: Celebrate your success. Nothing keeps motivation, enthusiasm and inspiration higher than a good celebration. Throw a Mad Hatter party, play “pin the tail on the cat” or read a chapter from a children’s book.

— Michael Greene, R.N., MBA, MSHA

Want More Info?

Details on gap analysis tools used in other industries can be found at the following websites:

- atcvantage.com/resources-tools.html
- fema.gov/pdf/plan/prevent/floodplain/fema_cap_ssse_program_gap_methodology.pdf
- gapanalysis.usgs.gov

Part 11: Safety Management Systems: On Teamwork and Conflict

As Daniel Patterson likes to say, “Bad teamwork equals bad outcomes.” His statement is backed by research in aviation and other high-risk industries that depend on teammates working well together. But what does teamwork have to do with a safety management system (SMS)? Remember that the goal of SMS development is high reliability, in which organizations operate in environments where the consequences of errors are high yet the high reliability organization (HRO) achieves a low error rate.

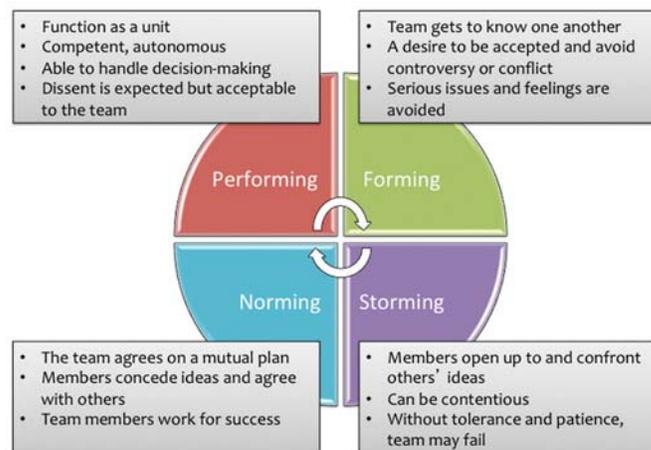
Researchers and leading teamwork authorities Eduardo Salas, Ph.D., David Baker, Ph.D., and Rachel Day, Ph.D., argue that “Teamwork is an essential component of achieving high reliability, particularly in health care organizations.” In fact, the teamwork-outcome association, be it good or bad, is well documented in health care literature, quality assurance processes and, unfortunately, litigation.

Consider findings from a simulation study led by NASA in 1986 on flight crew familiarity among new and unfamiliar aviation crews:

- More errors
- Less speaking up
- More social chatter, less work-related communication

Also consider a report from the National Transportation Safety Board that investigated commercial aviation accidents from 1978 to 1990. Findings show that in 11 of the 15 accidents for which data were available (73 percent), the accident occurred on the crew’s *first day* flying together; and in seven of 16 accidents (44 percent), the accident was the crew’s *first flight*

Tuckman’s Team Cycle Model



together. First flight or first day, the percentage of accidents is greater than would be expected.

“Teamwork takes time,” Patterson says. “Just look at the widely known Team Cycle Model proposed by Bruce Tuckman in 1965.” As the model at right demonstrates, teams go through a series of phases: forming, storming, norming and performing. Patterson emphasizes that while not all types of teams go through each phase in a linear fashion, most (if not all) are a necessary and inevitable part of team development. Still unclear is the time frame—in hours, days or weeks—for a team to progress to the performing stage of the team cycle.

But where is the research on teamwork in emergency medical services? In one study of EMT partner familiarity, Patterson and his colleagues at the Emergency Medical Services Agency Research Network (EMSARN) found that within a study group of three agencies and 182 EMTs, the average EMT worked with 19 different partners annually. Some worked with more than 50 partners during a 12-month period! That’s a lot of partnerships and a lot of teamwork to develop. Given the

expansive research from the aviation and health care industries, first day together/first run together may raise the risk for poor patient outcomes and safety.

The seven C's of teamwork

According to Eduardo Salas, the key components of teamwork can be characterized as the “Seven C’s.” (For more on this, listen to the EMSARN podcast at emsarn.org.)

- 1. Communication** The information protocols that team members use to complete the task. This includes frequency and accuracy of communication. This “C” can be developed through the use of structured communication such as SBAR (situation-background-assessment-recommendation) or protocols on “read-back” of critical communications.
- 2. Coordination** A behavioral strategy or mechanism to execute a task. It includes back-up behavior and situation monitoring.
- 3. Cooperation** The motivational aspect of teamwork in which a team member seeks input from other team members and enjoys the team.
- 4. Cognition** The understanding and knowledge of the mission, task and equipment.
- 5. Conflict** According to Salas, all teams have conflict—and some conflict is good. Conflict around the mission or task, not between individuals, may enhance teamwork.
- 6. Conditions** Asserted and supported by the organization that values teamwork.
- 7. Coaching** Effective team leaders coach teamwork through education and, most important, by their actions. According to Karl Weick and Kathleen Sutcliffe, authors of *Managing the Unexpected*, a key concept in coaching teamwork is deference to expertise rather than experts. They emphasize that expertise is relational and that knowledge,

Be on the lookout for a manuscript authored by Daniel Patterson and Eduardo Salas titled “Measuring teamwork and conflict among emergency medical technician personnel.” It will appear in the January 2012 issue of *Prehospital Emergency Care* and provides the first-ever EMS-tested tool for evaluating teamwork among EMS personnel.

experience, learning and intuition is seldom embodied by a single individual. They write: “Expertise resides in the heed with which people view their inputs as contributions rather than as solidary acts, represent the system within which their contributions and those of others interlock to produce outcomes, and subordinate their contributions to the well-being of the system, constantly mindful of what that system needs to remain productive and resilient.” The lesson here: A great coach defers to the expertise in his or her team.

Salas emphasizes that in stressful emergency situations, three of the teamwork C’s matter the most: conditions, communication and coordination. Teamwork must be the organization’s goal and practiced by the individual team members. The team must have timely, clear and concise communication followed by the elements of coordination (i.e., situation monitoring and back-up behavior). He concludes that the most frequent disrupters or derailers of teamwork that are readily controlled by the organization are culture and mutual trust, reiterating that the conditions for teamwork must be established, coached and supported for teamwork to be successful.

So who has your organization’s back—and, ultimately, the employee’s and patient’s back? The answer is clear: *You do*. Through teamwork, safety and the tools we have provided, you can achieve a high reliability organization. 

— Michael Greene, R.N., MBA, MSHA, and Daniel Patterson, Ph.D., EMT-B

Part 12: Safety Management Systems: The Value of a Life

In 1997, I learned a new concept: the statistical value of a life. From the first column in this series, you’ll recall that on Dec. 14, 1997, I also learned the heartbreak and pain of three lives tragically lost in the line of duty.

Very soon after this tragedy, I discovered that insurance settlers and workers’ compensation folks looked at the loss of life in very analytical, actuarial terms: the value of a statistical life (VSL). At one point, the term VSL was actually uttered to a

family member in the course of settling the loss of a loved one’s life. When the family member shared this with me, I was devastated, angry and speechless. How insensitive to treat a life, a lost life, a hero’s death as a formula, an exchange of monetary value to be quantified and “paid off.”

Since that time, I’ve learned the true meaning of VSL, developed by W. Kip Viscusi, a professor of economics at Vanderbilt University, but I have never accepted that a life, any life, is less than priceless. Like many of you, I’ve spent my life fighting death on behalf of fellow humankind, people who were total strangers prior to a 911 call.

Daniel Patterson, Blair Bigham and I have spent the past 12 months collaborating and sometimes conspiring for a change in the EMS approach to patient, caregiver and, yes, *culture* of safety. We have presented our evidence-based arguments,

shared new assessment techniques, demonstrated examples of industry safety leaders, and provided a simple template for your organizations to design and implement a safety management system (SMS). We now offer one final argument for engineering SMS into EMS.

The value of a life

Economists use the concept of VSL to look at the risks people are willing to take and how much they must be paid to take them. These studies, known as “revealed preferences studies,” look at a person’s actual choices in risk-taking from an economic perspective. A common source of such choices is the labor market, where jobs with a higher risk of death correlate with higher wages. For example, a company must pay lumberjacks an additional \$1,000 a year to perform work that generally kills one in 1,000 workers. It follows that most Americans would forgo \$1,000 a year to avoid that risk—and that 1,000 Americans will collectively forgo \$1 million to avoid the same risk entirely. That number is said to be the “statistical value of life.”

Another method used to estimate the VSL is to ask people how much they are willing to pay for a reduction in the likelihood of dying.

So what is the value of a statistical life? \$5 million? \$7 million? According to Viscusi, it’s \$8.7 million—the full range of figures used by the federal government in deciding which safety measures provide the greatest benefit. Feeling uncomfortable about this discussion yet?

“The reality is that politics frequently trumps economics,” said Robert Hahn, a leading scholar of the American regulatory process. Depending on the branch of government and the issue being decided, the VSL varies by \$2 million to \$3 million and some change. But Hahn said that putting a price tag on life still is worthwhile to help politicians choose among priorities and to shape the details of their proposals. “Even small changes,” he said, “can save billions of dollars.”

So where am I going with this discussion? We’ve said that EMS is not risk-free. And all of us know that our industry isn’t a cash cow. Budgets are being cut, EMS agencies are closing, reimbursement is declining, and expenses are increasing. You may be looking at SMS development and thinking, *we can’t afford that.*

Safety management isn’t about how much you spend in dollars, it’s about how much you invest in safety leadership, culture and the commitment to high reliability.

OK, reality check here ... how much time, effort and cash have you invested in the SMS concept so far? The cost of your subscription, time spent reading and investigating the ideas we’ve offered—maybe you’ve even started to implement the SMS process at your organization. So far your SMS has cost nowhere near the millions of dollars of a VSL. Depending on the size of your organization, you’ll likely spend just hundreds. What are you willing to pay for a reduction in the likelihood of losing a crew member or patient in an accident? Safety management isn’t about how much you spend in dollars, it’s about how much you invest in safety leadership, culture and the commitment to high reliability. Said simply, spend a little on SMS, save millions on VSL! Even small changes can save a life. It’s about the people—and that, after all, is the business we’re in.

To restate our point, consider, if you will, dialogue from characters in the Disney animation *Pocahontas*:

Grandmother Willow: There’s something I want to show you. Look. (*Dips a vine into the river, creating ripples.*)

Pocahontas: The ripples.

John: What about them?

Grandmother Willow: So small at first, then look how they grow. But someone has to start them.

Safety glasses, \$5; steel-toed work boots, \$100; turnout gear, \$500; computer aided dispatch, \$50,000; ambulance, \$100,000; salary expenses, \$500,000; everyone home safely, priceless.

Take a dip in SMS. The ripple starts with you. 

— Michael Greene, R.N., MBA, MSHA, Daniel Patterson, Ph.D., MPH, EMT-B, and Blair Bigham, ACP, MS, EMT-P