Emergency Management Principles and Practices for Health Care Systems, 2nd edition

Unit 4:
Emergency Management System Evaluation and Organizational Learning for Healthcare Systems

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Unit 4.

Emergency Management System Evaluation and Organizational Learning for Healthcare Systems

Unit Summary

This unit addresses the critical activities of system evaluation, both response and recovery performance (via exercises and incidents) and programmatic review via (evaluation of preparedness and mitigation efforts). Emphasis is placed on system improvement through "organizational learning" rather than relying upon the narrower "personnel learning" that occurs in standard "lessons learned" activities. This unit presents effective processes for planning and conducting exercises and other evaluation activities, capturing evaluation findings and effecting change in the healthcare system emergency management (EM) program and its component plans. Efficient methods for conducting "hot washes," more formal after-action report (AAR) meetings, and other evaluation methods are presented. A candidate method is proposed for processing and incorporating identified improvements into the emergency operations plan (EOP)and across the EM Program.

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Module 4.1

Module 4.1 Introduction and Overview: System Evaluation and Organizational Learning

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Lesson 4.1.1 Overview: System Evaluation and Organizational Learning

Lesson Objectives

- *Differentiate exercise from instructional activities.*
- *Define the major categories of exercises.*
- *List and describe the general methods for overall EM programmatic evaluation.*
- *Define the general purpose and methods of the after-action report process.*
- *Define the organizational learning purpose and process.*

Introduction

Success of an Emergency Management (EM) program requires effective implementation and management of an emergency response and recovery system, described by the Emergency Operations Plan (EOP) as presented in Module 1.5. As this emergency response and recovery system is implemented and evolves, careful attention is necessary to exercise the plans, evaluating system performance, and identify and implement appropriate change as necessary. An overview of these evaluation concepts and activities and how they interface is presented in the initial modules of this unit. The final module conveys an understanding of "organizational learning" for implementing lasting change. The various terms associated with program assessment, exercise and response performance evaluation, and organizational learning are precisely defined to clarify their purpose, relation to each other, and their application in emergency management. These definitions are highlighted in the "Terminology alert!" boxes throughout the unit lessons.

All healthcare system personnel should understand the importance and appropriate application of instructional strategies and techniques that contribute to their personal development and development as a team member in support of the EM program. Additionally, healthcare system personnel should understand the purpose, methods, and application of system and plan evaluation. Evaluation as described in this unit is not directed toward individuals, but is focused on the overarching goal of ***continually improving the EM program*** and its component plans for mitigation, preparedness, response and recovery. Contributing to program improvement is a shared responsibility that requires the active participation of all involved healthcare system personnel. Inherent in this participation is an understanding of the purpose and importance of the evaluation processes.

The activities of education, training, and instructional drills are collectively referred to as **instruction** and presented in Module 1.5. Exercise, on the other hand, provides primarily a method for **evaluating** emergency response and recovery systems, including the instructional initiatives, and identifying specific areas for improvement.

Response and recovery competencies provide the basis for instructing personnel in knowledge and skills required to maintain system operations during emergencies and disasters.

Competencies and capabilities in the healthcare system

Within a healthcare system, individual competencies and collective capabilities form the foundation for healthcare system operation during normal conditions. Specific competencies are also required to maintain system operations before, during and after times of emergencies and disasters. Emergency management related competencies are presented in detail in Lesson 1.5.6. As described in detail in that lesson, EM competencies should be carefully developed and applied during preparedness activities such as system development and personnel selection and instruction. They may then form a valuable, consistent basis to evaluate system and personnel performance and to improve the overall system in an ongoing, consistent, and permanent manner. Lesson 1.5.7 presents an extensive discussion of education, training, and instructional drills that promote the implementation of these competencies and capabilities.

Exercises

Exercise (see terminology textbox) has become increasingly recognized as a critical element of any emergency management program.

Terminology alert!

Exercise: A scripted, scenario-based activity designed to **evaluate** the system's capabilities and capacity to achieve overall and individual functional objectives and to demonstrate the competencies for relevant response and recovery positions. The purpose of exercise evaluation is to determine an objective, valid indication of future system performance under similar conditions, and to identify potential system improvements.

Although the term "exercise" is commonly used interchangeably with the term drill, exercises are in fact different in purpose and structure. Instructional drills primarily provide skills training as discussed in Lesson 1.5.7. Though an entity known as evaluative drills can be described (i.e., evaluating the performance of a series of skills), exercises are broader and conducted for the primary purpose of evaluating expansive processes and functions in the EOP and recovery planning. Accordingly, exercise objectives are established to reflect this purpose of system and plan evaluation.

Exercises provide a means of evaluating broader areas of the EOP and recovery planning.

- Scenarios as the basis of drills and exercises: Like drills, exercises are based upon a set scenario. However, drill scenarios are primarily used to prompt the performance of a relatively specific sequence of individual and team skills. Exercise scenarios are more interactive with the exercise players' responses, and prompt a wider range of possible actions. Exercise scenarios also tend to be more extensive, and involve multiple personnel, teams, and even organizations that must coordinate and work together in emergency response and recovery operations.

- Exercises build on a foundation of instruction and the existing system: It is essential to recognize that exercises build upon prior instructional activities and the existing system structure, description, policies, procedures, and resources. Some level of instruction and the refinement of skills (training) are a by-product, but are never the primary intent, of an exercise. **The primary value of exercises is system evaluation. Individuals and teams participating in the exercise should therefore already have the instructional foundation to accomplish their specific emergency operations functions in order to maximize the value of the experience. Similarly, accurate evaluation of the EOP through exercise can only be accomplished if the plans and system are clearly described and communicated, with exercise participants trained to a defined standard.** These evaluative activities can then provide the means of developing, reinforcing, and validating individual, team, and organizational competencies and capabilities.

Exercises build upon prior instructional activities and the system structure.

- Categories of exercises: There are three primary categories of exercises reflecting the complexity and presentation of the scenario, the level of participation by individuals and teams, and the range of functional areas involved. These categories are listed below and more fully described in Lesson 4.2.4:

  - Tabletop: A scenario-driven discussion of emergency response and recovery actions based upon elements of the EOP.

Different types of exercises allow for increasing levels of complexity and involvement.

- Functional: This is a scenario-based execution of specific tasks and/or complex activity within a functional area of the EOP. There is some level of simulation, particularly in the area of interaction with other functions and "outside" personnel and organizations. Realism for the exercised function is increased over tabletop exercises as time becomes a constraint for activities and decision making.

- Full-Scale: This is a scenario-based extension of a functional exercise to include multiple, if not all, functions and activities of the EOP.

The exercise category selected for a specific evaluation will depend upon the maturity of the EM program and the EOP, and other factors such as the results of previous evaluations, the turnover of personnel, changing organizational requirements, and new technologies. The scenario and scope of an exercise are then designed and developed to meet the exercise objectives.

Program evaluation: Exercise is one form of program evaluation, focusing upon the performance during the emergency response and recovery phases of a Comprehensive Emergency Management Program. Much broader program evaluation is necessary in effective program management. This is briefly presented in the next section and discussed in detail in Module 4.2.

EM Program Evaluation

Two primary reasons for program evaluation are commonly cited:

- Accountability: To determine if program activities and resource use contribute to the effective and efficient accomplishment of the organizational and program objectives.

The EM program evaluations should include examinations of continuity planning (resiliency) and maintenance of medical surge capacity and capability.

- Improvement or Enhancement: To determine the need for and means to accomplish and monitor organizational change that improves or enhances the ability to accomplish organizational and program objectives.

The EM program supports the organizational mission and the organization's strategic objectives related to emergencies and disasters. Evaluation of the overall EM program, therefore, must be accomplished within this context.

- Evaluation and the four major response and recovery capabilities: As

discussed in Module 1.1, preparedness planning and plan implementation must address all four of the healthcare emergency response and recovery major capability categories:

- Protection and security
- Continuity of operations
- Health and medical surge
- Support to external requirements

For a healthcare organization's EM program, the general overarching metric for each of these capabilities is presented below:

- Protection and security planning:
  - Potential hazard threats or impacts prompts personnel to perform the appropriate protective measures, demonstrating the safekeeping of personnel, patients and the patients' family/visitors, staff families as indicated and the organization's property.

- Continuity planning:
  - Potential hazard impacts create minimal or no disruption to ongoing healthcare and business operations.

- Medical surge to meet incident requirements:
  - The organization demonstrates the capacity to effectively manage the quantity of patient care needs presented by the simulated incident.
  - The organization demonstrates the capability to meet the types of patient care needs generated by the simulated incident.

- Support to external requirements:
  - The organization demonstrates capacity and capability to respond to likely requests for assistance from outside organizations per the organization's prior commitments and pre-planning.

To fully evaluate all EM elements that support these emergency response and recovery capabilities, EM program evaluation **must also focus upon the other CEM component plans: mitigation, preparedness, and long term recovery**. The preparedness plan is particularly important as an evaluation focus due to its many and varied activities as described in Module 1.5 of this text. Performance evaluation remains the primary orientation in all of these activities.

Performance metrics define desired levels of performance.

To accomplish comprehensive program level evaluation, the design, development, and implementation of the evaluation methodology and process must be accomplished as a building block of the program itself and not just as an after thought. Additionally the evaluation methodology and process **must also be subject to evaluation for the purpose of accountability and improvement**. To this end, performance metrics (criteria) defining the desired level of performance must be specified and the evaluation measures and methods selected to allow comparison of the measures (what is observed and described) against the metrics (what the ideal performance would be). The determination of appropriate metrics and the accompanying selection of measures and methods for comprehensive program evaluation is no easy task, but cannot be minimized or neglected due to the importance of the EM program and its support of the organization's mission.

Overall EM program evaluation can include the following areas: (more details are provided in subsequent lessons):

- Evaluation of mitigation planning: Assessment of the progress in the mitigation plan and the relevant annual work plan.

- Evaluation of the preparedness planning: Using the preparedness work plan as guidance, examination and assessment can focus upon the EOP documentation (i.e., has all planned guidance been developed?), recruitment, education and training, facility and equipment/supplies resource management, design and conduct of the exercise program, and the organizational learning experience. Evaluation of the performance of the EM Committee may also be considered in this category.

- Evaluation of the EOP and recovery plan: Systematic performance-based (operational) evaluation of the EOP and recovery plans is accomplished through the examination of:

    - Actual incidents (emergencies and disasters).

    - Exercises (tabletop, functional, and full-scale) as described earlier in this lesson.

    - Evaluative drills (drills conducted specifically for the purpose of evaluating personnel, policies, procedures, equipment, etc.).

    - Proxy events (actual experiences that fall short of a true emergency and/or disaster but provide insight into the adequacy of some elements of the response and recovery operations).

- Incidents that have impacted other healthcare organizations and provide insights applicable within the relevant EM program.

The After Action Review Process for evaluating emergency response and recovery

Emergency incidents, exercises, evaluative drills and proxy events can vary widely. The process for evaluating emergency response and recovery performance across these activities, however, should be as consistent as possible so that evaluation and processing of the collected information can be standardized.

Generally, the evaluation of operational incidents, actual or scripted, occurs after the conclusion of the incident or at logical break points.

Performance-based evaluation of the EOP is accomplished through the AAR process.

- The purpose of the AAR: The term chosen to identify the formal post incident evaluation is the "After Action Report (AAR) process." The AAR process serves several important purposes:
  - Documentation of exercise and response activities.
  - Identification of operational successes and deficiencies during response and recovery.
  - Analysis of evaluation findings to determine the effectiveness and efficiency of the EOP and/or recovery plans.
  - Definition of a plan of action for implementing needed improvements.
- The AAR process: Similar to program evaluation, the AAR process is based upon objectives and requires specific performance-based metrics, measures, and a defined methodology. In general the actual AAR process encompasses the following sequence of activities:
  - Collection of objective, authoritative, and relevant data and observations
  - Synthesis of collected data and observations into useful information
  - Development of a report that provides a description of the incident, exercise, evaluative drill or proxy event in a narrative form, and then describes objective issues arising, both positive and negative, with actionable recommendations aimed at

Evaluation of the EM program and the EOP supports organizational learning.

improving the EOP and/or recovery plans.

The evaluation process and the results of EM program evaluation support the concept of organizational learning, which is described in the next section. Each type of evaluation provides the ideas and supporting information necessary to identify, consider, and implement the changes necessary to adapt the EM program supporting plans in the context of the healthcare organization's mission and strategic objectives. This is often best documented or memorialized in a formal EM program evaluation summary, which may be part of an annual report on the EM program.

Organizational Learning

A "learning organization" is committed to continuous improvement based upon evaluation.

- Organizational learning and the "learning organization": Organizational learning is intended to establish and permanently sustain improvement in the organization itself. This goes far beyond individual learning associated with education, training, drills, and the experience gained in exercises. Organizational learning may be distinguished from the relatively informal and ineffective "lessons learned" approach commonly practiced in many settings. Organizational learning includes precisely defined systems-based processes that identify and assess all sources of data and information for the purpose of identifying opportunity for improvement. The process then implements system level changes that adapt and improve performance. For organizational learning to occur, an organization itself has to be committed to implementing necessary change. The most widely used term used to describe this organizational characteristic is the "learning organization."[1] A learning organization conducts continuous evaluation of its experience and transforms that experience into lasting improvements in performance. The improvements are incorporated through changes to:

  - Organizational and program-specific objectives.

  - Structure, processes and procedures within the emergency management program (including the EM committee) and/or its emergency response and recovery guidance as delineated in the EOP.

  - Policies and procedures for the larger healthcare organization and how it relates to emergency management.

[1] Senge, P. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*. Reported in Ott, S.J., Parkes, S.J., Simpson, R.B. Classic Readings in Organizational Behavior. Belmont, California, Thomson Learning: pp. 484 - 491.

- Personnel staffing levels and performance qualifications, including core, job group and task specific competencies. Instructional activities (training and education) are related areas.
- Facilities for emergency response.
- Equipment.
- Supplies.

- Responsible organizational change agents: Within the EM program, the emergency program manager is responsible for the organizational learning process. In consultation with the EM committee and healthcare organization leadership, the emergency program manager defines and administers the process for soliciting, analyzing, processing, tracking, and achieving selected organizational change. Once change is implemented, evaluating and monitoring the results of the organizational learning process is also within the purview of the emergency manager and the EM committee.

The EM Program Manager is responsible for organizational learning within the EM program.

- The Improvement Plan: The instrument used to drive organizational learning is commonly called the "improvement plan" or IP (see Lesson 4.4.2 for detail). In the HSEEP guidance, the IP is paired with the After Action Report.[2]

- The organizational learning cycle: Once change is implemented, evaluating and monitoring the results of the organizational learning process is also within the purview of the emergency manager and the EM committee. This cycle of continual improvement focuses the organization on meeting the objectives of the EM program and maintaining its emergency response and recovery capabilities as the organization and its environment evolves, and as hazards and/or vulnerabilities are newly recognized and addressed. When requested or directed, it is important for appropriate healthcare system personnel to participate in this organizational learning process so that improvements are fully implemented across the organization.

[2] US Department of Homeland Security. *Homeland Security Exercise and Evaluation Program Terminology, Methodology, and Compliance Guidelines*. Federal Emergency Management Agency's National Preparedness Directorate, page 3; accessed June 17, 2010 at https://hseep.dhs.gov/support/HSEEP_101.pdf

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Module 4.2

System-based Evaluation

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Lesson 4.2.1 Overview: Emergency Management Program Evaluation

Lesson objectives

- *Distinguish between overall EMP and EOP evaluation*
- *Define program evaluation.*
- *List reasons commonly cited why program evaluation is not a regularly scheduled and integral component of a system.*
- *Differentiate summative from formative evaluation.*
- *Define the terms measures, metrics, and analytical method.*
- *List other broader or more finite terms utilized in the discipline of program evaluation.*
- *Define expert judgment as utilized in this text and how it may be applied to EM program evaluation.*
- *Define needs assessments.*

Introduction

Program Evaluation (see terminology textbox) as a discipline has a long and extensive research tradition.[3,4] The concepts promoted here draw upon long-standing principles that support effective program evaluation. Options are presented for evaluating the overall EM program, its component plans, exercises, and response performance. Many industry applications of "evaluation" have arisen in emergency management since the post 9-11 surge in interest and funding (see foreword for discussion of industry applications). Homeland Security applications[5] of evaluation, such as those contained in HSEEP and the many "needs" and "gap" assessment tools that have been promulgated, are acknowledged where appropriate and presented where applicable. They are recognized as **industry applications** and, thus, not considered controlling standards. In most cases, effective emergency management program performance, as presented in this text, exceeds the guidance of these applications.

Evaluation as a discipline has an extensive history and is based on certain foundational concepts. More recent "industry applications" are acknowledged that vary from this emergency management conceptual approach.

[3] Shaddish Jr WR, Cook TD, Leviton LC. *Foundations of Program Evaluation: Theories of Practice* (1991); Social Program Evaluation: Its History, Tasks, and Theory, pages 19-68; Sage publications, Newbury Park, CA.
[4] Chen HT, Rossi PH. *Evaluation with Snese: A Theory-Driven Approach.* Evaluation Review 1983)7(3)283-302.
[5] Multiple industry applications (homeland security, public health, and others) are recognized.

Terminology alert!

***Program Evaluation*:** a systematic assessment process that leads to judgments and decisions about plans, programs, or policies.[6]

Major concepts related to program evaluation are presented here.

- Evaluation as a distinct discipline: This unit discusses evaluation as a discipline. It differentiates between performance evaluation of the emergency response and recovery function itself (e.g., through exercises) and the programmatic performance evaluation of the EM program (e.g., evaluation of preparedness planning—effectiveness of instructional activities, exercises, implementation actions, other preparedness initiatives, mitigation activities, and conduct of the overall EM program itself). The two distinct approaches can then be compared and contrasted.

- Evaluation defined: Evaluation is generally defined in dictionaries as:
  1. To ascertain or fix the value or worth of.
  2. To examine and judge carefully; appraise.[7]

- Evaluation as the basis for judgment: Evaluation is performed to provide a basis for judgment about the merit evaluated entity, and to find areas for improvement. Judgments are determinations of value or worth.[8] For organizations whose primary objectives are providing goods or services, useful judgments are generally made using performance-based information.

- Formal evaluation: Some variation of evaluation occurs in almost every life activity. **Systematic evaluation, however, incorporates an objective assessment process.** This formal approach minimizes reliance upon subjective impressions and anecdotal evidence in forming the basis for **judgment** of the assessed entity.

- Prevalence of evaluation in organizations: Systematic, ongoing evaluation activity as a component of organizational management is

[6] Adapted from Schalock, R. L. *Outcome-based Evaluation* (2001). New York, Kluwer Academic/Plenum Publishers, p. 6.
[7] From http://www.thefreedictionary.com/evaluate, accessed December 6, 2005.
[8] Adapted from Scriven M. *Evaluation Thesaurus, 4th ed.* (1991). Sage Publications, Thousand Oaks, California.

not as widespread as would be expected, particularly when its value to the organization is considered. This recognition prompts an analysis to delineate the positive and negative forces related to decisions to conduct a program evaluation initiative.

A systematic evaluation program is a critical activity for any successful organization, yet this importance is not widely recognized.

Instead of a regular ongoing effort, evaluations are often undertaken by organizations based upon specific inciting events (e.g., a "bad" outcome).

- Evaluation prompts: Many organizations embark on program evaluation activities, not as a matter of common practice, but as needs arise. Commonly, it is an external catalyst that prompts the evaluation activity. Typical initiating factors include:
  - Accreditation requirements: For example, evaluation necessary to obtain or maintain accreditation from The Joint Commission.
  - Accountability per regulations: For example, Federal organizations are subject to the Government Performance and Results Act of 1993 [GPRA], which instituted a government-wide requirement for agencies to set goals and post an evaluation report annually on program performance[9] (see Textbox 4.2.3.1).
  - Accountability as a requirement for new or continued program funding.
  - Accountability imposed by other stakeholders, such as organizational leaders, constituents, emergency response partners, and others.
  - Statistical data or other reports that indicate lackluster performance. More formal evaluation is then triggered to investigate this concern.
  - An adverse outcome that prompts questions about the system or organization itself. This is the least desirable prompt and should be preempted by preceding evaluation and organizational learning.
  - The need for new service provision capabilities.
- Historical reluctance to evaluate: The prevalence of "prompted" evaluation demonstrates the widespread reluctance to make evaluation a standard step in systems development and maintenance. Many of the "quality" related movements in the

[9] Government Performance and Results Act (GPRA), the U.S. Office of Management and Budget; accessed June 17, 2010 at: http://www.whitehouse.gov/omb/mgmt-gpra/

1980s and 1990s (Quality Assurance, Quality Improvement, Total Quality Management) were related to efforts to address the lack of organized system evaluation and incorporation of change.

Evaluation programs are often considered an unnecessary burden on regular organizational duties. Their importance is highlighted here for day-to-day as well as EM program activities.

- Resistance to evaluation: For many organizations, the reluctance to commit resources to systematic evaluation may be due to the following categories:
  - Evaluation as an expense: Evaluations have effort and cost implications and are often viewed as Herculean tasks. **Efficiency** of the evaluation process, therefore, can influence acceptance and frequency of use. An efficient process enhances the benefits of evaluation through additional cost-effectiveness and non-monetary benefits that come with system evaluation and change.
  - Evaluation as a burden: Identifying issues through an evaluation process that requires corrective action can be vexing for those conducting the evaluation, particularly if the corrective actions are beyond the authority, limited by budgetary constraints, or subject to other limitations. This can be addressed to some extent through an effective organizational learning process, where the responsibility for resolving identified issues can be appropriately assigned, and those assigned are empowered to resolve the issues.
  - Evaluation as a professional and legal risk: Evaluations are commonly viewed as risky endeavors, with managers and even general workers not always in favor of documenting failures and shortcomings. The **objectivity** with which issues are identified and described, the **tone and perceived purpose** of the evaluation process (see summative versus formative evaluations below), the **focus upon systems versus people** in the assessment, and the **effectiveness at addressing weaknesses** and failures in a positive manner is important in addressing the basis for this inherent reluctance. Legal expertise must be incorporated into the process to assure that an earnest evaluation effort does not raise legal and liability risk for the organization. For example, in healthcare, evaluation and quality improvement initiatives have generally been covered by medical-legal privilege and so have been not subject to the legal discovery process.

- The case for systematic evaluation: It is important to examine the primary reasons for performing evaluation and then to delineate the purpose (i.e., goal and objectives) for each specific evaluation activity.

Such an approach may counter the resistance to evaluation. Reasons for evaluation may be grouped into two general categories.

- Accountability: Program evaluation may be used to provide objective evidence that a program is performing as intended. Program evaluation, in many ways, may be viewed as an "insurance policy" that monitors whether performance is accomplishing planned activities and whether the organization's performance is effective and efficient.

- Improvement or enhancement: Program evaluation is increasingly viewed as the primary vehicle for driving organizational change and therefore improvement. Evaluation is also used to determine whether "organizational change" (see Module 4.4) is being implemented successfully. Many program managers and guidelines make potentially invalid assumptions about the relative ease of affecting such changes. They view the organizational environment as relatively static, roles and responsibilities as predictable, and the ability to achieve desired outcomes as uncomplicated. Effective program evaluation may appropriately temper these assumptions.

There are two general reasons for conducting evaluation activities: 1) Accountability: "is the system performing as planned?" 2) Improvement: "determining whether organizational change is necessary."

- Evaluation purpose as it relates to evaluation design: The controlling reason for conducting a specific evaluation within a system (i.e., the goal for the evaluation initiative) is important to define and communicate at the outset, since it leads the evaluation planners in one of two evaluation design directions:

  - Summative evaluation.

  - Formative evaluation.

  Each is based extensively on systems theory (see Textbox 4.2.1.1 below) and each has significant implications for evaluation design.

- Summative versus Formative Approaches to Evaluation: The following descriptions (see terminology textbox) have been adapted from a range of sources to provide clarity for emergency management personnel.

Summative evaluations are conducted for accountability.

Formative evaluations are conducted for improvement (organizational learning).

Terminology alert!	
Summative Evaluation	The primary purpose for this type of evaluation is to provide a definitive statement of merit, essentially a "grade," that stands as the judgment on the evaluated entity. Motivation behind these evaluations is **accountability**, including task completion, efficiency (cost containment), and effectiveness. Summative evaluation is more likely to be quantitative, using numeric scores or letter grades to assess achievement. The process of evaluation is designed to provide a **composite judgment** of all evaluated aspects of the entity, hence the term "summative."
Formative Evaluation	The primary purpose of this type of evaluation is to further shape the direction, strategy, and tactics of the entity being evaluated and provide feedback that will result in positive system change rather than focus upon shortcomings as failure: "evaluations are intended - by the evaluator - as a basis for improvement" (Scriven, 1996). This may identify and replicate best practices within the organizations and improve program management through an interactive evaluation process. These evaluations are tailored to each new environment and the assessments generally achieve more depth and breadth than summative evaluations.* *Scriven M. Beyond Formative and Summative Evaluation. In M.W. McLaughlin and ED.C. Phillips, eds., Evaluation and Education: A Quarter Century. Chicago: University of Chicago Press, 1991: p. 169. Reported in Patton, Michael Quinn, Utilization-Focused Evaluation: The New Century Text. Edition 3. Thousand Oaks, California: Sage, 1997: page 69.
Summative versus Formative Evaluation	Each type of evaluation approach can serve important purposes in program and plan evaluation, but it is important to recognize the difference in both designing and administering the evaluation instrument.

	One authoritative text emphasizes "the summative vs. formative distinction is context dependent" (Scriven, 1996). This may best be presented by a widely repeated quote from another evaluation authority: "When the cook tastes the soup, that's formative; when the guests taste the soup, that's summative." (Robert Stakes, 1991)** Of the two approaches, formative evaluation is generally far more useful for internal organizational purposes. Formative evaluation is conducted to provide program staff evaluative information useful in improving the program." (Worthen, Sanders, and Fitzpatrick, 1997)*** ** Robert Stakes quoted in Scriven M. Beyond Formative and Summative Evaluation. In M.W. McLaughlin and ED.C. Phillips, eds., Evaluation and Education: A Quarter Century. Chicago: University of Chicago Press, 1991: p. 169. Reported in Patton, Michael Quinn, Utilization-Focused Evaluation: The New Century Text. Edition 3. Thousand Oaks, California: Sage, 1997: page 69. *** Blaine R. Worthen, James Richard Sanders, and Jody L. Fitzpatrick, *Program Evaluation: Alternative Approaches and Practical Guidelines* (1997), New York: Longman.

- Evaluation and system theory: Systems theory (as discussed in Lesson 1.1.3) has become important in all management fields, not just emergency management. Evaluation is an integral component of systems theory and practice (see Textbox 4.2.1.1).

Textbox 4.2.1.1

Systems Theory & Evaluation

Systems theory revolutionized how organizations and organizational change processes are understood. The full complexity of any organization or system, the people and their personal motivations that make up such a system, and the difficulty of effecting change are important factors in this concept. The systems approach sees organizations as turbulent, unpredictable, rife with conflict, full of opportunities and threats, and always dynamic. Systems theory understands that there is a politics of change in large organizations

and that fostering change has much to do with organizational culture.

Systems theory does not view organizations as "closed" systems or independent of external forces. Instead, organizational systems are seen as made up of interdependent relationships with many defined components: the external environment, the individuals inside the system, the relationships that generate cooperation or conflict, and others. This "open system" recognizes the goals of each individual member can be as important to success as any singular organizational purpose declared by those in leadership positions. As such, systems theory focuses on the complexities of open systems and the necessity for organizations to adapt to ever-changing environments. It seeks to understand the social character of dynamic system interrelationships and their impact upon outcomes. A fundamental principle that characterizes open systems is that objectives can be pursued through a variety of methods and means and there is no single approach that will always produce the desired results.[10]

"Organizational rationality therefore is some result of:
1) constraints that the organization must face
2) contingencies that the organization must meet
3) variables that the organization can control." (J.D. Thompson, 1967)[11]

The complexity, uncertainty, and aggregate challenge that are attributed to organizational change in systems theory have resulted in an approach to program evaluation that advocates methodological pluralism. When organizational change and improvements to essential operations becomes an organizational objective, defining the change needed and evaluating the success of implemented change involves many different types of program evaluation. This combination of qualitative, as well as quantitative, methods recognizes that real-world factors dictate that methods that work well in one area may not work in another. **The systems approach to evaluation emphasizes the ability to adapt to a changing environment by tailoring evaluation styles to different components of the system in order to produce the most accurate and useful results.**

[10] Katz, D., Kahn, R. *Organizations and the System Concept*. Classics of Organization Theory (1966). J. Schafritz and S. J. Ott. Belmont, Wadsworth - Thomson Learning.
[11] Thompson, J D. Organizations in Action. Classics of Organization Theory (1967). J. Schafritz and S. J. Ott. Belmont, Wadsworth - Thomson Learning.

- Evaluation using performance measures: Performance-based evaluation is increasingly recognized as an essential component of systems management, but it is not a universally prevalent phenomenon.

  In the context of emergency management for healthcare systems, EM program performance evaluation is based upon the premise that **a carefully chosen evaluation instrument can be designed that allows emergency managers to evaluate their EM program in comparison to optimal risk reduction and response/recovery operational readiness.** In order to accomplish this, terminology in the evaluation instruments must be carefully defined.

  - Measures, metrics, and analytic methods in program evaluation: Evaluation judgments must be based upon the collection and processing of accurate and useful data. This is accomplished through a defined evaluation process, which uses "measures" that are compared against evaluation "metrics" through a specific "analytic method" (i.e., measuring). These three terms and their associated concepts are delineated below:

    - Performance ***measures*** in program evaluation: The **measures** are the data, observations, and other findings that are to be captured during the evaluation process. They may be developed from performance observations, from performance reports, and other programmatic activities. They must, however, **be captured through methods that are objective and that minimize subjectivity and bias**.

      Specifically describing the "measure" as a "**performance measure**" (see terminology textbox) promotes a more purposeful focus. The design of the evaluation instrument is focused upon **collecting data and information that specifically reflects the activity being examined.**[12]

Performance "measures" are specific elements that are observed during evaluation.

[12] Performance measures have commonly been called "performance indicators" in other healthcare system assessments (For example: Hunt, C., Andrews G.: Drop-out rate as a performance indicator in psychotherapy; Acta Psychiatr Scand, 1992 Apr.85(4):275-8). For clarity, performance indicators should be perceived as conceptually distinct from performance measures: "indicators" are commonly more narrow and distanced from representation of actual performance, and therefore may be less effective (see "corruptibility of indicators" later in this lesson).

Terminology alert!

Performance Measure: The specific data sets, objective observations, or other findings captured during the performance-based evaluation process to compare against a defined metric. Performance measures may address the adequacy of resources applied to the program (inputs); the type, level, and quality of program activities conducted (process); the direct products and services delivered by the program (outputs); or the results of those products and services (outcomes).[13]

- Performance ***metrics*** in program evaluation: Similarly, accomplishing an objective evaluation requires that specific evaluation criteria must be developed to compare the measures against. These may be called "**performance metrics**" (see terminology textbox) and also should be **prospectively defined** (i.e., prior to the evaluation activity). They may come from a variety of sources.

Performance "metrics" indicate the desired state that "measures" are compared against during evaluation. These should be objectively established prior to the evaluation activity.

Terminology alert!

Performance Metric: Specific criteria that objectively describe the desired performance state, against which the "performance measures" may be compared.

Program evaluation will include a wide variety of metrics in order to effectively evaluate the many aspects of a program, but certain characteristics should be consistent across all types of metrics:

- Objective and measurable: Like "objectives," they should be clearly stated, measurable to minimize bias, and realistically attainable under reasonable circumstances. They should also align with the overall organizational objectives.

- Performance-based: Metrics should be presented in a manner that focuses upon performance and that leads to actionable information for change.

[13] Adapted from: General Accountability Office. *Performance Measurement and Evaluation* (May 2005). GAO-05-739SP; accessed April 11, 2010 at: http://www.gao.gov/new.items/d05739sp.pdf

- Metrics versus type of evaluation: The type of metric should be related to the type of evaluation that is selected (i.e., input, process, output, outcome – see definitions below).

- "Inside" metrics based upon EM documents: Whenever possible, **the EM program documentation itself should be used to develop the metrics in the evaluation process.** For example, compare findings against the stated objectives of the EM program component that is being evaluated. Alternatively, performance by specific emergency response positions (the measures) may be evaluated against the performance metrics drawn from the specific competencies delineated for those positions. This will minimize evaluation design effort and promote more objective, measurable system documentation.

- "Outside" metrics: As noted above, some metrics will be either provided by outside organizations or developed from standards or benchmarks established by outside organizations. These should be carefully examined to assure that they are understandable, objective enough to be measurable, realistic, and appropriate for the organization and its EM program. For example, understanding the intent of The Joint Commission standards related to healthcare organization emergency response exercises is important before establishing the EM program metrics to meet that standard.

○ Analytic methods in program evaluation: These describe the process methodology for comparing the findings (performance measures) to the metrics. The result leads directly to the basis for "judgment": determining the value of the program (in a summative evaluation) or the recommended change that may move the program closer in line to the expectations (in a formative evaluation). It is important that this analysis also be as objective as possible. Several factors are important in defining the analytic methods for any specific evaluation activity:

Analytic methods used in program evaluation indicate the specific comparisons made between "measures" and "metrics."

In developing the measures and metrics, a determination should be made and clearly designated as to how the comparison will be conducted. A range of analytical methods and judgment categories are possible depending upon the circumstances:

- Direct comparison with absolute determinations: This may be a direct comparison that is absolute, such as "observed versus not observed," "pass versus fail," "present or absent" or some other way to objectively capture the relativity of the observed

measure to the relevant metric.

- Direct comparison with relative determinations: This may range from "acceptable" to "unacceptable" and can include intermediate determinations such as "observed or present but not equal to the projected performance metric" or other demarcation between a desirable or undesirable determination. Comparisons may be quantitative (e.g., number of patients processed per unit time, number of personnel trained versus the target number, or length of time interval to accomplish a task) or qualitative (e.g., followed procedure as delineated in the EOP). This should be as objective as possible to minimize the subjectivity of the evaluation assessments. Additional information should be captured to provide guidance for improvement in the measured domain.

- Less direct comparison with relative determinations: Some activities do not lend themselves to straightforward direct comparisons with written metrics. It is therefore important to recognize that expert judgment is necessary in the conduct of many evaluation initiatives. This is particularly important in comparing the observed measures against the metrics in complex systems such as healthcare organizations, particularly within the emergency context with its many variables or when metrics are less than objectively defined. Expert judgment is discussed in greater detail later in this lesson.

Acceptable or success is achieved when the observed performance meets the target performance metric (essentially the stated ideal level of conformance to the metric).

- Distinguishing this approach from the usual evaluation approach: In many performance assessment activities, evaluation consists of comparing the measures to some general idea on the part of the evaluator as to the ideal level of performance (i.e., no explicitly stated metric). The evaluator is simultaneously collecting the measures, interpreting them, and determining their value against this less-than-clearly documented metric. While very common and convenient, this more casual methodology introduces subjectivity, compromises reliability, and makes validity and predictability difficult to assess. This method is common in informal program evaluation and is more acceptable when based upon expert judgment (see below), but should be avoided as much as feasible during formal program evaluation.

Other Metric-related Terminology

A wide range of terminology has been used in evaluation practice. This text will use terms introduced earlier in this section but acknowledges other common terms found in the evaluation-related literature. These include:

- Performance Standard: A statement that establishes the criteria for how well a task or learning objective must be performed. The standard should specify how well, completely, or accurately a process must be performed or product produced. The term "standard" is generally generic to similar organizations and so is less specific qualitatively and quantitatively than a "metric" as discussed above. Performance standards are commonly used in summative evaluations and for the basis for the actual metrics. In formative system evaluation, other terms more applicable to systems process and evaluation science may be used (metrics, competencies, objectives, etc.). Standards may have specific applications.
  - A system or process standard is generally defined by design requirements (inputs) or by required outputs.
  - The task standard reflects task performance requirements (process and output) on the job.
  - The learning objective standard reflects the demonstrated knowledge, skills, and abilities (outputs) that must be achieved from the learning.
- Benchmark: Essentially, this is a synonym for "standard" but a benchmark is usually more broadly or generically described and, consequently, it is less specific to the organization's situation and generally less useful as a metric for formative evaluation. The early Hospital Preparedness Program, for example, used broad "benchmarks" for the expected increase in patient care capacity for an urban area, for example, as metrics for healthcare system performance in its emergency preparedness funding program.[14]
- Indicator: This term has similar meaning as a "metric," but an indicator is usually a more narrowly described requirement than a standard or benchmark. It is commonly used in summative evaluation in an attempt to present objective criteria that can predict overall, more subjective qualities in the evaluated entity. The indicator may therefore

Terminology and definitions vary in the performance evaluation literature.

[14] U.S. Department of Health and Human Services, Health Resources and Services Administration. *National Bioterrorism Hospital Preparedness Program, FY 2005* (July 1, 2005) *Continuation Guidance*; Washington, DC.

focus upon criteria that are only an indirect assessment of the quality of a program or service. Because of its narrow and indirect nature, an indicator that becomes used as a formative guide may be applied out of context and therefore become disassociated from indicating any actual level of performance during response and recovery. This "corruptibility of indicators" must be acknowledged and carefully addressed when developing and applying indicators (see Textbox 4.2.1.2). The "corruptibility of indicators" should be considered when assessing the validity, reliability, and predictability of the indicators for organizational success.

It is important to recognize that criteria can be used as a **performance metric** for one component of a program or plan, but only a **preparedness indicator** for the larger entity. For example, an input, process, or output measure for a training course is a **performance measure for that course**. In contrast, the output of a training course is only an indirect **preparedness indicator** in relation to effective incident response. This important distinction has critical relevance when examining the results of the system evaluation.

The relationship between the **preparedness indicator** and the actual "**outcome**" of effective response (i.e., the indicator's actual predictability) must be determined through careful analysis, and confirmed through incidents, appropriate proxy events, or very realistic exercises. There are several recurring issues with "indicators" that are important to recognize.

It is important to recognize that the use of indicators can be flawed due to the "corruptibility" phenomenon.

Textbox 4.2.1.2

Predictability versus Corruptibility of Indicators

An **indicator** is intended to "measure" the performance under study, and is selected in large part to be a **predictor of program success** in the area of study. Many of these "indicators" have never been validated as truly predictive. In addition, it has long been recognized in the evaluation literature that the designation of a behavior as an indicator can lead to a change in that behavior, a "corruptibility of the behavior of those whose performance is being monitored. The best-known example is teaching to the test..." (Nuttall, 1994).[15]

Essentially, "**corruptibility of indicators**" describes the phenomenon where as soon as a measure is selected as an indicator of successful program function, system participants re-

[15] Nuttall, D.L. *Choosing indicators* (1994); In Riley, K.A., Nuttall, D.L. (Eds.). Measuring quality: Education indicators–United Kingdom and international perspectives (pp. 17-40). Bristol, Pennsylvania: Falmer Press: 23.

direct their performance, intentionally or not, to perform well on the specific indicator itself. This focused change affects the "indicator" and its predictability of overall success and, in fact, may actually decrease process, output, outcome effectiveness, and eventual program success.

The Committee on Evaluation of the Metropolitan Medical Response System (MMRS) Program from the National Academies/Institute of Medicine examined an array of existing assessment tools that were applicable to the task of assessing preparedness for chemical, biological, and radiological terrorist acts.[16] The Committee found that the majority of the instruments in use were based upon self-reporting methods and that this type of reporting is particularly prone to corruption of indicators. This type of distortion of actual capabilities was suggested to be occurring across the board in self-reports and was attributed to a perceived need to show "success" in order to keep funding streams open and to avoid appearing unprepared before a constituent public that wants assurance that they live in safe, "ready" communities.

The evaluation methods recommended for the MMRS case intended to circumvent this problem by instituting multiple evaluation methods and requiring that any self-reports would be followed up with site visits by independent evaluators. The evaluators would then examine readiness without the coercive effect of having to worry about continued funding streams.

One way to address this phenomenon is to carefully select indicators that are true performance measures: broad enough or objective enough to be difficult to "corrupt" towards. Even more effective may be selecting performance measures that, when performers "corrupt" towards them, they are actually moving towards improved preparedness or more effective response and recovery.

Selection of performance metrics versus "indicator" or "benchmark" in predicting organizational success: Performance evaluation in complex organizations may require multiple measurement strategies and methods. The use of robust, valid and comprehensive performance metrics for an evaluation instrument may be the most reliable in predicting organizational success. One should avoid reliance upon narrow "indicators" or overly broad and difficult-to-measure "benchmarks" to accomplish this important purpose.

[16] Manning, F.J., Goldfrank, L. (eds). *Preparedness Indicators*, in Preparing for Terrorism: Tools for Evaluating the Metropolitan Medical Response System Program (2002). Washington, D.C., National Academy Press**:** 96.

- At the other extreme, many "benchmarks" lack the objective, measurable guidance that provides a direct relationship to organizational success (in this case, for mass casualties and other emergencies).

- Some "indicators" or "benchmarks" are furnished by outside organizations[17,18] in their efforts at accountability (i.e., for summative evaluation of the organization's system) or as guidelines to improve system performance. Many are only marginally or vaguely performance-based.

- Any "indicator" or "benchmark" should, wherever possible, be translated into performance measures with metrics that can be objectively evaluated and directly related to predicting organizational success.

Expert judgment is an important analytical adjunct during evaluation activities. It is, however, important that the "experts" are determined based upon valid criteria and that their observations are qualified appropriately.

The Importance of Expert Judgment in Healthcare System Performance Evaluations

Expert judgment (see terminology textbox below) is one of the most difficult concepts to clearly describe, yet is a very important component in almost all professional evaluation of complex systems. **In performance-based evaluation, expert judgment is essentially the determination made by a qualified individual comparing the collected performance measures, often approximated, to the individual's understanding of an optimal yet realistic metric.** Factors qualifying someone as an expert are variously defined, but the following considerations are important:

- Demonstrated expertise: An "expert" meets some defined level of knowledge, skills, and abilities (i.e., competencies) that usually have been demonstrated by the expert's past **experience**.

- Experience as the basis: For emergency management system evaluations, "experts" should ideally have successful experience in designing and implementing pertinent emergency management

[17] Hearne, S.A.; Segal, L.M.; Earls, M.J.; Unruh, P.J. *Ready or Not? Protecting the Public's Health in the Age of Bioterrorism* (2004). Trust for America's Health; accessed April 4, 2010 at: http://healthyamericans.org/reports/bioterror04/BioTerror04Report.pdf

[18] U.S. Department of Health and Human Services, Health Resources and Services Administration, Healthcare Systems Bureau: *National Bioterrorism Hospital Preparedness Program, (FY 2005) Continuation Guidance; Washington, DC* used "critical benchmarks" and other funding requirements applicable to healthcare organizations receiving HRSA funding through their State and local governments.

capabilities and demonstrating ability to manage under actual incident circumstances, rather than only scholarly activity (research and writings) or experience primarily as a consultant, trainer, or product and service sales.

- The "parallel experience" assumption: It is important to examine the common assumption that past life experience in seemingly parallel occupations (military, intelligence, law enforcement, governmental agency involved in emergency management, and others) has conferred true expertise directly applicable to the pertinent activity. This is particularly important as it relates to healthcare emergency management, which is an evolving profession that has distinct differences from many other emergency-related professions.

- "Resident" experts: It is also important to recognize the "expert judgment" that is acquired by individuals working, over time, in a professional manner within an organization's emergency management program. The value of this expertise, particularly as it relates to understanding the organization, the nuances important to effective program activities, and the organizational details important in customizing any outside recommendations should not be underestimated.

Terminology alert!

Expert judgment: "information and data given by qualified individuals in response to technical questions… Expert judgment is generally used when test/observational data are difficult or expensive to obtain and when other sources of information are sparse, poorly understood, open to differing interpretations, or requiring synthesis… expert judgment is an integral part of most problem solving and analysis." *(Los Alamos National Labs)*[19]

Other Evaluation Methods

In addition to the performance method discussed above, one other evaluation method may be very useful in emergency management.

[19]M.A. Meyer and J.M. Booker, "Eliciting and Analyzing Expert Judgment: A Practical Guide." Published by the Society of Industrial and Applied Mathematics, Philadelphia, PA, 2001. *Eliciting and Analyzing Expert Judgment*. Los Alamos National Laboratories; Accessed April 4, 2010 at: http://institute.lanl.gov/ei/shm/pubs/LA-14051-MS_Final.pdf

- Needs assessment: This is a specific form of evaluation, distinct from performance evaluation, which focuses upon "needs" rather than upon system performance. It is conducted with commonly used evaluation methodology: surveys, interviews, meeting reports, and others. These may take place both for programmatic as well as response and recovery purposes. Needs assessments are commonly performed during the conceptualization phase of program development, during major program or plan revisions ("identifying the specific needs that a program should address"), or during response and recovery, when it is unclear what the incident needs may be. For example, the "modified cluster sampling" done after Hurricane Andrew to assess Floridians' needs was a complex, formal response needs assessment.[20] Conversely, a "suggestion box" is a very simple example of a programmatic needs assessment.

In summary: Program evaluation uses multiple types of "**measures**," a range of "**metrics**" to compare the measures against, and a number of "**analytic methods**" to determine program success or failure and recommended follow-on actions. The use of performance measures and other methods of evaluation appropriate to healthcare system emergency management is examined in greater detail in the next lesson.

[20] Hlady, W.G.; Quenemoen, L.E.; Armenia-Cope, R.R.; Hurt, K.J.; Malilay, J.; Noji, E.K.; Wurm, G. *Use of a modified cluster sampling method to perform rapid needs assessment after Hurricane Andrew*. Annals of Emergency Medicine, 1994, Apr;23(4):719-25.

Lesson 4.2.2: Performance Measures and Metrics in Emergency Management Evaluation

Lesson objectives

- *Define the terms input, process, output, and outcome measures.*
- *Differentiate validity from reliability.*
- *Define predictability in relation to program evaluation.*
- *Define relative value and ease of use in relation to the four different types of measures.*
- *List common liability concerns related to program evaluation.*

Introduction

Performance measures gauge progress toward a stated goal, the performance metric. Evaluation of the EM program and its component plans supports organizational learning and the maintenance of a healthcare organization's mission and strategic objectives during all phases of Comprehensive Emergency Management. All healthcare personnel have the responsibility to generally understand the evaluation process and its application to the EM program and to participate at a level appropriate to their assigned roles and responsibilities.

Performance Measures and Their Application in Emergency Management Program Evaluation

- Categories of Performance Measures in Program Evaluation: Program evaluation literature defines four categories of measures that may be used in evaluation. They are important to understand, so that evaluation of the programs and program components may be designed and conducted in a logical and consistent manner and provide valid analysis and recommendations for change. See terminology textbox below.

Terminology alert! **Input, Process, Output, and Outcome Measures in Performance-based Evaluation**	
Input Measures	An **input** is effort, funding, personnel, and materiel (i.e., resources) that have been applied to the entity being evaluated (for example, resources applied to a system during

	development, revision, or maintenance). **Input evaluation measures the quality as well as the quantity of these applied resources in relation to the goals and objectives (the metrics).** The performance measures may be monetary, equipment, supplies, personnel, logistical agreements, standard operating procedures, training units, or even political, legislative, and regulatory mandates. **Input evaluation** often follows a checklist format and comprises simple answers to questionnaire lists.
Process Measures	A **process** is a defined activity, related to planning and/or implementation, carried out to achieve the objectives of the program. It is therefore also referred to as an "**implementation"** measure. **Process evaluation** focuses on these activities as critical components of the system and/or program. While inputs have a "quality and quantity" component, process has "completeness and quality" considerations. **Process evaluation** assesses program objectives and their related system activities: their delivery (i.e., how they are conducted), their feasibility, and their appropriateness for the intended audience.[21] Examples from across the four phases of emergency management include assessing process used for budgeting funds, forming a committee, completing component plan tasks, establishing a planned capability or recovery function, developing an incident action plan, and so on.
Output Measures	An **output is the product of an intermediate step that is measurable**. Quantitative measurements to assess program outputs could be: percent of total personnel taking and passing training courses, number of patients receiving care during emergency response, amount of prophylactic pharmaceuticals stockpiled as the result of a pharmaceutical cache activity, and so on. Qualitative measures could be: adherence to outside regulatory guidelines, meeting accreditation standards, and so on. **Output evaluation** often compares measurements

[21] Scheirer, M.A. *Designing and Using Process Evaluation*; In Wholey, J., Hatry, H.; Newcomer, K. *Handbook of Practical Program Evaluation* (1994). San Francisco, Jossy-Bass Inc.**:** pp. 40-68.

	against the objectives for a system component or intermediate processes and procedures (rather than the overall system itself), or against criteria established by outside organizations where it is in the interest of the organization to comply.
Outcome Measure	An **outcome** is the actual final result of the system performance under the circumstances in which the system is being used. The outcomes may be goods and/or services but are commonly some defined endpoint or result. **Outcome metrics in an emergency management program are defined by the overall system's goals and objectives, and the outcome measures can be assessed against these objective and measurable endpoints.** Essentially, the expected or planned performance outcome is established by the overarching incident objectives during an incident or by the goal and objectives of a component EM plan for a defined program interval. The **performance evaluation** captures actual outcomes and compares them, through analysis, to expected system outcome. This may be a quantitative measure, although most commonly **outcomes are qualitative judgments that refer back to the system objectives – "have the objectives been met under the conditions in which the system is intended to operate?"**

This terminology is context dependent:

Within an overall EM program, the terms input, process, output, and outcome are context dependent. For example, an "output" of a training course, trained personnel, could be considered an "input" for a response function that requires trained personnel to operate it. The terms should therefore be qualified as to the specific entity they refer to, and this can eliminate much of the confusion commonly associated with this terminology.

- Validity and Reliability of performance measures: The evaluation literature emphasizes the importance of both validity and reliability in performance measures and metrics (see terminology textboxes) in evaluation design.

Performance measures selected for evaluation should be valid (relevant and unbiased) and reliable (reproducible amongst evaluators).

Terminology alert!

"Validity means that 1) independent evaluators can agree on the relevance and appropriateness of criteria for judging value and on evidence that reflects those criteria and 2) safeguards are in place to control potential bias in measurement, data collection, analysis, and the drawing of conclusions.***"*** [22]

Terminology alert!

"Reliability means that different evaluators would reach similar conclusions on the basis of the evaluation methods used.***"*** [23]

While these factors are important to address when designing evaluation activities, performance metrics are rarely either perfectly valid or perfectly reliable in real-world activities that are as complex and vaguely defined as emergency management. What is equally or even more important is determining the value of the selected performance metric in relation to the overall organizational success, particularly in areas where actual organizational experience is limited.

- Performance metrics as predictors of organizational success: Determining the relationship between performance metrics and organizational success is relatively easy to achieve in programs that have **regular** outputs and outcomes from daily activity or frequent task performance. Ideally, the performance measures and metrics used in evaluation should directly relate to the success of the organization. This is harder to determine for the response phase of emergency management since emergencies are so infrequent.

  It is important to recognize that input, process, output, and outcome measures may be valid and reliable and may even register success individually, but the **overall system outcome** may still be a failure (as embodied in the cliché: "The operation was a success, but the patient died."). **It is therefore critical to also determine the approximate**

[22] Adopted from: Measurement and Data Collection in Evaluation. *Preparing for Terrorism: Tools for Evaluating the Metropolitan Medical Response System Program* (2002). Manning, F.J., Goldfrank, L. Washington, D.C., National Academy Press**:** pp. 75 - 76.
[23] ibid.

ability of each measure (input, process, output, and outcome) to predict overall organizational success (i.e. "predictability").

- Applied example: For example, if evaluation is being conducted on incident action planning, then process measures (how they did incident planning) may be more important than outcome measures (producing an incident action plan, but without an assessment of quality of that plan). The former measure may have more "predictability" of future success during response to actual incidents.

The selection of performance measures must relate to organizational success in order to provide "predictability."

- Defining failure as a metric: In developing metrics and measures relative to overall success, defining failure may be as important as defining success. For example, defining specific poor patient outcomes as an indicator of failure may make the performance issue clear and prompt an immediate organizational change.

Identifying performance metrics that predict organizational success is easier when the activities being evaluated occur regularly. As emergency response is not a regular activity for healthcare systems, relative value and ease of use must also be considered in selecting performance measures.

- Evaluating the value of performance metrics over time: As previously stated, true emergency response and recovery rarely occurs in emergency management, and so the predictive value of the four types of performance measures is less certain. The characteristics of inputs, process, outputs, and outcomes must therefore be considered separately for relative value and ease of use, so that informed decisions are made when selecting performance measures during evaluation design.

  The inputs, processes, outputs, and outcomes can be compared to each other and to actual organizational experience during exercises and actual incidents. Over time and varying circumstances, the performance metrics may therefore be assessed for **their value as predictors of future organizational success**.

- "Relative Value" and "Ease of Use" for each type of performance measure: These important factors can be generally and relatively described for the four types of evaluation measures in a performance-based EM system:

  - **"Ease of use"** of measures: This is related to the ability to translate evaluation findings into measurement units specific to the metric (through analysis) so direct comparison can occur. Generally, the relative ease of use for the four types of performance measures can be described:

    - Input measures: These are commonly the easiest measures to obtain and catalogue: They are usually simple, straightforward,

Performance measures to be utilized during evaluation should also be considered for their ease of use (ability to compare directly against the metrics).

and easily described units of measure.

- Process measures: These include implementation of system components and accomplishment of interim activities. They are relatively easy to obtain but can require significant interpretation. For example:
  - "What is successful implementation of a planned capability?"
  - "Is the quality of the activity in the process comparable to that expected in the evaluation design (i.e., the metric)?"
  - "Do the measures and metrics in this evaluation have reasonable validity and reliability?" (See "relative value" below.)
- Output measures: In an overall, complex program or plan, these can be more difficult than the preceding measures to define and track in a clearly objective fashion. This may be less of an issue for more straightforward activity, such as specific training.
- Outcome measures: These measures are not easy to use as the primary measures during many EM program activities, since "outcomes" may be rare (major incident response and recovery) or take some time to realize (mitigation and preparedness). Even under actual emergency and disaster conditions, it may be difficult or impossible to attempt real-time outcome evaluation of the emergency response and recovery system performance. For these reasons, EM programs incorporate exercise and proxy events as a means to obtain emergency response and recovery system outcome measures under simulated emergency conditions.

- **"Relative value"** of the types of performance measures: A general comparison may be made of the predictive power of the four types of measures, in terms of predicting future emergency response and recovery performance:
  - Inputs are generally the weakest for predicting success in the organization's performance. Inputs may best be thought of as "necessary but not sufficient." They may, in fact, be most effectively used for negative predictive value or as a measure of failure: if adequate input (quality as well as quantity) is not accomplished, it is unlikely for the entity to meet performance

expectations.

  - Process measures are similar to inputs in terms of the importance to overall system performance. Successful process implementation is important to achieve success and avoid failure, but process measures are usually insufficient alone to indicate future success in emergency response and recovery. They are, however, very important to the After Action Report process (see Lesson 4.4.2) in determining why output and/or outcome measures met or did not meet expectations.

  - Output measures are usually more indicative of overall outcome and therefore system success. While the predictive value probably grows with outputs that encompass increasingly comprehensive activities, the ease of objectively describing and measuring these outputs decrease.

  - Outcome measures are the most likely of the four measures to be accurate stand-alone predictors of system performance. These may be more reliable as predictors if regular outputs occur, which allows for outcome measures across a range of circumstances over time. For example, a successful outcome in a "perfect" situation where the system almost couldn't fail is not predictive for all future scenarios; conversely, a cataclysmic situation with no chance for success is equally unpredictable for system performance under most circumstances. Repeated outcomes experienced over time provide a more realistic picture of expected results over a representative range of circumstance, and also allow for "good and bad days," experienced versus inexperienced personnel on duty at different times, and other factors.

- Input, process, and output evaluations in relation to outcome: These can be predictors of outcomes, but their value as a predictor of organizational success (either individually or through some composite) should not be assumed. The predictive value for all four types of measures should be sought through some objective manner over time. This usually requires significant system experience, either actual or simulated through realistic exercise.

- Using input, process, output, and outcome performance measures in Healthcare System Emergency Management: The following guidance may be useful in determining how each type of performance measure may be analyzed against a defined metric.

  - Input measures: These may be analyzed (compared) against metrics drawn from the design requirements (i.e., resources

necessary for the system to function) for the overall EM program and its component plans. "Design requirements" developed during the original planning for the entity may also provide documentation of original designers' expected inputs and, therefore, a metric upon which actual inputs can be measured. For example, in developing a decontamination system for a hospital, the decontamination team design may indicate that four personnel are needed to run the decontamination area and that having three personnel available on each shift for each position will provide the necessary coverage. The input metric for recruiting personnel is therefore set, and the related input measures would be the number of qualified personnel recruited for each position on each hospital shift.

- Process measures: These may be analyzed against metrics developed from the system's or sub-system's task lists during mitigation, preparedness, response, and recovery. For example, during an exercise of the hospital decontamination system, was the decontamination area fully set up during the mobilization process? The detailed mobilization checklist is used as the metric by evaluators, and the measures are the action steps that the exercise "players" accomplished during the decontamination area mobilization.

- Output measures: These are the "outcomes" for intermediate steps in the overall plan or program being evaluated or for specific sections, functions, teams, and individuals within the overall system. These may therefore be analyzed against metrics directly developed from the pertinent sub-system objectives. They may also be compared to metrics from relevant areas of the system description and concept of operations (including task lists, operational checklists or job action sheets, and other response and recovery guidance); strategic and tactical plans (programmatic as well as response and recovery); and other aspects of the system documentation.

  - Output measures are commonly used in summative evaluations designed to demonstrate compliance with outside regulatory, funding, and supervisory organizations. For example, demonstrating that the healthcare organization maintains the required number of trained/certified personnel for a hazardous materials spill on the hospital premises is an output measure for healthcare engineers' preparedness.

- Outcome measures: These are compared against metrics that objectively describe the overall product, result, conclusion, etc., from the evaluated entity. Outcomes are easier to tie to

organizational success, since they are embodied by the overall mission and objectives of the organization if those statements are well constructed.

Other Healthcare System-specific Evaluation Issues

- Outcome as the goal: The overall goal of an emergency management program for healthcare systems is to develop and maintain a program and component plans that will provide an optimal **outcome** in relation to any and all-hazard risk.

    - As with any general EM program, the desired "outcome" is defined by program objectives. These are usually objectives contained in mission statements. Suggested healthcare EM program objectives are presented in Lesson 1.2.1 and repeated in Textbox 4.2.2.1. These can be used to directly extrapolate outcome objectives.

The overall objectives for the EM program include minimizing organizational disruption and addressing capacity and capability during response. These can be used to extrapolate outcomes in the evaluation program.

Textbox 4.2.2.1

Candidate Healthcare System EM program objectives

- Provide leadership and direction across all phases of emergency management.
- Identify hazards and take actions to minimize or eliminate their occurrence and/or their consequences.
- Define and prepare for the continuity requirements, protective actions, and service needs created by the hazard impact on the community and on the healthcare organization itself.
- Define individual, team and organizational responsibilities during emergency response and recovery operations, and the competencies to meet these responsibilities.
- Identify required resources needed for emergency response and recovery, and develop methods for acquiring and maintaining them in a state of readiness.
- Conduct effective organizational information management and effective decision-making during emergency response and recovery as well as during day-to-day mitigation and preparedness activities.
- Provide emergency response and recovery management and coordination within the healthcare facility and/or the healthcare system, as well as integration with the broader response community.

Though at times it may be challenging to achieve, formative evaluation is the preferred type of evaluation approach for healthcare systems.

- Complexity: Modern healthcare systems are extremely complex, characterized by a multifaceted web of activities that are carried out by a variety of public and private actors. Healthcare system emergency management within this construct involves establishing a management framework, coordinating resources, agreeing upon priorities, planning with parties that are parts of different organizations, and other activities. This complexity requires evaluation of the healthcare system EM program as a multi-layered network that must be organized to achieve operational readiness.

- Formative versus summative: The approach to evaluation advocated here is primarily formative in nature. Summative evaluation is used almost exclusively for accountability for external funding and regulatory requirements, and much of that can be drawn directly from the formative evaluation data collected primarily for system improvement.

- Varied evaluation instruments: Due to the complexity of assessing operational preparedness in healthcare systems, multiple evaluation methods are recommended, using inputs, processes, outputs, and outcomes in appropriate applications. Both qualitative and quantitative methods of evaluation may be implemented, which will broaden the understanding of capacities as well as capabilities.

- "Outcome measures" as the ideal: Whenever possible, objective, outcome-based measures should be used. This prescription is supported by the Institute of Medicine's Committee on Evaluation of the Metropolitan Medical Response System Program: "the importance of outcome-based indicators, especially those obtained from exercises or careful evaluations of real disasters, cannot be overemphasized."[24]

- Simulation to evaluate hazard preparedness: Many of the hazards of concern have not been experienced by individual healthcare systems (i.e., certain potential terrorist acts or technological and natural disasters). Simulations and proxy events, therefore, must be used to stress the system in a manner consistent with system assumptions about the response conditions during a real-world case. This important task requires high quality simulation to stress the system, as well as assessment tools to discern the degree to which a system is ready for emergency operations.

[24] Preparedness Indicators (2002). *Preparing for Terrorism: Tools for Evaluating the Metropolitan Medical Response System Program*. F. J. Manning and L. Goldfrank. Washington, D.C., National Academy Press**:** p. 99.

Organized Strategy for Comprehensive EM Program Evaluation

A specific evaluation strategy should be developed by an organization to assure that its EM program is evaluated in a balanced and comprehensive fashion and that each component is evaluated using the most effective evaluations methods for that type of activity. It should begin with the overall program assessment, which is based upon the program mission and objectives.

Two strategic areas of focus are provided for the healthcare EM evaluation program (see text).

- The component plans of the EM program: The EM program has component plans to accomplish the EM program objectives. Planning specific to mitigation, preparedness, and the EOP for response and recovery; these should all be included in the comprehensive program evaluation. As discussed earlier in this lesson, effective evaluation of both programmatic activities and emergency response and recovery performance requires a range of evaluation methods.

- Strategic options in program evaluation: The comprehensive approach to EM program evaluation involves two strategic evaluation pathways:

    - Programmatic performance evaluation: This evaluates the effectiveness and efficiency of the EM program is meeting its strategic objectives from the Strategic Administrative Plan and achieving the objectives of the annual work plans. This is primarily focused upon EM Committee activities, mitigation and preparedness planning and completion of related tasks; the effectiveness and efficiency of the activities is a component of the assessment. Programmatic evaluation is more fully presented in Lesson 4.2.3.

    - Emergency response and recovery performance evaluation: This strategic initiative assesses the actual performance of the system, generally through evaluating system function during emergency response and recovery exercises and actual events. This is a special subset of program evaluation and is more specifically presented in Lesson 4.2.4. It focuses upon the EOP and Recovery Plan, but provides indirect assessment of mitigation and preparedness planning as well.

Evaluation and Legal & Reputation Risk for the Organization

It should be noted that in some instances the findings from evaluation activities can become legally “discoverable” and/or subject to Freedom of Information Act if contained in public agency documentation.

Evaluation programs have legal implications that should not be prohibitive. Emergency managers are encouraged to consult their organizational legal counsel.

- Creating legal risk from mitigation and preparedness: A potential exists for good-faith efforts to create legal liability or reputation-related crisis. Conversely, the lack of documentation of earnest evaluation to improve mitigation and emergency response and recovery performance can be problematic.

- Involving legal counsel: Healthcare organizations should consult their legal advisors on how to protect themselves through the use of "risk management," "quality improvement," or other appropriate legal cover so that earnest efforts to optimize mitigation, preparedness, and emergency response and recovery system performance do not become a legal or financial risk.

- Public versus internal documents: The use of an executive summary or evaluation reports with general statements for "outside" release (the general public, regulatory agencies, and emergency response partners) while unattached appendices contain the necessary detail, are two documentation strategies that may be helpful in addressing these concerns.

- EM as a "quality"-related activity: As discussed in Unit 1, the EM program, including its evaluation process (meeting minutes, interim products, and final report) and all related documentation should formally be defined as an official part of the healthcare system's Safety and/or Quality Assurance/Quality Improvement program. This designation can be strengthened by locating the EM committee in an appropriate position within the organization's committee architecture, such as a subcommittee to the Safety Committee and also reporting to a clinical care committee where quality improvement activities are performed.

Joint Commission: Evaluation of Planning Activities and the Emergency Management Program

Evaluation prompts were previously discussed in lesson 4.2.1. For healthcare organizations, The Joint Commission Standards for Healthcare Organization Emergency Management Programs continue to be the most widely accepted evaluation program. These standards address both EM program planning and EOP response activities. They are presented below.

The 2009 revision of the Joint Commission Standards created a stand-alone chapter for Emergency Management (EM). The stated intent of this separate chapter is to not only improve organization and clarity of the

standards, but to reinforce an organization wide priority and effort in regard to emergency management programs. The Joint Commission continues to focus on an all-hazards approach, maintaining an Emergency Operations Plan (EOP), monitoring key areas during an emergency, and evaluation of both the planning process and the EOP.

Standards used to evaluate the planning process include the following concepts:

- Critical emergency asset support and on-site resource inventory and inventory management processes.
- Active participation of an organizations leadership including administration, medical and nursing staffs.
- Annual analysis and evaluation of the Hazard Vulnerability Analysis.
- Communication of needs and vulnerabilities identified during the EOP development to the greater community response agencies and coordination of available resources within the community in meeting those needs.
- Mitigation activities to reduce risk.
- Preparedness activities to mobilize essential resources and to manage those assets and resources during response.
- Development of response and recovery strategies.
- Maintenance of an Emergency Operation Plan with defined components and identification of capabilities and response efforts for a 96 hour stand-alone response with no community support in the six critical areas: communications, resources and assets, safety and security, utilities and clinical activities.
- Identification of alternate care sites.
- Emergency communication strategies.
- Resource sharing with other healthcare organizations.

The effectiveness of the EOP is primarily evaluated through exercises and through responses to actual emergency situations. TJC accreditation standards cover:

- Twice yearly testing of the EOP, either through an actual emergency or in a planned exercise.
- One exercise each year is escalated to evaluate the stand-alone capability of the organization without community support.
- Involvement of the greater community in a yearly exercise if the organization has a defined role in the community emergency management program.
- Realistic exercise scenarios are based upon the HVA.
- An individual whose sole responsibility during the planned exercise is performance monitoring and documentation of areas for improvement

in, at a minimum, the six critical areas: communications, resources and assets, safety and security, utilities and clinical activities.
- Exercises are critiqued through a multi-disciplinary process and appropriate modifications are made to the EOP.
- Prior improvements made on the EOP based upon identified areas for improvement found in previous exercises are evaluated.
- The results of the critiques from the exercise are communicated to the multidisciplinary improvement team responsible for monitoring environment of care issues.

The VHA Capability Assessment Program and development of Program Metrics

In 2007 the VHA directed the development of an emergency management assessment program for the operational readiness of VHA hospitals, Network Offices and their Central Office. The 2007-2010 assessment program was formulated with the assistance of multi-disciplinary internal VHA personnel and representatives of other federal agencies including Health and Human Services (ASPR and Agency for Healthcare Research and Quality, AHRQ), Homeland Security, Department in Defense (Health Affairs) and other external healthcare emergency management experts. The VHA "Capability Assessment Program" integrates all existing external and VHA emergency management-related standards and doctrine into one formative evaluation methodology. Lessons drawn from the Institute of Medicine (IOM) MMRS assessment recommendations and the Emergency Management Accreditation Program (EMAP) were internalized within the protocol to create an evaluation program using a variety of assessment methods placing a high emphasis on collaboration and organizational learning. Similar to the Joint Commission evaluation program, both "emergency operations capabilities" and "program level capabilities" are assessed. [25]

The assessment format divides the capabilities into six main areas for assessment:
- Program Level Capabilities
- Incident Management Capabilities
- Occupant Safety Capabilities
- Resiliency/Continuity of Operations Capabilities
- Medical Surge
- Support to External Requirements.

[25] US Department of Veterans Affairs. VHA Comprehensive Emergency Management Program Capability Assessor's Guide, Annex A (2007); Emergency Management Strategic Healthcare Group/VHA, Department of Veterans Affairs, Washington, DC.

A very detailed list of capability elements within each of the above capability areas has been described, with guidance for measuring the assessment components that correspond to the capability elements.[26]

In a related project, the VHA performed a regression analysis from findings from the 2005 web-based survey of all VA Medical Centers and Network Offices that preceded the Capabilities Assessment Program. The results of this analysis identified high-level metrics where the twenty-six most prepared VA Medical Centers in the 2007-2010 study performed well. These broad metrics that appear to correlate with effective preparedness are:

1. Committees are established at the VA Medical Center (VAMC) and Veterans Integrated Service Network (VISN)[27] levels that govern the emergency management program.

2. VAMCs and VISN Offices are represented in local, State and regional planning groups.

3. VAMCs and VISN Offices maintain Emergency Operations Plans and procedures.

4. VAMCs and VISN Offices have agreements in place for additional resources.

5. VAMCs and VISN Offices have identified resources necessary for an Emergency Operations Center.

6. VAMCs participate in community-wide exercises on a regular basis.

7. VAMCs and VISN Offices prepare After Action Reports and Improvement Plans following exercises and actual emergencies.

8. VAMCs and VISN Offices provide all hazards training to staff with responsibilities during emergencies.

[26] Department of Veterans Affairs, Veterans Health Administration. *VHA Comprehensive Emergency Management Program Analysis Capabilities Description* (January 26, 2008). Office of Public Health and Environmental Hazards, Emergency Management Strategic Health Care Group; Washington DC.

[27] A VISN is the Veterans Health Administration regional management and coordination network.

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Lesson 4.2.3 Performance-based Evaluation of the Healthcare Systems Emergency Management Program

Lesson objectives

- *List the evaluation types as related to EM program evaluation*.
- *List elements of the EM program that can be included in an overall review.*
- *Differentiate between qualitative and quantitative reviews.*
- *Summarize the steps involved in the strategic planning of EM programmatic evaluation.*
- *Summarize the steps required for effectively designing, developing, and conducting programmatic evaluation.*

Background

Programmatic evaluation in healthcare emergency management, as in any other EM program, is the process of analyzing the entire program, a component plan, or a subset thereof (including policy, process, procedure, product, or personnel). The end purpose of program evaluation is to determine where change is indicated and what change is needed. Excellent, Web-based basic program evaluation guides are available.[28] The proposed changes developed through program evaluation are then achieved through organizational learning (see Module 4.4).

- Program performance as the focus: Ideally, program evaluation should be performance-based. Lesson 4.2.1 differentiates "performance" evaluation approach for emergency response and recovery systems from the "performance" evaluation for the Emergency Management (EM) program. This lesson focuses upon the latter, EM program evaluation in more detail. EM program evaluation employs different metrics, and depends more on input, process, and **programmatic** output and outcome measures than on direct measures from response and recovery performance.

- Importance of programmatic evaluation: Programmatic evaluation is recognized as essential to the long-term success of an organization. It provides the method for achieving accountability, for determining needed program improvements, and for identifying indications for the EM program to evolve in a changing organizational environment. An example that reflects this importance is provided by the Federal

[28] McNamara C. *Basic Guide to Program Evaluation* (Feb 16, 1998); accessed April 4, 2010 at: http://www.managementhelp.org/evaluatn/fnl_eval.htm

Government Performance and Results Act of 1993 (see Textbox 4.2.3.1), specifically applicable to all Federal agencies.

Textbox 4.2.3.1

Government Performance Results Act (GPRA)

The Government Performance and Results Act of 1993 (GPRA)[29] was instituted as a government-wide requirement for agencies to set goals and objectives, evaluate their program(s) in the attainment of these goals and objectives, and report on their program(s) performance on an annual basis. Although not specifically mandated for healthcare programs outside Federal government authority, ongoing program evaluations are a necessary basis for any organization's viability, maintenance, and improvement.

The following are strategic concepts related to evaluation of the EM program

EM program evaluations can be classified according to performance measures used and the approach (formative versus summative). More recently published categorization schemes differ slightly, due to the purpose of the evaluation. These can be considered "industry applications."

- Programmatic evaluation types: Many "types" of evaluations have been described and a range of classification for these types is presented in the literature. Classification is commonly based upon the specific purpose of the evaluation, the evaluation measures used, or some combination thereof. McNamara refers to "at least 35 different types of evaluation" that have been described according to these factors.[30] Classifications in the literature are generally influenced by the source's orientation towards a summative or formative evaluation purpose (see Lesson 4.3.1 for description of these approaches).

  - Typed by evaluation measures: For simplicity and consistency with EM concepts, the classification of evaluation types in this text is described by the metric category used: input, process, output, and outcome evaluation, or the combination thereof. The program area being evaluated and the methods used will further qualify the specific evaluation description within the evaluation type.

  - Translating other categorization schemes: Most other evaluation categorization schemes may be easily translated into this classification. For example, a recent, authoritative representation from a primarily "summative" organization, the U.S. General

[29] OMB Website. *Senate Committee on Government Affairs GPRA Report*, accessed April 4, 2010 at: http://www.whitehouse.gov/OMB/mgmt-gpra/gprptm.html#h22
[30] McNamara, C. *Basic Guide to Program Evaluation* (February 16, 1998); accessed April 4, 2010 at: http://www.managementhelp.org/evaluatn/fnl_eval.htm

Accountability Office, is provided in Textbox 4.2.3.2.[31]

- The GAO presents four "types" of evaluation, but in its "accountability" role for the U.S. government does not discuss evaluations that are focused upon "inputs" or "outputs."
- The third GAO method, "impact evaluation," is described as a "form of outcome evaluation that assesses the net effect of a program by comparing program outcomes with an estimate of what would have happened in the absence of the program."[32] This is an extension of **outcome** evaluation as presented in Lesson 4.2.1.
- The "Cost-Benefit and Cost-Effectiveness Analyses," presented by the GAO as a separate evaluation type, is another example of a specific "industry application" of an outcome analysis. "Cost-effectiveness analysis assesses the cost of meeting a single goal or objective and can be used to identify the least costly alternative for meeting that goal. Cost-benefit analysis aims to identify all relevant costs and benefits, usually expressed in dollar terms."[33] The accountability industry recognizes cost analysis as one of its primary summative purposes and so has a designated category specifically for it.

Textbox 4.2.3.2

Performance Measurement and Evaluation: Definitions and Relationships[34]

"A program evaluation typically examines achievement of program objectives in the context of other aspects of program performance or in the context in which it occurs. Four main types can be identified, all of which use measures of program performance, along with other information, to learn the benefits of a program and how to improve it."

- Process (or implementation) Evaluation
- Outcome Evaluation
- Impact Evaluation
- Cost-Benefit and Cost-Effectiveness Analyses

[31] US General Accountability Office. *Performance Measurement and Evaluation* (May 2005). GAO-05-739SP; accessed April 4, 2010 at: http://www.gao.gov/new.items/d05739sp.pdf
[32] Ibid
[33] Ibid
[34] US General Accountability Office. *Performance Measurement and Evaluation* (May 2005). GAO-05-739SP; accessed April 4, 2010 at: http://www.gao.gov/new.items/d05739sp.pdf

EM program evaluation goals should include assessment of effectiveness and efficiency of the entity being evaluated.

- Goals of programmatic evaluation: A professional emergency management programmatic evaluation, whether summative or formative, is a proactive and carefully planned activity with two primary goals:

  1. To assess **effectiveness** or the degree to which a program is achieving its intended goal (or accomplishing a task) or whether program plans will achieve their goals when activated.

  2. To determine the **efficiency** (financial, time, and effort) with which a program is performing.

EM program evaluation should be incorporated into all aspects of the program, and it should be established as the EM program is established to ensure its success.

- Programmatic evaluation as an integral component of the program itself: Evaluation should be incorporated into each distinct component of the EM program. Programmatic evaluation that is initiated simultaneously with new program implementation may have a greater ability to be permanent and to produce desired results.

  - Early changes: Early monitoring offers the opportunity to make quick improvements with interventions that steer a program towards success.

  - Continuous process: It is of great importance to see evaluation as a continuous undertaking, and this is best established at the outset of any program rather than as a *post hoc* consideration initiated in response to an external, often adverse, prompt (see earlier discussion).

  - Timely reporting: A process can be established such that the reports and feedback generated by evaluation can be communicated to program managers and stakeholders in a timely and coherent manner so that corrective actions can be taken and system improvements implemented prior to major problems.

  - Integral to new program development: Evaluation methods should therefore be incorporated into a new program as it is conceptualized. Using that approach, evaluation can be fully incorporated during the process of program design, development, implementation, and maintenance.

- Evaluation strategy: What is specifically evaluated and how frequently must be carefully considered in any evaluation program. Resources, obvious need for change or improvement, outside accountability, balance with other activities, and other requirements must be considered. This presents a compelling argument for using strategic

planning (see strategic planning template later in this lesson) to address these many considerations in an organized fashion. Strategic planning can also be used to acknowledge and account for the extensive informal evaluation that occurs in a well-run EM program (see next bullet).

- Formal versus informal program evaluation: It is also important to recognize that, while this lesson has focused primarily upon formal evaluation, a range of **informal program evaluation activity** also occurs during emergency management program activities. Many aspects of the EM program are evaluated on an informal basis, accomplished by the program manager and EM committee members during review and revision of component plans, during committee discussions, and other activities. The determinations from these informal activities may also be important to capture and incorporate into the organizational learning process (See Lessons 4.4.1 and 4.4.2).

- Timing of evaluations: All aspects of the EM program should undergo performance-based evaluation on some time-related basis. This time-basis may be:

  - Onetime: All important aspects of the EM program should undergo formal evaluation, at least once, to both assure and document adequate performance. This onetime evaluation might be most appropriate when major changes or revisions are undertaken to the program.

  - Intermittent: Intermittent evaluation occurs according to a pre-determined schedule or according to pre-designated trigger criteria that prompts the assessment activity. This is usually more desirable but more labor intensive than one time evaluation of the program

    - Purpose: To assure that important EM functions are evaluated at appropriate intervals.

    - Frequency: The frequency and/or trigger for formal evaluation should be determined in part by the relative importance to mitigation of risk and to emergency response and recovery effectiveness.

    - EM program review: Much of this intermittent evaluation ideally takes place in the context of an annual EM program review or at the time that the strategic plan for the overall program is revised (e.g., one year, three year, and five year). Much of this

All EM programs undergo some intermittent evaluation in addition to single evaluation activities. These may be yearly evaluations (formal), or the regular monthly reviews of specific program components that can be conducted during EM Committee meetings.

is a straightforward assessment of "completion of tasks": "Did we meet the mitigation plan objectives for this year (which were designed to be measurable and objective)?"; "Did we complete the tasks listed in the annual work plans?"; "Did we meet the preparedness plan objectives for this strategic planning period?"

- EM committee meetings: Intermittent evaluation is also essentially what is accomplished by EM committee meetings. The agenda, conduct of the meeting, and capture of evaluation data for immediate and for long-term comparison analysis can be considered to be an evaluation process if properly conducted.

- Continuous: Continuous Monitoring is another specific approach to programmatic evaluation that may be considered. This can be the most resource intensive and yet most beneficial to the organization. It is typically more useful for specific high-risk or central elements of the EM program rather than the overall program itself.

  - Purpose: In emergency management, continuous or frequent monitoring (i.e., evaluation and frequent re-evaluation) is used to assure that mitigation, preparedness, response and recovery capabilities critical to success of the organization are evaluated on a continuing basis to assure they are constantly functioning as designed.

  - Design: Specific performance measures are continuously collected and analyzed. Generally, continuous monitoring is designed so that thresholds are set and/or other anomalies are readily detectable. Methods for further investigation should be established so that appropriate intervention, if indicated, can be promptly accomplished.

    - Example from hospital emergency management: An example of preparedness monitoring is daily radio checks of a hospital mutual aid radio system, conducted at a random time during each 24-hour period, with recording of each healthcare organization's notification confirmation. By performing real-time and monthly analysis, with feedback to healthcare facility chief executive officers, a very high rate of functional participation by hospitals may be maintained over time.[35]

[35] Described in multiple documents at www.dcha.org, plus internal D.C. Hospital Association committee documents. Description of Hospital Mutual Aid Radio System

- Example from clinical medicine: This concept is common in clinical medicine, when "performance measures" are used for ongoing monitoring of adherence to clinical practice guidelines.[36]

- Selecting targets for program evaluation: As with all other aspects of emergency management, formal evaluation actions must be assigned a relative priority and placed in timeframe based upon needs and available resources. The following examples are components of the EM program for consideration in selecting evaluation targets.
  - HVA (see Module 1.3)
    - The HVA findings: Accuracy and comprehensiveness of the hazard survey, assessment, and analysis.
    - The HVA instrument itself: Effectiveness of the HVA instrument in establishing priorities for mitigation, preparedness, response, and recovery planning.
    - The HVA process: Representation of organizational and "outside" parties and other parameters of the organization's HVA process.
  - Mitigation Planning
    - Mitigation planning objectives: The objectives, which are set in the annual mitigation plan, can be evaluated as to whether they were met (i.e., outcome). In addition, specific tasks (processes) utilized to achieve objectives can be evaluated for efficiency and effectiveness.
    - Specific mitigation plans or activities: Evaluation of specific, formally planned mitigation activity can also be conducted. For example, changes to the security perimeter, improvements in the physical structure of the facility, increasing generator capacity, or adding hurricane shutters can be assessed for completion and meeting the intended purpose. At the very least, all of these that are "completed" should be documented as such for accountability. Credit should be provided to the EM

Continuous EM program evaluation requires the continuous collection of performance measures. Efficiency for this continuous process can be enhanced by only conducting analysis when certain parameters indicate the need (see text).

(HMARS) presented in: Malson RA. Testimony for The Joint Public Oversight Hearing on District of Columbia Emergency Preparedness (October 28, 2002), accessed April 4, 2010 at: http://www.dcha.org/EP/102802EmergPrepTest.PDF

[36] American Heart Association. *Performance measures*; web site accessed April 4, 2010 at: http://www.americanheart.org/presenter.jhtml?identifier=3012904

committee or others responsible for successfully completing the mitigation activity.

- Preparedness Planning

  - Preparedness planning objectives: Similarly, the achievement of the annual preparedness planning objectives can be evaluated as a preparedness outcome evaluation. Specific tasks within the preparedness plan can be evaluated through process and outcome evaluations to assess efficiency or effectiveness.

  - Specific preparedness plans, programs, or activities: These will generally include:

    - The EM instructional program: Evaluation could include measures of the number and type of education and training courses and instructional drills, numbers certified or trained to a specific competency and proficiency level. Evaluation of training outputs, for example, could be guided by the question: "Do we have enough personnel at all times with the required certifications and qualifications to staff the key response positions?"

    - The EM exercise program: Evaluation could include how the exercises were selected, designed, and conducted. This would reflect the **exercises and exercise program**, not the exercise findings related to emergency response and recovery system performance. This is further addressed in Lesson 4.2.4.

    - EOP implementation and maintenance: This covers a wide range of activities. A sampling includes:

      - Personnel recruitment.

      - Facilities construction.

      - Equipment and supplies acquisition, storage, and maintenance.

      - Resource typing and other activities.

- EOP execution

  - The EOP and its structure, sections, functions, and other

aspects are formally assessed almost exclusively through performance-based evaluation of the exercise, evaluative drills, proxy events, and actual incidents. Examples include evaluation of:

- Functional component coordination.
- Information management.
- Incident action planning.

- Recovery Plan

  - Generally, the recovery planning is evaluated in the same manner as the EOP.

- Potential programmatic evaluation methods: a wide-range of valid methods is available to collect "measures," and have been advocated for the spectrum of EM programmatic evaluations.

  - Methodological options: Data collection can be conducted through self-assessments, focus groups, participant observation (fieldwork) and logs, document and organizational record analysis, open-ended interviews, ethnographic analysis, questionnaires, surveys, expert judgment, standardized tests, and equipment trials.[37] Every data collection method, whether qualitative or quantitative, has both strengths and weaknesses. An important selection consideration is the use of qualitative versus quantitative methods:

    - Qualitative methods: These require a degree of subjective interpretation, which means that observer bias can become an issue. Without objective guidance, "the evaluator literally becomes the primary measurement instrument in the investigative process"[38] when qualitative methods are used. On the other hand, this methodology allows the evaluator to capture nuance and detail; it also provides the ability to assess issues and areas that are not measurable via straightforward quantitative methods.

    - Quantitative methods: These often have a checklist character, and although they can produce relevant and helpful

[37] Adapted from: Wholey, J., Hatry, H., et al (Eds). *Handbook of Practical Program Evaluation* (1994). San Francisco, Jossey-Bass Inc: p. 49.
[38] Caudle, S. Using Qualitative Approaches; In Wholey, J., Hatry. H., Newcomer. K. *Handbook of Practical Program Evaluation* (1994), San Francisco, Jossey-Bass Inc: p. 70.

measurements, such as **quantity** of training modules taught, they are unable to answer the **quality** of delivery and the outcome questions. They are also not well suited to evaluating internal organizational processes (process evaluations).

- Quantitative versus Qualitative: Quantitative methods are often viewed as more objective because they approximate methods employed in the natural sciences and allow the evaluator to be a more detached observer recording numerical values. Qualitative measures, however, if guided by objective, relevant guidelines, operational checklists, and observers' recording instruments (see example in Lesson 4.2.4) may attain a similar level of objectivity as an evaluation measure.

- Evaluation methods guidance: A useful guide for evaluation data collection methods, developed for nonprofit organizations,[39] is provided in Exhibit 4.2.3.3.

Textbox 4.2.3.3:

Overview of Methods to Collect Evaluation Information

Method	Overall Purpose	Advantages	Challenges
Questionnaires, surveys, checklists	When need to quickly and/or easily get lots of information from people in a non-threatening way	-can complete anonymously -inexpensive to administer -easy to compare and analyze -administer to many people -can get lots of data -many sample questionnaires already exist	-might not get careful feedback -wording can bias client's responses -are impersonal -in surveys may need sampling expert - doesn't get full story
Interviews	When want to fully understand someone's impressions or experiences, or learn more about their answers to questionnaires	-get full range and depth of information -develops relationship with client -can be flexible with client	-can take much time -can be hard to analyze and compare -can be costly -interviewer can bias client's responses

[39] Adapted from: McNamara, C. *Basic Guide to Program Evaluation* (Febuary 16, 1998); accessed April 4, 2010 at: http://www.managementhelp.org/evaluatn/fnl_eval.htm

Documentation review	When want impression of how program operates without interrupting the program; is from review of applications, finances, memos, minutes, etc.	-get comprehensive and historical information -doesn't interrupt program or client's routine in program -information already exists -few biases about information	-often takes much time -info may be incomplete -need to be quite clear about what looking for -no flexible means to get data; data restricted to what already exists
Observation	To gather accurate information about how a program actually operates, particularly about processes	-view operations of a program as they are actually occurring -can adapt to events as they occur	-can be difficult to interpret seen behaviors -can be complex to categorize observations -can influence behaviors of program participants -can be expensive
Focus groups	explore a topic in depth through group discussion, e.g., about reactions to an experience or suggestion, understanding common complaints, etc.; useful in evaluation and marketing	-quickly and reliably get common impressions -can be efficient way to get much range and depth of information in short time - can convey key information about programs	-can be hard to analyze responses -need good facilitator for safety and closure -difficult to schedule 6-8 people together
Case studies	To fully understand or depict client's experiences in a program, and conduct comprehensive examination through cross comparison of cases	-fully depicts client's experience in program input, process, and results -powerful means to portray program to outsiders	-usually quite time consuming to collect, organize, and describe -represents depth of information, rather than breadth

Performance-based Programmatic Evaluation: A Template for the Strategic Evaluation Plan

- Strategic EM Program Evaluation Plan: All of the above considerations are incorporated into the development of a logical approach to **overall** EM program evaluation. The selected approach used in any EM program is essentially accomplished through strategic planning. The following outline therefore presents recommended steps to accomplish strategic planning for EM program evaluation activities:

  1. Constitute a strategic planning task group within the EM committee.

The EM program evaluation considerations presented earlier in this lesson are summarized into a strategic template for overall EM program evaluation.

2. Convene an evaluation strategic planning session.

3. Review pertinent evaluations accomplished in the past. Assess strengths and weaknesses of past evaluation activities, including any strategic planning for evaluations.

4. Review annual work plans and determine what additional data exists on the current state of:
   a. EM program implementation efficiency, and effectiveness.
   b. Any areas of concern or other indicators of the current state of the EM program.
   c. Component plans.
   d. Formal EM program activities.

5. Set statement of purpose and goals of the overall evaluation program or strategic plan.

   - Describe how evaluation will improve the **EM program effectiveness.**

   - Describe how evaluation will improve **EM program efficiency** (accountability or completion, effort and financial costs, and other efficiency-related objectives).

   - Prioritizing strategy for evaluations - a "what-should-be-evaluated-first" guide that establishes a priority for evaluating potential elements/gaps in the EM program and its component plans.

6. Define the process to be used for formal evaluation of the overall EM program and its components. This provides guidance to each specific evaluation team to develop the performance metrics and units of measures and other steps for each specific evaluation (see template for individual evaluations below).

7. Along with the activities in #6, acknowledge the informal evaluation that occurs with EM committee meetings and reviews of EM program documentation. Establish a formal method to capture (i.e., document) findings from this informal activity, so they may be incorporated into organizational learning.

8. Define the metrics that will indicate **EM programmatic success** during the time interval covered by the strategic planning. In many instances, metrics will be easy to provide if the EM program is well described (for example, the mitigation plan objectives could serve as the metrics for evaluating the mitigation plan). If "expert

judgment" will be a component of program evaluation, define what constitutes expert judgment (see earlier section on expert judgment).

9. Confirm the recommended strategy/process for evaluation findings to update the EM program and component plans (recommendations to be accepted by the EM committee).

10. Designate the schedule, types, and number of formal and informal evaluations to be conducted for the time interval covered by the strategic plan. Be sure to coordinate this with the exercise planning for the same time period, since that is another important evaluation activity (see Lesson 4.3.4) with outputs that must be closely coordinated or merged with programmatic evaluation findings.

11. Develop and assign evaluation teams for each activity.

12. Define parties in the local community that may benefit from receiving the evaluation findings.

13. Conduct the evaluations as projected in the strategic plan (see next section).

14. Perform the analyses as planned; capture the findings for further processing (see Lesson 2.3.1).

15. Periodically evaluate the strategic evaluation planning process and develop recommended changes; implement the recommendations ("organizational learning") within the organization (see Lesson 4.4.2).

Performance-based Programmatic Evaluation: A Template for Each Individual Evaluation

The following process template provides guidance for more focused EM program evaluations (i.e. designing, developing, conducting, and applying programmatic evaluation for each individual emergency management program activity). It is presented as a general guide that summarizes the program evaluation material discussed in this lesson.

A template is provided for evaluation of specific components of the EM program.

1. Select an evaluation team: Select personnel to design and develop the evaluation, based upon the area to be evaluated. This is usually a subset of the EM committee, with some representation from the evaluated entity (particularly in a formative evaluation process). For

example, chaplains and personnel who manage the family assistance center during healthcare emergencies should be involved in the evaluation of its structure and operations.

2. Establish the evaluation's **specific** goal and objectives: This step may have already been accomplished by guidance from the emergency program manager, the larger EM committee, the EM program strategic planning task group, or by an outside entity. In many of these cases, the evaluation group may translate the guidance into a goal and objectives that are directly useful for designing and developing the specific evaluation process. This should include delineating the "audience" that is to receive and act upon the evaluation report.

3. Establish the evaluation approach: Based upon the goal and objectives and final "audience" for the report, determine whether the evaluation is primarily summative or formative. A simple rule-of-thumb might be: if the evaluation is intended to promote change in the evaluated entity, then a formative process is utilized.

4. Develop evaluation strategies: This involves selecting the methods that will most efficiently and effectively achieve the evaluation objectives.

    - Focus: this could have multiple parameters:

        - Narrow (single task or unit) versus wider focus.

        - System-focused using system objectives, concept of operations, operational checklists, and other pre-developed materials.

        - Perception-focus involving data collection, looking at organizational responders' and "customer" satisfaction (patients, jurisdictional partners, etc.) where interviews and surveys may be more useful.

        - Other.

    - Temporal nature: Whether the evaluation is "onetime," intermittent (if so, regular versus triggered), or continuous (see monitoring above). The timeframe for when the findings are needed must also be considered.

    - Establishing metrics and measures: The type of performance metrics and measures are selected using the considerations presented in this lesson (relative value, ease of use, translation to

metrics, etc.). This defines the evaluation instrument.

- Evaluation instrument validity, reliability, and predictive value: The evaluation designers should strive towards validity and reliability of evaluation instruments. It is important to examine whether the selected metrics and measures are actually useful predictors of program performance (i.e., **effective performance measures**) for mitigation and preparedness and/or effective performance during emergency response and recovery.

- Determine available sources to obtain data: These include planners, responders, and "customers" (patients, patient families, the media, responders from community partners and others, other reports and data pools, etc.). For information collection involving individual interviews, questionnaires, and surveys, the need for informed consent should be determined through the organization's institutional review board.[40]

- Methods of data collection: Methods include observation, self-reporting, interviews and focus groups, survey, facilitated meeting, and others (see Textbox 4.3.3.3).

- Measures and Metrics to be used, analytic process, and evaluation determinations (judgments): See remaining steps for details.

5. Evaluators: Determine who will conduct the evaluation.

6. Evaluation design and development: Design the evaluation process; then develop it, pilot test, and revise if this is indicated.

   - Guidance: Develop the instruction for the exact entity to be evaluated, the specific input, process, output, and outcome measures that will be captured and how they will be analyzed against the metrics.

   - Tools: These include checklists, surveys, interview questions, and others, including the instruments that the evaluators will use to objectively capture the findings.

   - Analysis: Designate personnel to do the analysis (if this activity is separated from the evaluators).

   - Evaluation determinations: Delineate how these will be accomplished and what constitutes success versus failure,

[40] Institutional Review Board is the body that oversees human research studies in healthcare organizations.

adequate versus "improvement needed," or other classification for the final determinations. This commonly should also address resource utilization, efficiency, and cost-effectiveness: "Can you do it with fewer resources, less expensive resources, or other less expensive approaches?" (i.e., the central focus of some evaluations may be determining cost benefit or cost effectiveness[41]).

7. Conduct the evaluation: Acquire the information and format it so that the information can be objectively analyzed.

8. Conduct the analysis: The evaluation findings must be objectively compared to the selected measurement index: the evaluated entity's objectives, metrics, standards, indicators, or other criteria.

9. Apply the analysis: This is accomplished according to the evaluation approach (formative versus summative):

    - For a **formative evaluation**: The analysis findings should be in a format that can be readily imported into the organizational learning process (see Lesson 4.4.1 for details – the following steps summarize the organizational learning process described in Lesson 4.4.2):

        - Process the analysis: Transform the analysis findings to information that objectively describes potential organizational change and its projected impacts.

        - Develop a determination: Judgment in the formative evaluation is usually focused upon potential change that will bring improvement or will institutionalize informal but well functioning findings. During the organizational learning process, a judgment is made as to whether the recommended change is accepted as is, accepted with a revision to the "action plan for improvement," or is rejected. This is based upon the merits, priorities, cost-effectiveness, and other impacts to the organization, Activities might include providing important references that can be utilized to improve the system element being evaluated.

    - For a **summative evaluation**: The findings can be judged as to whether they are a valid presentation of the state of the evaluated entity and whether the entity's performance is acceptable or

[41] US General Accountability Office. *Performance Measurement and Evaluation* (May 2005). GAO-05-739SP; accessed April 4, 2010 at: http://www.gao.gov/new.items/d05739sp.pdf

unacceptable (or can be assigned a "grade") according to the summative criteria.

- For both types of evaluations: It is generally advisable to meet with the personnel from the evaluated entity, explain the findings and determinations, answer questions, and seek feedback on their view of the validity of the findings and determinations. Their recommendations for the "way forward" should be sought from this venue, and in many formative evaluations, this should occur before completion of the following steps. This interaction should be accomplished in a positive fashion wherever feasible and appropriate.

10. Determine further evaluation needs for this issue: Based upon the overall evaluation findings and recommendations, and/or upon "outside" direction, a decision should be made as to whether further evaluation is needed. If it is, the approximate timeframe and other details should be documented. This would be submitted for consideration in the follow-on strategic preparedness planning that addresses evaluation activity (see Step 3 in the evaluation strategic planning process).

11. Reporting the program evaluation: The evaluation team develops and submits the evaluation report to the appropriate body, which usually is the EM committee. When accepted, the results are disseminated and archived through EM program reporting processes.

    - Reports can range from brief statements and attachments to the EM committee minutes, to an evaluation section in an EM program annual report, or to formatted, summative answers to meet "outside" organizations' accountability requirements.

        - For organizational purposes, reporting should be developed with format and content most conducive to organizational learning whenever possible (see Lessons 4.4.1 and 4.4.2).

        - Accuracy and level of detail are important, with attention to privacy, professionalism, proprietary interests, and legal/financial risk as indicated and discussed in Lesson 4.3.1.

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Lesson 4.2.4 Performance-based Evaluation of the Healthcare Emergency Operations Plan: Developing and Conducting Exercises

Lesson objectives

- *List approaches for designing and conducting emergency response exercises.*
- *Describe the use of competencies in exercise design and evaluation.*
- *Explain the purpose of an Exercise Program.*
- *Describe considerations in planning and developing exercises, including the key characteristics of exercises.*
- *List the general considerations that differentiate exercise types.*
- *Describe the specific steps in planning, developing, and conducting effective tabletop exercises.*
- *Describe the specific steps in planning, developing, and conducting effective functional and full-scale exercises.*
- *List the exercise considerations specific to healthcare systems (tabletop, functional, full-scale).*

Introduction

Exercise (see terminology textbox) is a planned preparedness activity that is developed and conducted to evaluate the emergency response and recovery system, or specific functions or elements of the system. Its **primary** purpose is to accomplish "performance-based evaluation" (see Lesson 4.2.2), or simply put, to answer the question "Did ___ perform as expected?" This allows determination of whether specific emergency response or recovery objectives can be achieved without having to experience an actual emergency or disaster. It also indirectly evaluates progress towards the EM program's preparedness objectives.

Exercises are an evaluation tool. The appropriate instructional activities should be conducted before the exercise. Otherwise, the performance findings from the exercise are unreliable.

Terminology alert!

Exercise: A scripted, scenario-based activity designed to **evaluate** the system's capabilities and capacity to achieve overall and individual functional objectives and to demonstrate the competencies for relevant response and recovery positions. The purpose of exercise evaluation is to determine an objective, valid indication of future system performance under similar conditions, and to identify potential system improvements.

- Evaluation as the objective: Like instructional and other EM activity, exercises are designed, developed, and conducted to achieve specific, attainable objectives. **Exercises are primarily an evaluation activity, and the objectives for each exercise should reflect this.**

- Relationship of exercise to system development: Exercises should never be considered a starting point in system development (see Textbox 4.2.3.1), but as a method to evaluate the performance of an established system and/or its component sub-systems, processes, procedures, and competencies.

Textbox 4.2.4.1

Exercise as a Primary Training or Plan Development Tool

Even though common practice, it is an inappropriate and ineffective practice to use exercises as initial or early **individual and team training experience**. It can actually be detrimental to conduct an exercise with personnel who have not received the necessary instructional foundation to accomplish their job functions, resulting in unsafe conditions or very discouraging outcomes. Within an exercise, a small percentage of participants may be primarily being trained (particularly expert-level training). These personnel must be carefully monitored and supported by experienced proctors.

Conducting exercises on an incomplete System Description/ Concept of Operations has little true value and can lead to complications.

Similarly, it is not appropriate to conduct an exercise as a means of defining the emergency response and recovery organization and guidelines. The system being evaluated must already have been adequately defined **with objectively described system, processes, procedures, positions, facilities, equipment, and supplies.** It is only under this setting that the exercise performance can be compared to the designed system function. Conducting an exercise to develop system design requirements is inefficient and potentially misleading:

- It risks the incorporation of exercise artifact (defined and discussed later in this lesson) into the system design.
- Exercises cannot be considered an objective system evaluation with predictive value for future performance if personnel haven't been adequately trained for their roles.

- Relationship of exercise to instructional activities: While some practice and instructional activity occurs in all exercises, this should not be the primary reason to conduct exercises (see scenario-based training as

an alternative activity). By assessing the competencies demonstrated by exercise actors, an exercise indirectly assesses instructional activities for the relevant individuals and teams.

- Exercise and "practice": **Secondarily**, exercises may be viewed as activities that provide practice (e.g., training) opportunities for participants. While skills can be practiced and knowledge acquired for some during a well-planned and executed exercise, this is not the primary purpose. That purpose is better served through a competency-based instructional program (i.e., training and education) - see scenario-based training in Lesson 1.5.8. Expert level training may be included in the exercise, since this may be the place for field experience in expert judgment under realistic conditions. The trainee should be mentored by someone competent in the position so that the exercise flow will not be impeded by "student" decisions.

- Sequencing training with exercise: Training and exercise can be paired sequential experiences. For example, operations-level training can be provided, and then be followed by an exercise to evaluate the system performance at some point post-training. This can be an effective method for accomplishing instruction and assuring it is effective. This approach shouldn't, however, "cheat" by training directly to the exercise, since the evaluation will provide only dangerous over-confidence rather than a true test of system preparedness.

- Exercise as partnership facilitation: Exercise, if well-planned and executed, is also an important method for imparting understanding of, and respect for, the healthcare system's emergency response capabilities to outside agencies that interface with the healthcare system during all phases of emergency management.

A Systems-based Approach to Exercise Activities

Exercise serves as a key step in **continuously improving** the overall response system and/or specific aspects of the EOP. Each exercise should therefore be carefully designed, developed, implemented, and evaluated to assure optimal benefit.

- Focus areas for exercise evaluation: Almost all aspects of the EOP, including recovery planning, can be assessed through properly conducted exercise activity. Common areas are listed in Textbox 4.2.3.1. These include the EOP structure, sections, functions, process and procedures, response tools, preparedness and proficiency of

individual staff positions, and functional elements, as well as adequacy and function of equipment and supplies.

Textbox 4.2.4.2

EOP Components Commonly Evaluated Through Exercises

- Organizational structure
- Individual functions
- Mobilization processes and procedures
- Incident operations processes and procedures
- Demobilization processes and procedures
- Adequacy of overall and functional preparedness activities as guided by the EOP
- Effectiveness of individual positions
- Effectiveness of functional elements
- Effectiveness of training (indirectly)
- Adequacy and function of supplies and equipment
- Functional adequacy of emergency facilities (e.g., hospital command post or emergency operations center)
- Effectiveness of recent system "improvements"

- The role of an exercise **program within the larger EM program**: Exercises should not be considered isolated activities within the EM program. Instead, they should be scheduled as a coordinated series that provide balanced evaluation across the emergency response and recovery system. This should also demonstrate a relationship with other elements of preparedness, including training, new resource development, and recent completion of mitigation measures. A structured exercise **program, is achieved through strategic preparedness planning,** providing an overall exercise strategy consistent with EM program objectives. The strategic preparedness plan should therefore establish an ongoing cycle of exercises.

  The exercise program itself can be assessed during EM Program evaluations. Both FEMA and The Joint Commission have provided guidance that could be used as metrics against which the exercise program can be measured.

  - FEMA-suggested metrics: FEMA's exercise guidance provides bullets that suggest metrics for an effective exercise program (see Textbox 4.2.3.2 below).

Textbox 4.2.4.3

FEMA: An effective exercise program will:[42]

- Identify EOP strengths and weaknesses.
- Confirm resource requirements.
- Clarify the appropriateness of team and individual responsibilities.
- Reinforce individual and team competencies.
- Demonstrate the areas that need additional coordination.
- Identify and strengthen intra- and inter-organizational relationships.
- Comply with recommended and required exercise program standards.
- Provide a means of applying the exercise evaluation results for the continuous improvement of the EOP and EM program through an inclusive After Action Report and system improvement process.

Exercise guidance provided by many sources can be used as metrics for an effective exercise program.

- The Joint Commission exercise-related accreditation standards: Within the healthcare community, The Joint Commission (TJC) has disseminated the most widely accepted exercise standards for healthcare organizations within the United States. These standards have recently been upgraded and are presented in Textbox 4.2.3.3. A review of the TJC standards reveals that they are also generally consistent with the ISD process. An organized, programmatic approach to exercises that is supported by the ISD process will meet or exceed TJC accreditation standards related to developing and conducting exercises.

[42] Adapted from: *Guide to Emergency Management Exercises.* Federal Emergency Management Agency Emergency Management Institute. Emmitsburg, Maryland. 1997.

Textbox 4.2.4.4

Joint Commission:
Environment of Care and Hospital Exercises

The Joint Commission has recognized the importance of exercising emergency plans. Its 2006 standards related to exercise have greatly expanded over past guidance. [43] The requirements expanded further in the 2008 accreditation standards.[44]

The standards address:

- Stressing the hospital EM system with the exercise.
- Using plausible scenarios based upon the HVA.
- Thorough and objective performance evaluation, with multiple accompanying requirements.
- Communicating evaluation findings throughout the organization.
- Regular exercises or actual response (twice/year) - Tabletop exercises don't count, except they may satisfy a communitywide exercise requirement; One annual exercise each year must include influx of actual or simulated patients.
- Exercise evaluation covering notification, internal and external communication, and a range of patient care activities, including tracking.
- The organization must examine its ability to sustain operations and perform without the support, including re-supply, for an extended period.
- Improvements to be made based upon exercise findings, and these are evaluated in future exercises.

Additional considerations for the organization's exercise program are presented later in this lesson.

Exercise Planning and Initial Development

A systems approach to exercises should be used. A process similar to the ISD for instructional activity (see Lesson 1.5.8) may be applied, with

[43] Joint Commission Resources. Emergency Management Drills: Revised Standards Encourages Organizations to Improve the Quality of Emergency Exercises, in *EC News: The Official Joint Commission Environment of Care® News Source* (March 2006), Volume 9, Issue 3; Oakbrook Terrace, Illinois.

[44] The Joint Commission. *Approved: Revisions to Emergency Management Standards for Critical Access Hospitals, Hospitals, and Long Term Care.* In Perspectives, (June 2006);23(3), pages 1-10 Oakbridge Terrace, IL

minimal adaptation, to exercise planning and implementation. The ISD process provides guidance that is consistent with and perhaps more structured than exercise guidance provided by common authoritative sources. It provides guidance to analyze (set exercise objectives), design, develop, implement (conduct), and evaluate EM program areas described above. This approach is recommended, both for simplicity and for promoting consistency with instructional activities. The ISD application to exercises is presented here, followed by additional detail drawn from other exercise guidance sources.

- Goals and Objectives: During the analysis phase, the **exercise goal(s)** (mission) and **objectives** are determined and delineated. Defining these objectives is essential to focus the exercise on specific EOP areas that the emergency program managers have chosen to emphasize and "exercise." For example, key exercise objectives may include: "evaluation of the healthcare system command post function," "demonstrating effective use of the portable communications equipment," and "evaluation of the new procedures for interfacing with the city's Emergency Medical Services."

- Strategy: The exercise is planned, developed, and conducted primarily to evaluate the EOP and its processes, procedures, and other system components and qualities. It is **not** accomplished primarily to evaluate any specific individual's performance.

    - System focus: The exercise objectives should be similarly restricted to "exercising" and evaluating the EOP and its components, and should not focus upon the evaluation of specific individuals or the everyday clinical skills and knowledge of staff. It should be emphasized (during both exercise planning and in pre-exercise communications to the hospital personnel) that the exercise **assumes** the clinical competency of hospital staff and is **not** intended to test the individual medical/nursing knowledge of clinicians and other providers. Rather, exercise is intended to evaluate the system's ability to adequately address the event as well as the response-generated demands during emergency response and recovery.

    - Position/team focus: If individual position and/or team performance within specific positions and functions will be a focus of evaluation, this should be prominently noted in the exercise objectives. This may be important in assessing clinical activities related to emergency response and should be clearly publicized as **performance within the context of the EOP**. Examples where this may be important include:

Exercises are primarily focused on system, or system component, evaluation, not assessment of individual participants. When evaluation will be conducted for individual activities (see text for examples), participants should be notified that this is within a "systems" context (e.g., adequacy of the system design, adequacy of training etc.,) and not for personal "grading."

- The pace of patient triage
- The adequacy of decontaminating (removing) a simulated chemical
- The effectiveness of providing life-saving interventions during patient decontamination
- The surge capacity to register and process lab specimens from a large number of victims
- The surge capability to set-up and administer very unusual and cumbersome pharmaceuticals and vaccines.

See the exercise design template at the end of this lesson for further application of the ISD process during exercise-related activities.

Planning and Conducting Exercises

EM programs should strongly consider using ICS to develop and conduct the exercise and the After Action Report process.

The choice of the exercise scenario should be directly relevant to the exercise objectives. In addition, the scenario should be realistic and allow accomplishment of the exercise objectives.

Over the past decade, emergency response and recovery exercises have developed a relatively standard set of management recommendations and nomenclature for the job titles and associated roles and responsibilities in conducting the exercise (participants, evaluators, safety personnel, etc.). Relatively comprehensive references are available, including the Homeland Security Exercise and Evaluation program (HSEEP) and the VHA's Exercise Builder-Hospital Program.[45,46]

Only key terms and concepts are presented here:

- Managing the exercise: **The exercise should be managed using ICS**. This includes establishing an organizational structure (using ICS principles) for developing and conducting the exercise. The exercise evaluation process should also use ICS for information processing, analysis, and lead to continued use of ICS for managing the After Action Report process (see Lesson 4.3.3).
- Exercise Scenario: All exercises are scenario driven, with a scenario that prompts decisions, actions, and outcomes (actual or verbalized) that address the exercise objectives.

[45] US Department of Homeland Security. *Homeland Security Exercise and Evaluation program (HSEEP)*. Federal Emergency management Agency. Web site accessed April 11, 2010 at: https://hseep.dhs.gov/pages/1001_HSEEP7.aspx

[46] US Department of Veterans Affairs, Veterans Health Administration. *Exercise Builder - Hospital.* Emergency Management Strategic Health Care Group, Washington, DC.

- Realistic and moderate impact: The **scenario should be realistic and of only moderate severity** such that if personnel reasonably achieve the level of performance delineated in the EOP, they are successful in achieving their exercise objectives. An "Armageddon–style," overwhelming scenario can be demoralizing and provides little benefit to personnel or to program managers. Conversely, a low volume or carefully choreographed scenario that is "scripted for success" provides a false sense of capability, and the feel-good effects can be more than offset by accompanying complacency.

- The HVA for scenario guidance: The preferred starting point for planning exercises should be the Hazard Vulnerability Analysis (HVA) process (see Lessons 1.3.1 and 1.3.2). The HVA provides guidance for selecting hazards and vulnerabilities that are deemed likely or possible. The exercise goals and objectives are then developed that in turn drive the scenario selection and completion. During this process the credible hazards are identified, along with their potential impacts and resultant situations. Taken together, these factors should provide the context for developing the circumstances and injects for a realistic and challenging scenario. Subject matter experts should be consulted as indicated to assure that the exercise details and timeline are realistic for the hazard impact, for the anticipated response actions, and for the ongoing injects to the scenario.

Standardized terminology has been described in several publications for the range of exercise roles.

- The selection of metrics: Since exercises measure performance under simulated emergency conditions, proper selection of performance metrics is necessary. The primary source for metrics should be the healthcare system's EOP and its related documents. These can provide the process, output, and outcome metrics against which performance observations can be measured. At the more granular level, the relevant competencies (core, job group, function-related and position competencies), can be used to extract metrics for performance by individual positions. These should objectively describe the knowledge, skills and abilities for positions being evaluated, so observable metrics can be directly extracted. This individual performance is focused upon the *position* rather than the person in the position in terms of judgment: Evaluation of key positions is intended to answer: 1) Have we designated the right pre-qualifications for personnel that staff this position? 2) Have we provided the right training to reach the expected proficiencies at this position? 3) Did the position perform well but the resources available or system design need improvements? Competencies such as those developed in this VHA initiative (see Unit 5) may be very useful for this purpose.

- Establishing and managing the Exercise Team: An exercise team is recruited and members are assigned to position with tasks for scenario development, recruitment of personnel and obtaining resources,

    - Exercise Director (also referred to as the "Lead Exercise Planner" or "Exercise Planning Team Leader"): this individual is charged with the responsibility for and authority to properly plan an exercise. If ICS is used as recommended in developing and conducting the exercise, the Exercise Director is in effect the Exercise Incident Commander for these activities.

    - Exercise Planning Team: This is the group that is: "The exercise planning team oversees, and is ultimately responsible for, exercise foundation, design, development, conduct, and evaluation. The team determines exercise objectives, tailors the scenario to meet the exercising entity's needs, and develops documentation used in evaluation, control, and simulation. Planning team members also help with developing and distributing pre-exercise materials and conducting exercise planning conferences, briefings, and training sessions.[47] The Exercise Planning Team performs its responsibilities under the leadership of the Exercise Director. The team should be selected to be representative of the various functions, activities, jurisdictions, and organizations participating in and/or impacted by the exercise. A leader of the Exercise Planning Team (below the Exercise Director) serves as the Planning Section Chief for the ICS structure conducting the exercise. The concepts of action planning should be used to manage exercise activities as the exercise is conducted.

    - Master Exercise Controller[48]: The individual charged with the responsibility for ensuring that the exercise is conducted according to the exercise plan, objectives, scenario, and the Master Sequence of Events List (MSEL). Generally, the Master Exercise Controller will be selected from the Exercise Planning Team due to her/his familiarity with the exercise planning process. In the case of a tabletop exercise or a functional exercise limited to one location, the Master Exercise Controller may be the sole exercise

[47] US Department of Homeland Security. *Homeland Security Exercise and Evaluation Program*. *Volume II: Exercise Planning and Conduct*, Chapter 1, page 1 (February 2007). Federal Emergency Management Agency, Washington, D.C. accessed January 15, 2010 at: https://hseep.dhs.gov/support/VolumeII.pdf

[48] Adapted from *Guide to Emergency Management Exercises (1997)*. Federal Emergency Management Agency Emergency Management Institute. Emmitsburg, Maryland.

controller. In an ICS structure developed to conduct the exercise, the Exercise Controller would be the Operations Section Chief. In this example, the Exercise Operations Section could have three branches: Control Branch; Player Branch; and Evaluator Branch. Specific responsibilities of the Master Exercise Controller during an exercise include:

- Monitoring the sequence of events to ensure the exercise is proceeding as planned
- Maintaining order and professionalism by all involved
- Acting as a simulator for unanticipated decisions and actions by players and/or resource requirements
- Managing message flow (adding or discarding) to speed or slow the exercise pace[49]
- Monitoring actions and decisions to make sure that they are consistent with the exercise plan
- Monitoring activities for safety issues (if a safety controller for smaller exercises has not been designated).

The use of standardized exercise terminology and exercise personnel categories makes the exercise design and execution more efficient and avoids confusion.

- Controller[50]/control staff: Individuals assigned to exercise locations as required to accomplish the responsibilities of the Master Exercise Controller (Exercise Operations Section Chief) under his/her direction. They provide the scenario injects from the Master Scenario Events List (MSEL) and facilitate "player" (see below for definition of these terms) information and actions as indicated by the type of exercise and the exercise plan. In a large or complex exercise, the controllers should be organized using standard incident command structure and process.
- Safety controller: Controller/s designated to perform the safety function during the exercise.
- Evaluator: Personnel assigned to make objective observations, using supplied exercise evaluation guidance that will provide a

[49] Any major deviations from the exercise plan should be cleared by the Master Exercise Controller. This simple "rule" can prevent freelancing by personnel involved with conducting the exercise and prevent significant confusion.

[50] US Department of Homeland Security. *Homeland Security Exercise and Evaluation Program. Volume II: Exercise Planning and Conduct. Chapter 2*, p. 39. (February 2007). Federal Emergency Management Agency, Washington, DC; accessed April 11, 2010 at https://hseep.dhs.gov/support/VolumeII.pdf

uniform basis for system evaluation from the exercise experience (see Lesson 4.3.3).

- Player: Healthcare system personnel and personnel from relevant outside organizations who are participating in the exercise in the roles they would take during an actual emergency.

- Actor: Individual simulating a victim, victim family, media, perpetrator, or other person within the exercise scenario to prompt realistic action/reaction from the exercise players.

- Simulators: Simulators create (through a Simulator Cell) an artificial reality through the delivery of pre-scripted and spontaneous messages to exercise players. In this role they portray the role of the entire external environment and as such should be familiar with the agencies/entities/individuals they are representing in the context of the exercise. In many exercises at the healthcare facility level, the Simulators are members of the controller cohort. Specific responsibilities of the simulator include:

  - Simulating all actions taken by the outside agencies/entities/individuals.

  - Sending pre-scripted messages representing the outside agencies/entities/individuals according to the MSEL.

  - Responding to unanticipated actions by players with spontaneous messages.

  - Informing the controller of simulation problems and progress of the exercise.

- Exercise Observers: "Outsiders" invited to observe all or selected portions of the exercise. Observers do not participate in exercise play or in exercise control functions: it is important to specifically brief them on this, since many observers are VIPs and prone to inject themselves into exercise play or controller roles. A resource to answer their questions should be made available if possible. Their only participation is in After-Action Report meetings (see Lesson 4.3.3), providing their observations (or other invited comments) related to exercise response and recovery play. Their observations are generally less formal and possibly more subjective than those of evaluators, who are following pre-scripted guidance in capturing observed data (see Lesson 4.3.1).

- Exercise terminology: Terms common in today's lexicon are important to define:

  - Simulation Cell (SIMCELL)[51]: This is the physical location for controllers (or other qualified personnel) generating injects and receiving player communications/responses. The SIMCELL may provide MSELs injects simulated for nonparticipating functions (in a functional exercise) or outside agencies/organizations (in a full-scale organization exercise). This may require phones, FAX, radio, or other means of communication to simulate actual experience. For large or full scale exercises, healthcare emergency managers may wish to establish a SIMCELL.

  - MSEL (Master Sequence of Events List): The list of scenario injects that drive play and the scenario progression through time and incident evolution. They may be primary injects or action/information selected to "react" to a player's response to a preceding MSELs injects. The master list may therefore have a large menu of injects for a full-scale exercise, but not all MSELs injects will be necessarily used. MSELs may be injected by controllers performing role play, by simulated victims ("actors") presenting during the scenario, perpetrators, and by other physical actions, including simulated communications. MSELs may also be inserted through a range of media appropriate for the type of exercise, including video, slides, written material, or other presentations.

  - Additional exercise terms are available.[52]

- Exercise categories: Exercises are generally categorized according to their specific goals and objectives and their respective level of "play"[53] as described in Module 4.1. Level of "play" includes the methods for how the scenario is presented, the level of "play" by participants (i.e., oral discussion versus actual physical demonstration of skills and appropriate actions), and the range of functional areas involved. The general categories described for exercises are: Tabletop, Functional and Full-scale exercises.

The different types of exercises (tabletop, functional, full-scale) can be viewed as increasingly complex and should be considered in the overall exercise strategy.

Tabletop exercises are an effective and often-used exercise type for evaluating Command and other EOP elements.

[51] Adapted from: US Department of Homeland Security. *Homeland Security Exercise and Evaluation Program. Volume II: Exercise Planning and Conduct. Chapter 2*, p. 27. (February 2007). Federal Emergency Management Agency, Washington, DC; accessed April 11, 2010 at https://hseep.dhs.gov/support/VolumeII.pdf

[52] US Department of Homeland Security. *Homeland Security Exercise and Evaluation Program*. Volume II: Exercise Planning and Conduct (February 2007). Federal Emergency Management Agency, Washington, D.C. accessed January 15, 2010 at: https://hseep.dhs.gov/support/VolumeII.pdf

[53] Adapted from Sikich G. *Emergency Management Planning Handbook* (1996). Washington, D.C. McGraw Hill.

- Tabletop exercise: This is a scenario-driven interaction where participants discuss projected action based upon the relevant areas of the EOP and the scenario situation. This is accomplished using minimal or no physical activity, hence the descriptor "tabletop." Distinguishing characteristics of the tabletop category of exercise include:

  - Tabletop scenarios are presented predominantly via media (oral, video, slides, audio tapes, and others) rather than through physical actions and props, with limited facilitation of actions and decision-making processes.

  - Tabletop exercises are generally focused upon EOP **elements** rather than full EOP **functions**. For example, a management tabletop exercise includes the participation of management personnel (i.e., the "management element") from across multiple functions and from varying management levels within the organizations. They are placed in a simulated situation (scenario) while sitting together, with the scenario prompting them to function in the roles and capacities expected of them in an emergency response and recovery event. Decisions, actions, and other responses are generally verbalized by players, and interaction is facilitated by one or several controllers.

  - Tabletops may range from "minimally" to "highly interactive." The use of sub-groups with break-out sessions with additional facilitators can increase role playing by participants. As noted above, the level of complexity may also progress.

    - A "basic" tabletop[54] is generally informal, stress-free, and not subject to incident time constraints. It usually uses a relatively static scenario that only evolves through injects from the facilitator to the collective participant cohort. These are designed and facilitated to superficially evaluate broad concepts, such as policies and overarching strategy. These concepts are applied by tabletop participants according to their individual and team responsibilities within the context of the EOP, with the necessity for some collaboration and cooperation among participants. Generally, verbal description is the simulation used, primarily to prompt the

[54] Adapted from US Department of Homeland Security. *Homeland Security Exercise and Evaluation Program. Volume II: Exercise Planning and Conduct. Chapter 3*, p. 31. (February 2007). Federal Emergency Management Agency, Washington, DC; accessed April 11, 2010 at https://hseep.dhs.gov/support/VolumeII.pdf .

investigation and discussion of issues and problems. Response and recovery equipment is not actually used, nor are resources deployed. In fact, if this level of tabletop is reduced to a primary objective being "familiarization" (i.e., education, training, or instructional drill) rather than evaluation, it would be more correctly categorized as "scenario-based training." The appropriate delineation of objectives for the activity will promote consistent use of terminology, and the precise use of terminology to describe the activity (drills/training versus exercise) will better inform participants.

- An "advanced"[55] or "interactive" tabletop is a simulated exercise with an evolving scenario (through injects, often to individuals rather than the entire participant cohort). These tabletops build upon the "basic" type to evaluate specific elements of the EOP and evaluate the organization's capabilities and capacities in response to an exercise scenario. The level of simulation and time pressures are increased. Collaboration and cooperation can extend within the organization and to outside organizations to include decision making and implementation. In some cases, limited amounts of equipment may be used and resources deployed.

- Tabletops are usually conducted in a conference room or classroom environment and are designed and developed to meet specific objectives related to an identified issue and/ or problem. Discussion and problem solving is conducted in the context of the exercise emergency scenario. The overarching goal is for participants to work with established emergency operations plans, policies, and procedures to demonstrate their individual and team skills (as a reflection of preparedness training) and to evaluate the completeness and effectiveness of the EOP and its components. By working together in a relatively low stress and non-threatening environment, participants are able to identify, investigate, and address questions of coordination, responsibility, and authority.

- Functional exercise: This exercise is a scenario-based, full action execution of specific tasks and complex activity within a specific function or functional area of the EOP. Functional exercises are designed to evaluate the capacity and capability of a single function, or a complex activity within a function. Functional exercises are appropriate when the function or activity can be

Functional exercises focus upon a single function or sub-function within the EOP.

[55] *Ibid*

exercised in isolation from other functions or activities and/or the interface and interdependencies with other functions and activities can be adequately simulated. Distinguishing characteristics of the functional category of exercise include:

- Functional exercise is developed to increase the level of complexity and stress beyond that experienced in a tabletop exercise. It is typically conducted under increased levels of urgency and genuine constraints (time and resources) that provide increased realism, and so is less reliant upon orally presented simulation.

- Functional exercise commonly employs the communication modes that would be used during an actual incident (radios, telephones, facsimile, and the Internet). Managing collaboration and cooperation and interactive decision making is more focused within the exercised function and accomplished in real-time. The focus is on interactive decision making, coordination, and cooperation in response to the exercise scenario. The "play" provides sufficient freedom to demonstrate initiative and creative problem solving.

- Scenario progression is generated both through injects and by actual performance of actions by participants. Emphasis is placed on interaction **within the function**, but interaction with other functions and "outside" personnel is simulated by controllers, simulators or other artificial methods.

- An example for healthcare systems might be the exercise of a hospital's decontamination capability, including mobilization, patient reception, processing, decontamination, triage and entry into the medical care system. If the "function" is narrow in scope, the activity can be qualified as an "evaluative drill" rather than an exercise.

Full-scale or "Field" exercise may provide a more robust evaluation of the EOP. It necessarily requires more preparation and management to adequately conduct.

○ Full-scale exercise: A scenario-based extension of a functional exercise, to include all or a combination of functions and complex activities and guided by the EOP. It is ideally conducted under high levels of stress and the very real-time constraints of an actual incident. Distinguishing characteristics of the full-scale category of exercise include:

- A consistent scenario is exercised across multiple functions and may be extended to interaction and coordination with other organizations. Interaction across all functions by the players decreases the artificial (oral) injects by controllers and makes

the overall scenario much more realistic.

- Exercise objectives may involve the actual mobilization of personnel and resources as well as performance in response operations and recovery. It commonly involves the physical movement of emergency personnel and equipment required for operational response. These and many other complex activities requiring the participation of multiple functions may be prompted through exercise injects. Because of this, the full-scale exercise is a more comprehensive evaluation/validation of the EOP and its policies and procedures in the context of emergency conditions.

- Depending on the complexity of the scenario, a full-scale exercise may also extend over a prolonged period of time.

- This type of exercise activity usually uses players, actors, the SIMCELL, and other exercise components defined earlier.

○ Exercise category and outputs: The system outputs that are evaluated vary according to the exercise type (for example, decisions that can only be verbalized in tabletop exercise versus actions that can be observed in functional or full-scale exercise). Each type of exercise may be designed with progressive complexity, sophistication of simulation (i.e., realism), and personnel/organization involvement that require more preparation, planning, resources, and support. The full-scale exercise provides a more robust evaluation/validation of the EOP policies and procedures than the other exercise types, in the context of a realistically simulated but controlled scenario. Overall management, coordination, and communication between functions may therefore be fully and objectively evaluated.[56, 57]

Exercise Development Template

Exercise development follows the ISD process as set forth in Lesson 4.2.2. The following steps provide a summary of exercise development actions:

An exercise development template consistent with the ISD process is provided (see text).

- Analyze

[56] Adapted from: *Guide to Emergency Management Exercises*. Federal Emergency Management Agency Emergency Management Institute. Emmitsburg, Maryland. 1997.
[57] Adapted from: Sikich G. *Emergency Management Planning Handbook* (1996). Washington, D.C. McGraw Hill.

- Review the organization's Hazard Vulnerability Analysis (HVA) findings and its final prioritization of areas of concern.
- Review the EM program/EOP to identify strengths and weaknesses and to determine the functional areas and elements in need of performance evaluation.
- Review the organization's exercise program planning documents (see next section), previous exercise After-Action Reports (see Lesson 4.3.3), and recent EOP changes. This review will prompt the inclusion of specific EOP areas to be evaluated.
- Review personnel assignments to EOP positions of responsibility and/or authority.
- Review regulatory requirements (e.g., JCAHO, OSHA) impacting exercise content and frequency.
- Review inter-organizational agreements and requirements.
- Review other constraints (e.g., budgetary and timing of work shifts).
- Establish realistic and achievable exercise objectives that support the results of the above reviews and best contribute to the continuous improvement of the EM program and EOP.

• Design

- Determine the boundary conditions for conducting an exercise (based upon the identified availability of resources and personnel, willingness and availability of other organizations to participate, regulatory requirements, amount of time to prepare, and other factors from the Analysis activity).
- Finalize the exercise objectives as constrained by the boundary conditions, guided by the findings from the Analysis effort above.
- Select an exercise scenario that is consistent with achieving the exercise objectives.
- Select the most appropriate type of exercise to achieve the intended evaluation.
- In general, the time required from the initiation of exercise design

to conducting the actual exercise[58] is approximately:
  - One month for Tabletop exercises.
  - Three months for Functional exercises.
  - Six to 12 months for Full-Scale, complex exercises involving multiple organizations.

- Determine the exercise setting and levels of involvement.

- Determine the acceptable length of exercise play that allows for the relief and/or rotation of personnel consistent with exercise objectives.

- Develop

  - Establish the Hot Wash and After Action Report requirements for exercise evaluation (see Lesson 4.3.1 for definitions).

  - Develop guidelines for exercise evaluation.

  - Identify the ICS structure to manage the exercise. Select and prepare personnel that will conduct and evaluate the exercise (e.g., exercise director and staff, controllers, observers, evaluators, safety officer).

  - Arrange for and prepare exercise actors/simulators (simulated victims, perpetrators, and others) and a manager of the actor simulators, if required, to meet exercise objectives (see the section on exercise victims in this lesson for specific victim/actor considerations).

  - Determine and arrange for exercise location and logistics.

  - Arrange for additional staff on duty to manage normal system operations (patient care and others) that can't be temporarily suspended during exercise play.

  - Develop the exercise script.

  - Develop exercise materials.

  - Conduct a safety-focused review of the "developed" exercise.

[58] *Guide to Emergency Management Exercises*. Federal Emergency Management Agency Emergency Management Institute. Emmitsburg, Maryland. 1997.

- Implement
  - Develop the exercise management plan.
  - Distribute the exercise management plan.
  - Check for potential conflicts sufficiently before the exercise date to resolve problems.
  - Check all logistical arrangements sufficiently before the exercise date to resolve problems.
  - For announced exercises remind all personnel to be involved to review their EOP responsibilities and to contact the appropriate person in authority if they require role clarification and/or training.
  - Receive, process (moulage, etc.), and brief the actor/simulators, including a safety briefing; Stage and deploy actors as indicated by the scenario.
  - Receive, process, brief (including a safety briefing) the exercise controllers.
  - Make provisions to reassure patients and exercise non-participants during and after the exercise (see the section on patient reassurance in this lesson for specific considerations).
  - Initiate the exercise consistent with exercise objectives (i.e., an announced or an unannounced exercise). Assure that all appropriate notifications have been made.
  - Continually monitor the exercise for safety problems and be prepared to terminate the exercise for safety violations (see the section on exercise safety in this lesson for specific considerations).
  - Adjust the exercise scenario as indicated by unexpected developments, time concerns, and the need to assure that exercise objectives are achieved.
  - Terminate the exercise at the appropriate time or when the exercise objectives have been accomplished. Assure that all appropriate notifications have been made.
  - Assure that **incident review** (see Lesson 3.3.8), demobilization, and return-to-readiness activities are conducted.

- Evaluate
    - Conduct and manage the hot wash if indicated (see Lesson 4.3.4).
    - Conduct and manage the After-Action Report process (see Lesson 4.3.4.).

Exercise Program Considerations

- Establishing an exercise program requires the development of strategic exercise planning. This establishes a schedule of exercises with a balanced mix of exercise types, complexity, participants, focus, and other considerations:
    - Exercise program goal: As stated in the introduction of this lesson, the goal of the exercise program is to accomplish a **balanced, comprehensive evaluation** of the EOP's effectiveness. This includes all elements of the EOP, from base plan concepts to the detail of operational checklists and other guidance tools. Indirectly, the effectiveness of the preparedness program can also be assessed, including:
        - Training.
        - Equipment, supplies, and facility maintenance.
        - Appropriate recruitment and retention of personnel.
        - Revision/improvements based upon prior findings.
    - The HVA as programmatic guidance: As discussed above with the development of individual exercises, the exercise program itself should also be informed by the organization's HVA findings and prioritization of risk concerns.
    - Balance in the focus of exercises across the organization: Across healthcare organizations, a tendency has existed to focus exercises almost completely upon the emergency department functions, including triage, decontamination, and patient treatment, with some attention to trauma care and the operating suite. It is important to evaluate all areas of the healthcare system with important roles during emergency response and recovery. Examples of other areas for exercise focus include:

Given the value of exercises and the complexity in managing them, emergency managers may wish to develop an "exercise program" with specific considerations (see text).

- Other clinical areas, such as the operating suite, critical care units, and outpatient treatment areas

- Clinical laboratory and other clinical support areas could be a focus for examining surge services capability

- Command Staff in a complex situation require decisions for managing scarce resources

- Liaison officer and other personnel involved with information management should receive a similar level of attention during exercises, commensurate with the selected scenario.

A balanced exercise program examines these other critical areas. This broad focus promotes a more appropriate expansion and balance to training courses, system revisions, and other important preparedness activities.

○ Balance in the focus of exercises across emergency response stages: Across healthcare organizations, a tendency also has existed to focus exercises almost completely upon the incident operations. It is also important to exercise incident recognition, emergency notification and mobilization to assure the system works. This is critical to success, since without these activities the ability to establish timely and effective incident operations is compromised. Exercising demobilization and return to readiness of response assets, and even key elements of recovery planning, should also be considered.

○ Strategic progression within the exercise program: As discussed in prior lessons, a logical progression in exercise complexity, stress, urgency, and difficulty may be demonstrated through strategic planning for an exercise program:

- Tabletop exercises are generally less complex, less difficult in terms of exercise logistics, and useful for examining coordination and communication interfaces, decision support tools, and other non-physical processes and procedures.

- Functional exercises are the logical progression in an exercise program in terms of developing and conducting task level activities.

- Full-scale, realistic, multi-dimensional exercises are the most difficult to accomplish and to be completely successful require significant understanding of the response system that is to be

exercised. Careful attention to exercise management, logistics, communication modalities, coordination of controllers, and MSELs injects is required. The complexity can approach that of actual incident response. In fact, a successfully accomplished full-scale exercise that was designed, developed, and conducted using only "in-house" expertise, may be a valid predictor of how the organization will perform in an incident, regardless of the actual exercise scenario outcomes.

Additional Exercise Issues for Consideration by Healthcare Systems

- Exercise Actors: Managing and coordinating actors (participants are simulating victims and other roles) requires special consideration.

  - Recruiting actors: Actors must be recruited and, since they are usually volunteers, the effort to find volunteers and assure that they come at the agreed upon date and time should not be underestimated.

    - Physical fitness and any other requirements for actors should be delineated during the planning process. Fitness can be important for some actor roles that require exertion.

    - Actor recruitment should ideally target professional groups, such as police, fire, military recruits, healthcare personnel (including off-duty personnel from the exercising facility), health-related students (medical, nursing and other health disciplines) or others with some professional understanding of healthcare systems and medical procedures. Alternatively, members from the hospital volunteer cadre may be well suited, since they are familiar with normal hospital operations and comfortable in the hospital environment.

    - Actors should receive pre-arrival instruction so that they are adequately informed in committing to the actor roles, and to adequately being prepared to participate (see Textbox 4.2.3.4 for recommendations for actors for a DECON exercise).

    - Actor managers should be aware that there are additional issues with volunteer actors. Some that have been experienced include reluctance to give up valuables during DECON exercises, reluctance or aversion to walk barefoot in the healthcare facility or DECON areas, declining to be placed into backboard and cervical collar stabilization, and similar concerns that should be anticipated.

Actors used to portray victims during exercises need to be recruited. Preparatory material should explain the importance of their participation.

Textbox 4.2.4.5

Example Pre-arrival Instructions for Exercise Actors
DECON Exercise[59]

Volunteers should receive their instructions prior to the day of the exercise. These instructions should tell volunteers about any special considerations, such as:

- Wear old clothing because clothing could possibly be cut or ripped.
- Wear a bathing suit under outer garments because clothing could be removed for simulated disrobing or become wet during a decontamination process.
- Bring shower footwear if indicated.
- Eat and hydrate prior to attending the exercise.
- Do not wear expensive clothing or jewelry.
- Inform the victim actor coordinator about any pre-existing health conditions.

Victim actor instructions should also include information on when to arrive, where to report, how long their participation is expected, and whether a meal will be provided during or after the exercise.

Actors can be used to play several distinct roles during exercises to add realism. These include victims, victim family members, and the media.

- Preparing actors: Actors simulating victims must be prepared for their roles prior to commencing the exercise play. Readiness tasks include:
  - Familiarizing them with the script.
  - Applying "moulage" (i.e., cosmetic makeup and other effects) to simulate appropriate injury and illness in victims.
  - Staging them for realistic presentation as called for by the exercise scenario script.
  - Assuring the "victim" actors simulate the affect and behavior of real victims impacted by the designated hazard situation.
  - Provide safety instructions (see below for more detail).

[59] Adapted from US Department of Homeland Security. *Homeland Security Exercise and Evaluation Program. Volume II: Exercise Planning and Conduct. Chapter 2*, p. 24. (February 2007). Federal Emergency Management Agency, Washington, DC; accessed April 11, 2010 at https://hseep.dhs.gov/support/VolumeII.pdf

- Actors beyond the "victim" role: In addition to "victims," actors should be designated to play other roles that are important for evaluating response beyond direct victim care:
  - Members of the media, if media is not involved in exercise play
  - Family members looking for loved ones
  - Law enforcement personnel arriving to investigate the incident
  - Authorities calling for information
  - Dignitaries (political leaders and other "VIPs") arriving to visit victims and responders or "to be seen" by the media.
  - Others as indicated by the scenario and the exercise objectives.

  This lends realism in exercising all other vital components of the EOP beyond direct patient treatment. These actors may also need make-up and other props, and they should be briefed, staged, and deployed as the scenarios unfold.

- Safety: Actors should be provided with a safety briefing before the start of the exercise play (see below).

- Actor debriefing: Actors should be provided a forum for debriefing after the exercise, with an opportunity to have questions answered and to provide suggestions for both the exercise process and exercise findings. They should be thanked and, particularly if they are volunteering their time, provided a meal or other token of appreciation.

Actors must receive a briefing on the safety considerations relevant to the exercise.

- Overall Exercise Safety: Succinct but comprehensive safety planning should be conducted prior to the exercise:
  - Safety analysis: Analyze the exercise plan for risks and safety concerns.
  - Addressing the physical and psychological risk: Address any identified or anticipated safety issues that could arise from the exercise scenario (such as slip hazards during decontamination). As exercises become more realistic and focused upon unusual hazards, both the physical and psychological risks to actors

increase:

- Some risk of physical harm is incurred when decontaminating (washing off) actor victims and in other exercise actions taking place under duress (e.g., transferring "victims" urgently between stretchers, moving around heavy equipment, and others).

- Chemical agent and other mass casualty simulation exercises can appear more realistic than other types of exercises, and the psychological impact to some actors may approximate that experienced by actual victims in actual incidents. Disrobing (even to the level of a swimsuit) may cause discomfort for some actors even if they know ahead of time that it will occur. This should be recognized and addressed through proper recruitment, adequate briefing information, and debriefing opportunity for questions and discussion.

  - Professional safety supervision: This task is accomplished under the supervision of the exercise safety controller, who oversees the safety aspects of both the exercise planning and the conduct of the exercise. The individuals performing this function should be properly qualified and involved in all aspects of the design and conduct of the exercise.

  - Safety briefing for controllers and evaluators: Exercise controllers and evaluators should be given a safety briefing prior to the exercise. They should also be tasked with being vigilant for, and immediately addressing, any safety concerns they encounter during the exercise.

  - Safety briefing for players and actors: Both exercise players and actors should be briefed about safety also. Both players and actors should know (from their safety briefing and written guidelines) that they can stop the play at any time by saying **"this is real"** and then expressing their concern.

Exercise artifact can complicate clinical decision making during the activity. This should be addressed.

- Exercise artifact versus realism: All exercises introduce a significant amount of exercise artifact (see terminology textbox). This must be recognized and carefully addressed. It will otherwise unrealistically complicate many player decisions and potentially derail the exercise from the scenario and exercise objectives. Most significantly, it can negatively impact players by making medical, nursing, and other clinical judgments problematic in individual patient decisions.

  - It is difficult to capture enough detail in a simulated clinical-patient

interaction to expect the clinician to diagnose a very complex or obscure etiology. Exercise victims' "stories" and their specific clinical "findings" should either obviously indicate the medical decisions that should occur or the clinical decisions ("needs the operating room," "needs to be intubated," etc.) unless the exercise is specifically designed to evaluate clinical judgment. This can be indicated to the exercise clinicians by the "victim" actors or controllers. Cards with the incident medical information may be provided to victim actors to expedite this process and to maintain accuracy of injects.

- At the same time, the exercise of specific emergency operations skills and knowledge should be as realistic as possible. For example:

  - A safe (non-caustic, non-allergenic) but realistic chemical agent simulant could be used in chemically contaminated patient exercises (and training drills) to assure that the decontamination process is fully performed. It can promote more realistic play by both exercise players and "patients," and can be used to evaluate the thoroughness and effectiveness of decontamination.

  - Actual personal protective equipment (PPE) should be worn by players during these types of exercises. The maintenance of an exercise cache of PPE for this purpose is helpful, since small holes and tears are non-consequential during exercise. The "exercise cache" of PPE and other equipment should be clearly and indelibly marked "training use only."

Terminology alert!

Exercise artifact: artificialities that occur during exercises of all types that affect tasks, processes, outputs, and outcomes in either a positive or negative fashion. They should be recognized and addressed by exercise controllers during the exercise event or by exercise evaluators and after-action report managers during the exercise analysis.

- Player (Participant) Briefing: Personnel participating as "players" in the exercise should also receive instruction, which includes safety issues, the "rules of engagement" for the exercise, and other guidance that provide common understanding of what is expected and why it is important to participate earnestly. This information is commonly

Players or participants in the exercise should also receive a briefing prior to commencement of the activity. In most instances, this is best provided in both a written briefing as well as oral presentation.

conveyed through a written briefing and should occur for all types of exercises (the setting for tabletop exercises is conducive to oral briefing as opposed to written). A written example is provided in Exhibit 4.2.3.1 below.

Exhibit 4.2.4.1: An example of a written hospital exercise briefing for exercise players.

Instructions and Ground Rules for Exercise Players:

- All communications related to the exercise will begin and end with **"THIS IS AN EXERCISE**"….if there is a situation that represents a real-life issue that must be addressed, the communication begins with **"THIS IS REAL".**
- As in actual hospital practice, safety of staff and patients is paramount. Please adhere to all usual safety practices, and abort any exercise activity that suggests a safety concern. It is particularly important to exercise care in lifting and moving simulated victims and other potentially dangeous activity.
- Verbalize issues, decisions we believe we would make, and the actions that we believe we would take, knowing what we know at the time.
- Hospital Capacity will be based upon the **"REAL TIME"** bed status as of **Thursday, September 15, 2005 at 1630..**
- All stretchers and transports are REAL; all victims will be transported on stretchers. Laboratory specimens and ABGs will be transported to the lab.
- We will critique and learn from those decisions and actions later.
- Exercise participants placing telephone or cellular phone calls will identify/maintain log of the organization, agency, office and/or individual with whom they are contacting.
- Decisions and actions can be reversed as you would normally do in a real event, as further information is gathered.
- As you normally would, seek to address issues and correct problems that arise.
- We may encounter issues we don't know how to deal with---that is considered realistic in emergency response. Do the best you can under the circumstances. System issues will be captured for later discussion and resolution. This is not a test of your individual performance.
- All exercises introduce artifact that can actually make many things more difficult in the exercise than they would be in real life. Controllers will try to acknowledge and address them as they arise.
- Please understand that the EOP is primarily a tool to support the clinicians and others performing healthcare system services and maintaining continuity of operations under adverse conditions. It is intended to allow our professionals to apply their expertise in adequately caring for very unusual patient loads (surge capability and capacity), and that the exercise is a method of evaluating and improving the EOP. It is not intended to evaluate usual clinical expertise, or primarily focused upon any individual person's performance, but rather the functional performance of the hospital's emergency response system.
- We ask that each person participating in the hotwash forward comments and suggestions to the Chairperson for Emergency Management, using the format provided, to maximize the consideration of your information. 'Issue' forms to provide this feedback from exercise participants will be made available to all participants.

The Emergency Operations Plan will be revised and expanded as indicated, and emergency preparedness activities (training, maintenance actions, etc.) may be adjusted based upon your input.

- Managing patient care operations while conducting exercises: It is important to remember the everyday organizational mission in developing and conducting exercises. Healthcare systems cannot interrupt much of their regular patient care services in order to fully participate in exercises. They also have to address the issue of real patients, families, and visitors being present during exercises. Problems can be avoided through careful attention to detail:

  - Maintaining everyday mission staffing: Exercise planners must arrange additional staff to manage the regular healthcare services while other staff members (i.e., "players") are participating in the exercise. This should be considered when examining the costs associated with exercising point-of-service healthcare organizations.

  - Inform and reassure regular patients and visitors: Information and reassurance should be provided to the regular "customers": patients, their family members, and other visitors. Otherwise, undue concern can be generated by witnessing or experiencing the intrusive-appearing activities of a realistic exercise. It is therefore important to address this issue in the design and conduct of functional and full-scale exercises, with responsibility specifically assigned to address the issue.

    - Placards may be placed in public areas of the healthcare system (the lobby, waiting areas, hospital entrances) and handouts should be provided to actual patients and their families, explaining that:

      - An exercise will be occurring, which is important in preparing the healthcare organization to respond to community emergencies

      - Regular patients are being cared for by non-exercise personnel without any quality-of-care compromise

      - The exercise may include characteristics that are simulations. For example, parameters that could create anxiety include actors that will be moulaged to appear severely injured and actors yelling and simulating out-of-control victims, family members, medical personnel, and others. For chemical contamination exercises and drills, it should prominently note that "No actual chemicals are in use."

Healthcare facilities cannot suspend normal operations while conducting exercises. It is therefore important to consider providing information to regular "customers" (i.e., patients and visitors) to preempt any concerns.

- Hospital personnel who are providing normal patient care to actual patients in the areas where exercise activity will occur should be reminded to verbally reassure patients and family members as the exercise unfolds and perhaps point out the informational signs or brochures.

- Outside agencies (EMS, Public Health, and others) should also be notified for similar reasons.

- Exercise Evaluation: This important subject is comprehensively presented in Lesson 4.3.1.

Healthcare system participation in community-wide exercises should permit early inclusion in design and development.

- Participating in community-wide exercises: Whenever possible, hospitals and healthcare systems should be active in the development and implementation of **community-wide** exercises. This includes synchronizing the healthcare system's exercise plans as much as possible with those of the community, the healthcare coalition (Tier 2), partner hospitals, EMS, or other single public safety agencies. Additionally, it can include nearby businesses such as universities that conduct emergency response and recovery exercises. In these joint activities, it is important for the community agencies and partner organizations such as universities to incorporate healthcare facility personnel very early in the exercise planning activities in order to:

  - Develop a medically realistic and useful scenario: Assure training and exercise products are medically realistic and meet the preparedness needs of the overall hospital/healthcare system response community. This is best accomplished through a healthcare coalition so that all appropriate healthcare organizations have an opportunity to participate in the planning and conduct of the exercise, or at least be adequately represented by coalition members.

  - Jointly make time and logistics decisions: Provide input into the exercise time of day, length, and logistical parameters in order to optimize the healthcare organizations' ability to participate.

Federal Emergency Response Exercise Guidance

- Federal exercise guidance: The current (2009-2010) guidance for Federally funded exercises is contained in the Homeland Security Exercise and Evaluation Program (HSEEP) and its reference manuals as described in Lesson 1.1.3. This is administered through the Preparedness Directorate of the U.S.

Department of Homeland Security (DHS). Federal funding for exercises, such as those provided through DHHS/ASPR[60] and other agencies require compliance with applicable HSEEP guidance.

- HSEEP focus: HSEEP guidance provides useful exercise and exercise program concepts and is referenced throughout this lesson. The guidance, however, is oriented towards jurisdictional and larger, more complex exercises, and therefore many of the planning activities are not **directly** applicable to the development and conduct of exercises focused at the healthcare system level.

- HSEEP as an educational adjunct: At the same time, the HSEEP manuals explain the complex exercise planning, conduct, and evaluation activities that will occur during these large-scale exercise events. These insights may help healthcare system personnel better anticipate and, therefore, more fully participate in all aspects of community-wide and larger exercises.

- Consistency with HSEEP: The exercise guidance within this lesson, with the evaluation and organizational learning guidance provided in Modules 4.3 and 4.4, is intended to meet or exceed HSEEP guidelines.

HSEEP provides important considerations for healthcare systems planning exercises. Much of this material, however, is oriented to larger (e.g., jurisdictional) activities. Guidance provided in this curriculum meets and in many areas exceeds HSEEP requirements.

Textbox 4.2.4.6

Homeland Security Exercise and Evaluation Program (HSEEP)[61]

"The Homeland Security Exercise and Evaluation Program (HSEEP) is a capabilities and performance-based exercise program that provides a standardized methodology and terminology for exercise design, development, conduct, evaluation, and improvement planning."

[60] Health Resources Service Administration (HRSA), U.S. Department of Health and Human Services. *National Bioterrorism Hospital Preparedness Program, 2005,* information available at: http://www.hrsa.gov/bioterrorism/, accessed May 15, 2006.
[61] US department of Homeland Security. *Homeland Security Exercise and Evaluation Program. HSEEP Mission.* Federal Emergency Management Agency; web site accessed April 11, 2010 at: https://hseep.dhs.gov/pages/1001_HSEEP7.aspx

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Module 4.3

Capturing and Processing Evaluation Measures

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Lesson 4.3.1 Capturing and Processing Performance-based Measures through Healthcare System Emergency Management Evaluation

Lesson objectives

- *Define the role and purpose of the After Action Report (AAR) process in system evaluation.*
- *List and describe the four major sources of data for accomplishing performance-based evaluation of emergency response and recovery.*
- *List the steps for a comprehensive AAR development process.*
- *Define the important differences between a "hot wash" and a formal After Action Report meeting.*
- *Describe the "issues-based" format for capturing AAR information and its advantages.*
- *List the elements of the documented AAR as suggested in this text.*

Introduction

As presented in Lesson 4.2.1, two categories of system evaluation exist for emergency managers. Lessons 4.2.2 and 4.2.3 present a description of performance-based evaluation and the application of performance-based evaluation to the emergency management program, which is a **programmatic evaluation**. The second, very important category is **performance-based evaluation of emergency response and recovery plans which is the focus of this lesson**.

- Evaluation opportunities: Evaluation of response and recovery performance may be accomplished through examination of:
  - Actual incidents (emergencies and disasters).
  - Exercises (tabletop, functional, and full-scale).
  - Evaluative Drills (i.e., drills with a formal evaluative component).
  - "Proxy events" and other activities (see Textbox 2.1.3.9).

Evaluation of response and recovery can occur through examination of actual incidents, proxy events, exercises, or evaluative drills.

- Emergency operations evaluation: Due to its nature, this type of evaluation occurs after some type of unusual activity, whether planned (exercises/drills) or unexpected. Many terms have been used to describe a post-activity review to capture information from incident or exercise performance (see Textbox 4.3.1). The development of all of

these different permutations has been strongly influenced by organizational culture, history, mission, and preference.

- After-Action Report process: The term "After-Action Report (AAR) **process**" (see terminology textbox) presented in SEMS[62] well over a decade ago best reflects the **comprehensive activity** utilized after actual or simulated incidents. It provides meaningful data that can be efficiently applied to revise and enhance emergency response and recovery systems.

- The AAR goal: For emergency managers and, more specifically, healthcare system emergency managers, the "AAR process" is best viewed as a structured method to capture performance findings and evaluate system performance after actual or simulated incidents. The AAR products (incorporated into the After-Action Report itself) can then be processed to effect "system change." This change may be to the EOP, a long term recovery plan, instructional activity based upon the EOP, mitigation planning, and so on.

Many terms exist and are used to reflect the post-incident evaluation activity. The term After Action Report "process" is utilized in this text, as it reflects the range of activities necessary to achieve a comprehensive review.

Terminology alert!

After Action Report (AAR) Process[63]: A focused, post-incident or post-exercise activity to capture objective observations, both positive as well as negative, related to response system performance. Its product is commonly referred to as "lessons learned," but a comprehensive process goes beyond the collection of "lessons learned" to accomplish objective improvements in procedures, assignments, equipment, training, and personnel to attain true **organizational learning**.

[62] *Standardized Emergency Management Systems (SEMS) Guidelines, Part III. Supporting Documents*, p. 1 (1994). California Office of Emergency Services (now California Emergency Management Agency). Sacramento, CA.

[63] This term "AAR process" is used by SEMS to describe the activity related to developing and conducting the After-Action Review, including meetings and documentation review.

Textbox 4.3.1.1

Terms Used for Post-incident Evaluation

The capture of system evaluation after actual or simulated incidents ("After-Action") has been addressed with varying success through many different methods over the past decades. Many approaches have been described in both the public (civilian and military) and private sectors. Some of the terms used to describe this range of activities include:

- Post-mortem
- Critique
- Lessons Learned
- Retrospective
- Hot wash
- After-Action Review
- After-Action Report Process
- Improvement Plan.

- AAR process objectives: In emergency management, the AAR process serves the following important purposes:[64]

  - Documentation: Establishes a record of evaluating exercise and response activities.

  - Capture performance observations and other data: Records these findings in a manner that identifies both problems and successes encountered during emergency operations.

  - System evaluation: Analyzes findings to determine the effectiveness of the EOP and/or long term recovery plan and indirectly provides feedback for mitigation and preparedness planning.

  - Develop recommendations for change: Establishes recommended changes that can then be used to form a plan of action for implementing improvements.

The AAR process not only identifies successful and problematic issues during response and recovery, it also documents evaluation activities (for future reference) and establishes recommendations for organizational change.

[64] *Standardized Emergency Management Systems (SEMS) Guidelines, Part III. Supporting Documents*, p. 1 (1994). California Office of Emergency Services (now California Emergency Management Agency). Sacramento, CA.

- Components of the AAR process: The AAR process, as an organized activity for evaluating emergency response and recovery system performance, encompasses the following sequence of activities:
  - Collection of objective, authoritative data and observations.
  - Synthesis of the data and observations into useful information.
  - Development of a report that provides a brief description of the incident, exercise, drill, or proxy event in a narrative form, and then describes objective issues, both positive and negative, with actionable recommendations.
- Applying AAR process outputs: The actual processing and implementation of recommendations is considered a separate activity, **organizational learning,** and is presented in Module 4.4.

The value of the AAR process is only realized when the "products" of this process are further addressed through organizational learning, as discussed in Module 4.4.

  - AAR process outputs: The **outputs** of the AAR process should therefore be viewed as an **interim product** in systems enhancement or revision. The frequent statement, "we discussed that during all of our prior AAR meetings and nothing is ever done about it" is a reflection of an inadequate completion of the AAR process and organizational learning requirements. Issues raised during any AAR meeting (and by personnel who were unable to attend the AAR meeting) should be ultimately addressed by processing and analyzing them in a systemic fashion. This is delineated in the discussions on **organizational learning,** presented in Lesson 4.4.1.
  - Timing of the AAR process: Emergency management experience has consistently demonstrated that response system revisions are most likely to be implemented in the time period immediately following the exercise or incident. In order to capitalize on the motivation and, in some situations, the funding available in the immediate post-response period, the AAR process should be completed as soon as possible after an incident or exercise. The AAR products are then fed into the pre-established organizational learning process.

A critical concept that deserves emphasis: the AAR process evaluates systems, not individuals.

- AAR process – critical concepts: There are several important concepts related to the AAR process as presented in this text:
  - System versus individual position evaluation: It is important to emphasize that an AAR process is a "**system evaluation**," and is not generally used for **individual performance evaluation**. Separate, constructive methods exist for this purpose (for example,

the ICS mandated individual performance evaluation that occurs at the end of incident response). In fact, it is advisable to remind participants of this purpose at the beginning of every AAR activity, to prevent the otherwise common tendency to digress the discussion into critique of individual actions.

- Responsibility for the AAR process: Professionally conducted AAR process requires significant effort and attention to properly prepare, conduct, and complete. As a post-incident activity, the responsibility for organizing and conducting an AAR process is with the emergency program manager. This contrasts the incident review (IR), which is conducted by the Command and General Staff that managed the incident response. There are, however, some specific early AAR activities, which are managed by incident response positions as described later in this lesson.

- Type of information sought: The types of information sought in the AAR process should include positive issues as well those that indicate a need for improvement.

  - A true systems evaluation focuses first upon whether the system, as designed and implemented, met its objectives. If so, the successful parameters are important to document.

  - Ad hoc activities may have occurred during response that, while not part of the original system design, had positive influence on the organizational success. These should be carefully captured for official incorporation into the system.

  - Problems that arise during incidents, exercises, and other evaluated activities should be analyzed by comparing them to the emergency response and recovery system construct. Poor outcomes may be due to **poor system performance** (ineffective design, incomplete implementation, inadequate training, or other reason) or other circumstances **beyond** the system design. This analysis is important when developing recommended changes. As an example, a frequent confounding factor is exercise artifact as described in the previous lesson.

  - The exact nature of any shortcomings or problems is important to discern so that recommended actions are accurate and comprehensive.

- Evaluation measures and metrics: The measures commonly used to evaluate incident performance are usually **process**, **output,** and

Process, output, and outcome measures are more commonly utilized in the AAR process than input measures.

outcome performance measures (see Lesson 4.2.2).

Metrics utilized in the AAR process are drawn from the EOP and described incident response objectives. This emphasizes the importance of these documents.

- **Metrics** for use in analyzing the performance measures obtained during response and recovery are developed from EOP, Recovery Plan, incident objectives, personnel competencies and other EM program documents. This emphasizes the importance of carefully defining objectives, system description, concept of operations, and other documentation for all activities in all phases of emergency management.

- **The focus of the AAR process** is commonly placed on **outcome evaluation** where possible and then secondarily upon **process and output evaluation**. Organizational success in response and recovery, which is usually defined as accomplishing incident response objectives, is best determined through an **outcome** evaluation, as opposed to a primary focus on evaluating **process** or **outputs.** The latter two performance measures generally relate to more tactical accomplishments and do not necessarily predict overall organizational or mission success. At the same time, process and outcome evaluations become more important if the outcome is sub-optimal, since they may provide insight into where key improvement is necessary.

The major sources of information for the AAR process are: evaluator observations, incident documentation, and AAR meeting products.

- Sources for Incident or exercise information relevant to the AAR Process: All potential sources of relevant performance information are used in developing the information basis for the AAR process. Different methods may be used for optimal collection of information from each of these sources, and that is discussed later in the Lesson.

  - Evaluator observations: Evaluators' real-time observations during the incident or exercise are captured, ideally in a pre-formatted manner as described in Lesson 4.2.4.

  - Response and recovery documents: These are incident-related or exercise-related documents produced by the response personnel, most of which is produced during the incident or exercise activities.

  - After-Action Report (AAR) meetings and AAR participant observations: These are findings from hot washes, functional meetings and other activities.

  - External sources: These may include media reports, statements by community responders or leaders relative to the organization's performance, and relevant sections of other organization's

response documents and AARs, such as EMS or public health.

Additional details on these sources are provided below.

With all of these sources, acquired performance information is processed into content and format that is **objective and actionable in terms of system change, measurable to assess implementation, and able to be tracked through further analysis and implementation** (see Module 4.4).

After Action Report (AAR) Analysis of Evaluator Observations

A major element of the AAR process is aggregating and analyzing the evaluators' observations.

- Managing the evaluator observation reports:
    - Focus on comprehensive and objective reporting: Continuous improvement in the evaluator process and instruments strives for comprehensive and objective reporting. Over time, a judgment of the **reliability, validity, and predictability** of the evaluators' observations may be made relative to actual system performance. Also, with the development of optimal observation tools, improvements to the system (organizational learning) may be more consistently evaluated through follow-on exercises.

After Action Report (AAR) Internal and External Document Collection and Analysis Process

- Internal incident-related documents: These are documents from sources within the organization. The method for analyzing incident-related or exercise-related documents varies by the types of document.
    - Incident-related documents generated by the organization during the incident response and recovery: This source is likely to provide information that is different from that in the evaluator forms (above) and the AAR Meeting methods (discussed below) for capturing information for the After Action Report process. Most incident-related documents:
        - ICS-generated forms, reports, and other incident documentation: The collection of these should be initiated by the Documentation Unit of the Planning Section during the

Incident-related documents such as healthcare system incident action plans serve as an important source of information for the AAR process.

incident response/recovery and demobilization activities, and continued until the ICS function is demobilized. The Documentation Unit should therefore determine who they are to transfer this ongoing responsibility to and how they are stored. These documents are useful in determining what occurred, when, and under what circumstances. Additionally, they can serve as **performance measures** to compare against incident guidelines/metrics (what should have occurred). Examples of pertinent ICS documents include:

A range of internal documents can provide important information for the AAR process.

- Incident action plans and all supporting plans developed to support the activities in each operational period.
- Unit Logs (completed ICS 214s).
- Incident Summaries (ICS 209s).
- Function and position checklists used during the incident.
- Patient tracking documents.
- Official communications from external agencies (local jurisdiction's EOC, EMS, other healthcare facilities through the healthcare coalition [Tier 2], etc.).
- Check-in sheets (completed ICS 211s).
- Demobilization sheets (completed ICS 221s).
- Financial documents related to response (e.g., bills for vendor emergency contracts).
- Situation reports and other official documentation developed by the healthcare organization and transmitted to external agencies, patients, or others.

Incident-related documents from entities external to the organization can provide another important source of information for the AAR process.

- Incident-related documents from outside organizations: Some of these are documents generated by other organizations during the incident. Many of these may be collected by the Liaison Officer during performance of their incident duties and should be transmitted to the Documentation Unit for archiving for AAR purposes. Other external documents may be generated by media organizations (e.g., a reporter's description of the organization's actions), or may have relevant statements from authorities and other organizations reported in the media. Many of these may be collected by the Public Information Officer during performance of

their incident duties and should also be archived for AAR purposes. Due to their nature, some of these documents may not be generated until after the emergency response phase of the incident or exercise. Additional documents that should be sought by those charged with the AAR document analysis include:

- Pertinent media reports.
- Satisfaction or other victim surveys as indicated.
- Outside research that analyzes the response. Usually, this must be a "quick response" research activity to be useful in the AAR process timeframe, as opposed to the typical research methods in medicine and public health.
- Observations pertinent to the organization's performance that may have been produced during a community-wide hot wash or AAR process, if they are available in the appropriate timeframe.
- AARs developed by external agencies, if they are available in the appropriate timeframe.

From all of these instruments, objective observations should be recorded for consideration in the analysis phase of the AAR process. Even though some reports may be considered inaccurate, the *perceptions* that led to the report should be examined for ways to improve the organization's response, including better management of public information.

After Action Report (AAR) Meetings

- AAR Meetings and associated documentation: The AAR Meeting (see terminology textbox) and associated documentation is the last source category and commonly the most emphasized source of information for the AAR. This source of information for the AAR process focuses upon participants' observations from their experience during the pertinent response and recovery activities.

- Method: The method for capturing participants' observations consists of **AAR Meetings** (often called "After Action Reviews") and the **organized processing of information produced in the meeting/s**. It is based upon oral and written (preferred) input from incident response and recovery participants and observers. While most of this input is obtained during "AAR meetings," incident or exercise participants and observers who are unable to attend meetings should

AAR meetings provide the third source of information for the AAR. These meetings are distinct from and serve an important different purpose than an Incident Review.

be encouraged to submit their input, in a standardized format and procedure, outside of the meetings themselves.

- AAR meeting versus Incident Review: The AAR meeting is distinguished from the "Incident Review," presented in Lesson 3.2.9 which is an important response demobilization activity and not primarily evaluative in nature. **While a brief review of the incident is used to start most AAR meetings, this is distinct from a formal Incident Review.**

> **Terminology alert!**
>
> ***After Action Report Meeting:*** The gathering of incident or exercise participants and observers in a tightly moderated effort to discuss the incident response and/or recovery for the purpose of obtaining system performance information useful to the AAR process.

- Preparation and planning for the AAR meetings: The AAR meeting approach is not a simplistic process of just "calling everyone together" for a meeting. It requires planning and management to establish the environment, facilitation, and documentation to ensure that issues are captured in the appropriate format to optimize organizational learning. The "meetings," called "workshops" in SEMS, may be viewed as a vital instrument for gathering objective information on the response and recovery performance. The following AAR meeting preparation steps may be useful:

  - Select timing and site: The timing and location of the AAR meeting and any related preceding meetings is selected and disseminated to the appropriate personnel. The timing should consider the usual work schedule for participants to ensure the fullest participation possible. It is generally best to conduct the AAR meeting soon after the incident/exercise (for memory purposes) but with enough time first for system and personnel recovery. The location should provide adequate space for the participants. The critical participants who should be present should be informed as soon as possible to maximize participation and memory recall.

  - Present the AAR objectives: The primary objective of the AAR meeting is to obtain participants' observations and recommendations related to incident response and recovery activities. The findings and recommendations should be presented in relationship to the organization's EOP and/or Recovery Plan to

be most efficient. Participants should be informed of this to shape their input.

- Delineation of responsibilities: The AAR process, including the AAR meetings, is officially the responsibility of the EM program and, therefore, the emergency program manager and the EM committee. They may wish to involve personnel who were assigned to the Planning Section during the response.

  - SEMS and other early ICS guidance delineate the relationship between the incident operations and conducting the AAR process: "…the responsibility for initiating the After Action Report process should be assigned to the Documentation Unit within the Planning/Intelligence Function… At the completion of the emergency period, and after the field ICS and emergency operations center have been deactivated, the responsibility for the continuance of the After Action Report process should be assigned elsewhere within the organization. In many organizations, the same personnel may actually be assigned to the After Action Report function to provide continuity." [65]

  - Persons responsible for organizing and managing the AAR meeting activities, facilitating the AAR meetings, and developing the information from the AAR meeting participants should all be pre-designated. For continuity purposes, it is helpful to include incident Planning Section personnel if possible. In some situations, it is even appropriate to utilize a Planning Section Chief as the facilitator, as the methods for conducting the AAR meeting follow many of the same principles used for conducting meetings during response and recovery.

- Identify required meeting resources: Support materials are identified and secured for the AAR meeting. For example, adequate audiovisual equipment should be acquired.

- Documentation Review and Analysis: The pertinent documents described above should be collected and analyzed prior to the AAR meeting. Findings should be considered to identify issues that should be raised during the AAR meeting. Though many of these documents may not be presented or referred to during the actual AAR meeting, they are referenced during the writing of the AAR Report.

The AAR process is ultimately the responsibility of the EM program. It is useful to utilize individuals in the AAR process who served in response positions (especially Planning personnel) to provide continuity and consistency from the response to the AAR.

In evaluating complex incidents or full EOP activations, individual functional elements should meet prior to the full AAR meeting to develop their input.

[65] *Standardized Emergency Management Systems (SEMS) Guidelines, Part III. Supporting Documents*, p. 2 (1994). California Emergency Management Agency, Sacramento, CA.

- Function-specific meetings: In evaluating a full EOP activation or complicated partial EOP activations, each ICS section should meet prior to the full AAR meeting and develop their AAR input.[66] In some particularly large or complex incidents, even smaller or more specific sectional sub-units (key operating units) may also meet to capture their function-specific input. Examples of these smaller sub-functions include the decontamination team, the "initial patient care function" (i.e., the Emergency Department and supplementary staff), or the Operating Suite staff. This "bottom up approach" provides empowerment to the lower echelon of responders to present operational issues, positive and negative, that may ne essential to improving the system.

  - These preparatory meetings should generally follow the guidelines/agenda listed for the full AAR meeting (see below).

  - For efficiency and effectiveness, the information from these preparatory meetings should be documented according to the "issues-based" template described below for use during the AAR meeting.

- Identification of AAR meeting participants: Contrary to an Incident Review, in which the purpose is to clear misconceptions so all participate, AAR meeting participation may be more limited. AAR meetings typically involve a more limited participant group. Command and General Staff, Branch Supervisors, and Unit Leaders are usually mandated participants, and others may be invited to represent the sub-section personnel who provided input through function-specific meetings.

Participants in the AAR meeting should be pre-identified. Information from additional personnel is developed during preparatory meetings (see text) and reviewed prior to the AAR meeting.

- Develop an agenda and outline for the AAR meetings: An agenda for each AAR meeting should be established according to the guidelines below under "Conduct of the AAR meeting." It should be disseminated to participants before the start of the meeting.

- Select AAR meeting facilitator: This is the individual responsible for leading the discussion and ensuring that the stated objectives of the meeting are met and in the prescribed timeframe. As noted above, a Planning Section Chief is often selected for this role due to the nature of his or her duties during response and recovery.

[66] For smaller AARs, participants may individually list these items according the same format, rather than have a formal function-specific meeting.

- Conduct the AAR Meeting: The AAR meeting should be structured to ensure the purpose is met, the appropriate information is clarified and captured, and time-utilization is efficient. This is best accomplished with an agenda that designates allotted time for each selected topic.

  - Adhere to the agenda: The meeting facilitator should move through the structured agenda that covers all aspects of the emergency response and recovery system that was the focus of the exercise or incident (as defined by the incident or exercise objectives).

  - Maintain balance to the input: No one issue or sub-set of participants should dominate the meeting. This generally argues against AAR meeting methods that use "open-ended questions" as the approach to AAR meeting facilitation, even though some medical authors have proposed this for generating discussion.[67] This industry application for healthcare organizations can create inefficiencies in meetings and developing AAR information.

    - Brainstorming, debates, extensive problem-solving debates, and free-flowing discussion are typically not conducive to an efficient AAR meeting process, anymore than they are in the meetings used to manage an actual incident (see Unit 3).

    - Human tendency is to focus solely on the problems encountered and the presentation of suggested solutions. The AAR Meeting facilitator should **balance the positive and the negative** as indicated by the overall system performance and keep the discussion objective and depersonalized at all times.

    - Additionally, many organizations conduct the AAR meeting with the idea that most of the "learning" that is to occur from the exercise or incident will be accomplished by the AAR meeting itself. This "learning," while important, must be recognized as individual personnel learning that is limited to attendees and those with whom the attendees interact in an instructional activity later (i.e., training). This "lessons learned" objective must be distinguished from the much more important objective of **organizational learning**, presented in Lesson 4.4.1, where the findings of the AAR meeting, along with the other sources of data (described above) are used to accomplish **permanent change in system design, equipment, supplies, and instructional activity**.

To ensure an efficient process, the AAR meeting should avoid extensive and detailed discussion of any single issue. Contentious issues should instead be assigned to appropriate parties for resolution, with presentation of the information to the AAR committee.

[67] Evaluation of Hospital Disaster Drills: A Module-Based Approach. AHRQ Publication No. 04-0032. By Johns Hopkins Evidence Based Practice Center. 2004; accessed April 10, 2010 at: http://www.ahrq.gov/research/hospdrills/hospdrill.htm

A template agenda is presented to summarize the AAR meeting considerations that are presented in the text.

Efficient AAR meetings are conducted in a similar fashion to incident Planning Meetings.

Each function is given the opportunity to provide summary statements of their AAR findings. For complex incidents or exercises, these comments may be provided in a sequential fashion for each of the stages in the Concept of Operations.

- Template for conducting the AAR meeting: the following is a suggested template for an AAR Meeting agenda, incorporating the preceding considerations:

  - Review AAR objectives for participants: The facilitator should briefly review the objectives of the AAR process (and therefore the meeting) as noted above. The concept of focusing on systems as opposed to individual performance should be emphasized.

  - Review the AAR process: After briefly presenting the AAR meeting agenda, the facilitator should provide an outline of how material generated is reviewed, analyzed, and incorporated into systems enhancement.

  - AAR meeting ground rules and meeting facilitation: The meeting facilitator should present the meeting "ground rules," which are similar to those utilized during response and recovery meetings (management, planning, operations briefing, etc.). They are designed to limit outside distractions, adhere to the agenda, keep the conversation focused, and maintain order. (e.g., participants speak only when recognized by the facilitator, they know how to be recognized, and they engage in no side conversations). The meeting should be moderated to avoid lengthy soliloquies or extensive problem-solving discussions (these should be assigned to individuals to complete outside the meeting and report back to the EM committee). Meeting facilitation also keeps the input balanced and assures that all appropriate response and recovery areas are covered.

  - Brief review of incident activities: The facilitator should provide a brief synopsis of the incident response highlighting important developments and response activities. The material from incident-related documents (see above), as well as from the evaluators, can be utilized to develop this synopsis. It is important to note that this discussion is unilateral (the facilitator talking) and has a different purpose than that of the formal IR done as part of incident demobilization. It is not primarily intended to discuss conflicting views of what occurred, or clear misconceptions about the incident, but is conducted to set the stage for examining the response during the AAR meeting.

  - Function-specific input: Each function has a designated representative address the group listing important AAR issues (ideally, they should have been pre-identified during functional meetings and/or a hot wash). The majority of the AAR meeting

time is devoted to this input:

- The issues should be presented and discussed using the issue documentation format presented below (issue, background, proposed solution, proposed responsible party).

- For particularly complex events, Branch Supervisors, Unit Leaders, or other leadership incident positions may be called upon to speak to a specific issue.

- In addition, AAR meetings examining large or complex events may wish to follow Concept of Operations stages,[68] allowing each function to comment independently on each stage as indicated. As an example, each section would be provided an opportunity to comment on their mobilization stage in the incident response.

- Clarifying questions may be asked, but general debate or problem-solving discussion is sidelined for resolution outside of the AAR meetings.

- Overall organizational objectives for the incident or exercise response: Although the facilitator has presented the incident objectives for the exercise or the response during introductory remarks, comments on them are best held until the individual functions have been examined. At this point, the facilitator should provide a brief opportunity for participants to comment on whether these incident objectives were met.

- Closing comments: Follow-on activities to the AAR meeting (e.g., the organizational learning process) should be briefly presented so that participants are aware of how their input will be used. Timelines for resolution of controversial issues that came to light during the meeting, development of the written AAR, and incorporation of accepted EOP changes should be presented. Any assignment of participants into these follow-on activities could be sought at this time. The facilitator and healthcare system executives may wish to make closing comments (e.g., expressing appreciation for participants' efforts, presenting encouraging remarks regarding personnel performance during the event being evaluated, and reinforcing the importance of the emergency management professionalism

[68] In this text, the "Response Phase" of CEM is divided into the stages of Incident Recognition, Activation/Notification, Mobilization, Incident Operations, Demobilization, Transition to Recovery in the concept of operations presented in detail in Unit 3.

to the organization and the community).

Some organizations and agencies use a separate evaluation tool called a "hot wash." Healthcare emergency managers may wish to consider the use of this tool but must understand that it has a distinctly different purpose and construct than an AAR meeting.

The "Hot Wash" as a Component of the AAR Process

- Immediate review and feedback: In emergency management, it has become increasingly common for participants to meet immediately after an exercise or incident and evaluate the response. In some situations, it may be important after these events to provide a relatively informal forum for **all** participants and observers to "**express" their thoughts and reactions** and for leaders and managers to **express their appreciation** for the time and effort expended by all. The overall AAR meeting, in contrast, commonly is more formal and has a limited participation, with management participants from each level of response rather than "all players."

- The "hot wash": A "hot wash" (see terminology textbox below) is normally conducted immediately after the conclusion of an exercise or actual event. If conducted in a non-threatening and non-judgmental manner, the hot wash can capture important system performance issues while reinforcing individual and team learning. In lieu of an incident review, it can also provide a means for addressing inter-personal conflicts and misperceptions before they are internalized and become counterproductive.

    - Planning and preparedness: A hot wash should not be an ad hoc gathering. It requires planning and management to establish the environment, facilitation to bring individuals into the discussions, and documentation as much as possible to ensure that positives ("strengths") and negatives ("areas for improvement") are expressed.[69] It is critical that this information be captured by the controllers and evaluators and imported into the AAR process, so the "lessons" do not become "lessons forgotten."

    - Participation: A hot wash is more likely to have the participation of all the relevant players, and may also be opened up to formal observers.

    - Not a substitute for a formal AAR meeting: A hot wash is important in those incidents where post-incident circumstances do not permit the formal preparation and conduct of an AAR until well after the response phase (e.g., in particularly complex recovery events). In these instances, the less formal hot wash provides the means of identifying and capturing information while still fresh in participants' minds. It should be emphasized that the **hot wash is an**

[69] These two terms were used in the HSEEP description of hot wash. See HSEEP "hot wash" description and reference in textbox 4.2.4.3.

intermediate process and should not be accepted as a replacement for the AAR. Ultimately, the more formal AAR process should be conducted, or the hot wash must take on the characteristics of the AAR meeting (with information capture). This curriculum's definition of "hot wash" may differ from that of other disciplines, but provides more precise meaning.

Terminology alert!

Hot wash: A systems performance review that is generally less formal and detailed than the After-Action Report (AAR) meeting and occurs in close proximity to the end of the incident or exercise. Preparation for a hot wash is commonly less extensive than for an AAR meeting. The results of the hot wash may serve as a starting point for a later, more formal AAR meeting. It should never be considered the endpoint to an After-Action Report process for an incident or exercise, or replace formal AAR meetings.

The HSEEP definition of a hot wash is presented for comparison (see Textbox 4.3.1.2).[70]

Textbox 4.3.1.2

"Hot Wash" Description (HSEEP)[71]

"A hot wash is a facilitated discussion held immediately following an exercise among exercise players from each functional area. It is designed to capture feedback about any issues, concerns, or proposed improvements players may have about the exercise. The hot wash is an opportunity for players to voice their opinions on the exercise and their own performance. This facilitated meeting allows players to participate in a self-assessment of the exercise play and provides a general assessment of how the jurisdiction performed in the exercise. At this time, evaluators can also seek clarification on certain actions and what prompted players to take them. Evaluators should take notes during the hot wash and include these

[70] U.S. Department of Homeland Security. *Homeland Security Exercise and Evaluation Program Glossary* (2007), accessed April 11, 2010 at :https://hseep.dhs.gov/pages/1001_Gloss.aspx.

[71] U.S. Department of Homeland Security. *Homeland Security Exercise and Evaluation Program Glossary* (2007), accessed April 11, 2010 at :https://hseep.dhs.gov/pages/1001_Gloss.aspx.

observations in their analysis. The hot wash should last no more than 30 minutes."

- "Hot wash equivalent" for exercise management and evaluators: For exercises, HSEEP guidance also recommends a similar meeting, called a "**debriefing**," be held for those who participated in the planning and conduct of the exercise (see Textbox 4.3.1.3). This is one other source of valuable information for the AAR process. For the EM exercise program personnel, this is also an opportunity for additional feedback on the development and execution process for the exercise itself, including the usefulness of the evaluator briefing and observation recording instrument.

Textbox 4.3.1.3

Exercise "Debriefing" Description (HSEEP)[72]

"A debriefing is a forum for planners, facilitators, controllers, and evaluators to review and provide feedback after the exercise is held. It should be a facilitated discussion that allows each person an opportunity to provide an overview of the functional area they observed and document both strengths and areas for improvement. Debriefs should be facilitated by the exercise planning team leader or the exercise program manager; results should be captured for inclusion in the AAR/IP. (Note: Other sessions, such as a separate debrief for hospitals during an operations-based exercise, may be held as necessary.) A debriefing is different from a hot wash, in that a hot wash is intended for players to provide feedback."

A standardized format for capture of AAR information is critical to ensuring an efficient process. The model presented here is based upon methods utilized by multiple Federal agencies.

Information Capture from All AAR Process Activities

As discussed above, a well-executed formal AAR process collects a large amount of potentially useful information that must be processed into objective, accurate documentation for archiving both the exercise or incident actions and the subsequent evaluation. More importantly, the AAR process documents should be formatted and written with an action-oriented approach that promotes efficient translation into organizational improvements. This argues for a report that is segmented into issue focused sections rather than a descriptive account and overview recommendations only.

[72] Ibid

- Standardized issue-based formatting: A standardized format should allow for efficient processing of information into final AAR documents. The recommended format is presented in Textbox 4.3.1.4.

Textbox 4.3.1.4

Issues-based Approach to Presenting AAR Information

The following general template is useful for capturing each issue presented during the AAR meeting or determined via analysis of the incident-related documents and evaluators' reports discussed earlier in this lesson.

Issues for Action

Brief statement of the issue: One or two sentences that describe the issue.

Background: One or two paragraphs to briefly summarize how the issue, as described, relates to the emergency response and recovery system. It may also be important to present the history of the issue, other information that explains why it is important, and the implications for not addressing or resolving the issue.

Suggested action: A brief description states how the identified issue should be addressed, according to the AAR participant or the appropriate ICS section or function. This should be action-oriented, written in a positive manner that provides the strategy and activities necessary to fully resolve the issue. If the proposed solution involves capital expenditure, it is helpful to include some comments as to how the purchase can be funded. Whether the presented issue relates to a positive or negative experience during response, this section should address the recommended permanent systems enhancement, such as: 1) the appropriate EOP change, 2) education or training change, 3) recruitment suggestion, and so on. It must be objective, actionable, and focused on "system" rather than "person" (i.e., "So and So should be fired" would be considered an unacceptable recommendation, whereas "'x' change to the 'y' position description and position qualifications is necessary" is acceptable).

Proposed responsible party: A brief suggestion is listed indicating what party or parties within the EM program (and possibly also external to the organization) are thought to be most responsible for the suggested system change. For example, the "better

communications" issue could be related to equipment acquisition or repair if the communications hardware didn't work. It also could be a training issue for Command and General Staff or Section Chiefs if the problem was not enough attention to disseminating information. If the issue must be addressed primarily by an "outside" organization (e.g., "EMS dispatch failed to notify the hospital of additional incoming casualties"), the responsible party would be the healthcare organization's position of authority that interacts with the "outside" organization during preparedness activities.

It should be noted that some organizations do not include this final "Proposed Responsible Part" category, deferring to the committee processing the "issues sheets" to assign implementation responsibility.

- Advantages to the "issues" documentation: This approach provides several advantages to consider when developing this aspect of the AAR process for a specific organization:

  - Validated in national response experience: The suggested template for documentation of findings at an "issues" level (see textbox below) is adapted from that used by multiple Federal entities for AAR documentation (e.g., The FEMA National Urban Search & Rescue Response System and others), and similar to the format used by the Department of Veterans Affairs.

  - Allows efficient data sorting of information according to purpose: This format organizes information into a series of individual "units," with each unit constructed around a single identified issue. The information therefore may be easily sorted and re-sorted as necessary for different purposes during processing of information and incorporating change through organizational learning. For example, the issue sheets that relate to one specific area of response, such as the hospital incident command post, may be grouped together (i.e., sorted by function) when completing the evaluation of that function. During organizational learning activity, however, all issue "sheets" with training recommendations (i.e., sorted by accepted training revision recommendations) would be grouped together electronically or physically for consideration when revising the pertinent training courses in the EM preparedness planning.

  - Allows efficient revision: The formatting also provides for an

efficient approach to revising the issue sheet information, as each issue is considered, amended, further processed, and resolved (i.e., rejected or accepted and incorporated) during the organizational learning process described in Lesson 4.4.2.

- Reporting out: This format also promotes straightforward reporting out as each issue is considered and a decision is made.

- Issue sheet aggregation and cataloging: The issues sheets are all collected (by paper where necessary or, ideally, in an electronic format such as Excel) and catalogued by EOP function. This process may use the same function designators used in developing the function-specific AAR pre-meetings discussed above. For example, the Veterans Health Administration sorts its issues by the categories listed in the textbox below. This aligns the issues with the VHA's EOP structure, so findings from the AAR process can be easily aligned with EOP changes.

Textbox 4.3.1.5

Department of Veterans Affairs - Emergency Management program

After Action Report (AAR)[73]
Issues for Action

I. Functional/Key Activity Area:
- Command and Control (CC)
- Public Information (PA)
- Planning/Intel (PI)
- Logistics (LG)
- Finance/Admin (FA)
- Operations (OP)
- Business Continuity (BC)
- Plant & Utilities (PU)
- Safety & Security (SS)
- Health & Medical (HM)

- Post-information collection activities in the AAR process:

  - Developing the After Action **Report**: Designated individuals should collate the material from the AAR process and write the AAR

[73] *Emergency Management Program Guidebook (2005),* After Action Report Sample. Department of Veterans Affairs, Washington D.C.

The actual After Action Report has multiple purposes and careful attention should be given to the development of this document.

document (see suggested template below). The report has specific purposes and therefore careful consideration and attention should be given to completion of this important document. The AAR can be used for:

- Historical reference: The After-Action Report provides an accounting of the incident or exercise details, as well as the emergency response and recovery activities. It documents both the successes and the problems encountered during these activities; it also provides an assessment of response and recovery system effectiveness.

- Future education, training, and exercise: The After-Action Report itself can serve as a resource for future education and training and for planning future exercises.

- Systems enhancement efforts: The After-Action Report serves as the official mechanisms for documentation of systems enhancement recommendations. The issues that are not immediately decided are tracked in a continuous manner through the EM program organizational learning process until finally resolved (see Lesson 4.4.2).

Textbox 4.3.1.6

Suggested Template for AAR Report for Healthcare Systems

- Executive summary: to include purpose of AAR Report and synopsis of major or principal recommendations for systems enhancement. This important section could serve as a redacted copy for sharing external to the organization (e.g., with jurisdictional response agencies or other healthcare systems).

- Introduction: a review of the AAR process, its relation to the EM program, and its relation to the incident in question (exercise, drill, real response, etc.).

- Incident Summary: A chronological summary that describes the incident or the exercise scenario. For smaller, partial EOP activations, this may take the form of a brief synopsis. For more complicated events or full EOP activations, this may best be represented by outlining important activities according to the stages outlined in this text's Concept of Operations (Incident Recognition, Activation/Initial Activation, Mobilization, Incident Operations, Demobilization, and Transition to Recovery).

Reference may be made to important attachments, such as specific ICS forms or other included documents.[74]

- Recommendations by function: The recommendations from the AAR meeting should be catalogued by ICS sections and sectional functions. Interacting systems, agencies, and programs (media, mutual aid, and others) should be noted when involved in the response.[75] As decisions may have already been made in regards to incorporation of some of the systems changes, a method of tracking these should be included in this catalogue. Some systems prefer to present this material in a spreadsheet format for use in tracking issues that have not been rapidly or fully resolved at the time of Report completion.

- Conclusions: Brief commentary on organizational control objectives for the incident and the relationship to organizational performance.

- Attachments: Pertinent documents are attached for reference in the AAR report.

  - Disseminating the AAR: The appropriate parties to receive the AAR should be evident in a review of the AAR process goal and objectives. Personnel within the healthcare system, as well as appropriate authorities, emergency response partners, and those who supported the organization during the activities evaluated by the AAR, are candidates for this dissemination list.

The use of Quality Improvement/Total Quality Management "cover" from legal discovery: The AAR process (meetings, interim products, and final report), as well as all related documentation, should be designated as an official part of the healthcare system's Quality Improvement/Total Quality Management program or otherwise addressed per the organization's legal experts (see Lesson 4.3.2). This can potentially protect the information from being subject to legal discovery or Freedom of Information Act requests. All documents related to the AAR process should be clearly labeled indicating they are a part of this process.

[74] Practically, it is not possible in most situations to attach all relevant incident documents to the AAR report. Instead, the AAR report should describe how and where these important documents have been stored (physically or electronically).

[75] From *Standardized Emergency Management Systems (SEMS) Guidelines*, Part III. Supporting Documents (1994), p. 8. California Office of Emergency Services (now California Emergency Management Agency), Sacramento, CA.

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Module 4.4

Organizational Learning: Incorporating Improvement into the Emergency Management Program

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Lesson 4.4.1 Overview: Organizational Learning Concepts

Lesson objectives

- *Define and differentiate the learning organization from organizational learning.*
- *Define "lessons learned" in relation to the organizational learning process.*

Introduction and Background

While the concepts "ICS," "EOP," and the "Emergency Management program" and others presented in this text are relatively recent developments, management of organizations is not. It has been studied for many decades, particularly in the business management and military command disciplines. Many of the important research findings and principles developed over many decades in those research areas are directly applicable to emergency management. They are also relevant to incident command, particularly if modified for the very different emergency and disaster context (urgency, great uncertainty, high stakes and possible austere conditions).

Management researchers and practitioners have worked for many years to address questions related to optimal organizational function. Achieving and maintaining this level of function is a dynamic process. Since, the organization's environment is not static, the organization must constantly evaluate its situation and adapt (i.e., "change") as the environment evolves.

All successful organizations must adapt and change to evolving circumstances. This applies not only to the regular, day-to-day management of organizations, but also to EM program component plans as well.

- The process of change: How the organization interacts externally, how it manages internally, how it changes its outputs (products and/or services) to meet evolving demands, and many other aspects of the organization requires continual evaluation and change. The range of change may be characterized in many ways, from "adjustments" to "evolution" and even major "transformation."
    - All potential changes should be considered within the strategic context for the organization:
        - "Is this change for one sub-area of the organization consonant with the organization's overall mission and objectives?"
        - "Does this change to a process unintentionally change other areas of the organization and, if so, is the overall change a benefit or detriment to the organization's overall mission and

objectives?"

- The changes must also be managed well at the tactical level within the organization. For example, tactical questions must address:
  - "What is the best way to accomplish this change, while also addressing cost-effectiveness, worker motivation, and other issues?"
  - "How do you make the change permanent?"
  - "How do you assess the impact of the change once it is accomplished?"

- Varied approaches to change: A range of management approaches have been developed to accomplish change. Several methods became prominent within the U.S. medical establishment over the recent decades: Quality Assurance, Quality Improvement, Total Quality Management, and others.[76] These tend to be relatively narrow approaches to change and results have been less than expected over the long term. It may be more effective to consider the organization itself, and then focus upon a comprehensive strategy for improvement through change.

A prominent concept utilized in management research is one called the "learning organization." This concept places emphasis on the importance of needed change within the organization.

- The "learning organization": A prominent, more robust conceptual approach in management research views the goal of change as first transforming the business or other entity needing change into a "learning organization." The term "learning organization" has been presented by a range of authors in the research literature. One of the earliest and best-recognized descriptions is Peter Senge (see Textbox 4.4.1.1). While the terminology these authors use differs from that used in modern comprehensive emergency management (CEM) [see Unit 1], many of the conceptual descriptions are consonant with the system approach to emergency management. For example, the first of Senge's five basic "disciplines" for a learning organization is "systems thinking," which is entirely consistent with the emphasis found throughout this EM text.
  - Open participation: A critical concept of the learning organization[77] is that individuals across the organization can actively and

[76] Ahire, S.L., Landeros, R., Golhartotal, D.Y. *Quality Management: A Literature Review and an Agenda for Future Research.* Production and Operations Management (Summer 1995) Vol. 4, No. 3, pp. 277-306.
[77] Senge, P. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*. In Ott, S.J., Parkes, S.J., Simpson, R.B. *Classic Readings in Organizational Behavior*. Belmont, California, Thomson Learning: pp. 484 - 491.

productively participate in organizational change that leads to improvement. This can only occur if the organization's systems have been designed to promote this behavior while assuring that proposed change is considered within the organization's overall mission and objectives.

The individuals that make up an organization participate in the development and implementation of change. This is essential to being a "learning organization."

Textbox 4.4.1.1

Learning Organizations – Peter Senge

"This then, is the basic meaning of a 'learning organization' - an organization that is continually expanding its capacity to create its future." Peter Senge, page 491.[78]

The dimension that distinguishes learning from more traditional organizations is the mastery of certain basic disciplines or "component technologies." The five that Peter Senge identifies are said to be converging to innovate learning organizations. They are:

- Systems thinking
- Personal mastery
- Mental models
- Building shared vision
- Team learning.

He adds to this recognition that people are agents, able to act upon the structures and systems of which they are a part. All the disciplines are, in this way, "concerned with a shift of mind from seeing parts to seeing wholes, from seeing people as helpless reactors to seeing them as active participants in shaping their reality, from reacting to the present to creating the future" (Senge 1990: 69). [79]

- System change and individual mastery: This systems thinking therefore allows the members of an organization to see how they may actively participate in creating the reality they experience, and equally how they can change that reality and address problems they face in a shared fashion (i.e., Senge's "Building shared vision"). This phenomenon is thought to push organizational personnel to strive for individual excellence, or Senge's "personal

[78] Senge, P. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*. Reported in Ott, S.J., Parkes, S.J., Simpson, R.B. Classic Readings in Organizational Behavior. Belmont, California, Thomson Learning: pp. 484 - 491.
[79] Smith, M.K. "Peter Senge and the learning organization." The Encyclopedia of Informal education (2001); access April 2, 2010 at: http://www.infed.org/thinkers/senge.htm

mastery."

- Contrast with traditional organizations: Researchers have not considered the management thinking in traditional organizations to be open to the influence of others in the organization, to dialogue, and to teams as learning units. The motivation to learn at all levels of an organization, therefore, may not be as prevalent in traditional authoritarian and/or hierarchical organizations. The concepts of the learning organization directly address this, promoting participatory change while assuring an awareness of each component's role in the overall organization and the organization's role in its environment; these are Senge's "mental models."

These concepts are very helpful in developing an understanding of how to conduct an emergency management program within a healthcare organization. How the healthcare organization views emergency management in general, and emergency management within their organization, is important to the success of the emergency management program. How leaders, managers, and others within the organization view change to their usual environment (structure, process, procedures, etc.) for emergency management purposes, and changes to the emergency operations plan that affect them, is equally important. This is particularly relevant when it comes to significant change since any meaningful and permanent change to an organization has very real implications for many individuals within that organization. Without careful attention to detail, many of these affected individuals (including leaders) are not nearly as vested in the emergency management vision as the emergency program managers and committee.

The term "**learning organization**" has therefore been defined by the authors for use in this discussion (see terminology textbox below).

Terminology alert!

Learning organization: An **organization** that conducts continuous evaluation of its experience and transforms that experience into lasting improvements in performance.[80] This is accomplished through change to objectives, structure, process, personnel qualifications (including competencies, which describe knowledge/skills/abilities), facilities, equipment, supplies, and other parameters. This "learning process" is accessible to the whole organization and relevant to its core mission and objectives.

- Learning organization in business continuity: An example from the business community that highlights this approach and is applicable to emergency managers is presented in Textbox 4.4.1.2.

Textbox 4.4.1.2

Marriott International, Inc.

Marriott is a lodging company with properties and offices throughout the world. Their "Business Continuity Program" (BCP)[81] is considered to be one of the best.

"… a sensible structure that combines executive-level support with grassroots participation"[82]

To support its planning efforts, Marriott has a comprehensive company policy on BCP that mandates all company locations plan for business interruptions and report compliance on an annual basis. Dr. Penny Turnbull [senior director of crisis management and business continuity for Marriott International, Inc.] says, "The corporate policy provides clear direction for planning within a robust

[80] Adapted from Senge, P. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*; In Ott, S.J., Parkes, S.J., Simpson, R.B. *Classic Readings in Organizational Behavior*. Belmont, California, Thomson Learning: pp. 484 - 491.
[81] "Business Continuity" is the term for the continuity of operations and emergency management that is commonly used by commercial businesses – see NFPA 1600.
[82] This Marriott textbox information is reproduced from: Rojas B. BCP the Marriott Way. *Continuity Insights* magazine (November-December 2004).; Gardner Publications, Inc, Cincinnati, OH. Reproduced with permission.

framework, enabling a consistent approach to planning across the enterprise, and yet allows local flexibility, taking into account the size and function of the location and the myriad of national, regional, and local challenges. This is also reflected in our response methodology, which takes a tiered approach as well, escalating response activities and authority from the local level up to corporate HQ as needed.

"Compliance," she continues, "is reported from the unit level, all the way up through the corporate structure. Finally, each of the company's executive vice presidents is responsible for certifying the compliance of their business area; this is reported to the board annually."

But Dr. Turnbull realizes BCP is more than crafting policy and assigning responsibility. "All BCP efforts are supported by the BCO [Business Continuity Office] and its comprehensive Website on the company's intranet that provides a planning guide, resource library, and other valuable tools and resources," she says.

Executive support, while essential, isn't everything. "All of the literature you read says you have to get executive-level support before you can move the program forward. Which is true, but at the same time, I need the support of our facilities and engineering staff, our security officers, the employees who are living and breathing and doing this every day. If they're not believers, I can have all the executive support in the world, but it doesn't really help much. You need both," she says. "You need the top down, but you really need to build a strong foundation from the bottom up."

Not only does business continuity touch all the different functional parts of the organization, it goes up and down the entire corporate ladder— from hourly workers to C-level executives. That's the approach that Marriott takes in planning, "involving everyone in-between," she says. **"**Everyone has a role to play."

And everyone must understand what that role entails and why it is important. Your plans are only as strong as the people who will carry them out, says Dr. Turnbull. "People have to make decisions, ultimately, and that's what gets you through a crisis."

- Organizational learning: While "personal mastery" is a highlight of the learning organization, it is important to recognize that effective change must reach beyond personnel enlightenment, and, from an emergency management context, well beyond "lessons learned" by individuals

within the organization. The term "**organizational learning**" is used to emphasize this concept (see terminology textbox) and to distinguish it from "lessons learned" (see Textbox 4.4.1.3).

Terminology alert!

Organization learning: A systems-based **process** for assessing proposed changes to the system and incorporating the accepted proposals to effect lasting change in system performance. This is accomplished through alteration to system structure, process, competencies, facilities, equipment, supplies, and other parameters. This process is accessible to the whole organization and relevant to the organization's core mission and objectives.

Textbox 4.4.1.3

"Organizational Learning"
Versus "Lessons Learned"

"**Organizational Learning**" uses a defined process to effectively and permanently incorporate change. The organization therefore evolves and improves beyond the simple "personnel learning" that is commonly found in the "**lessons learned**" approach to exercise and incident evaluation.

The concept "**organizational learning**" is therefore contrasted with the narrow people-focused "lessons learned." Change based only upon personnel learning becomes lost or diluted over time, personnel attrition, and organizational restructuring. "Lessons" soon become "lessons forgotten," only later to re-emerge as "lessons re-experienced."

Organizational learning, in fact, captures the "lessons learned" idea as a more comprehensive principle: "personal mastery" per Peter Senge. "Lessons learned" may therefore be viewed as one element of organizational learning; it is necessary but not sufficient for adequate organizational progress.

Consonant with the "learning organization," "organizational learning" implies that the entire organization incorporates improvements. This is distinguished from individual "lessons learned" and is, in the aggregate, more productive for the organization.

- In the overall EM program structure, organizational learning is a

preparedness function and must be well coordinated with the evaluation activities that occur during training, exercise, and EM program reviews.

Lesson 4.4.2 Organizational Learning in the Emergency Management Program: Incorporating Effective and Lasting Change

Lesson Objectives

- *List procedures for analyzing and accepting suggested changes from the AAR process, program evaluations, and other sources.*
- *List strategy and practical procedures for prioritization and incorporating changes to the EOP and the EM program.*
- *Describe suggested methods for formatting and tracking suggested EM program and EOP changes.*
- *Describe the use of an Improvement Plan in achieving organizational learning.*
- *Describe suggested methods for disseminating EM program and EOP changes.*

Background

As described in the previous lesson, a learning organization is one that places appropriate emphasis on the incorporation of recommended improvements into the system itself. The distinguishing characteristic is that the **organization "learns"** along with any concurrent individual personnel "lessons learned."

- Learning across all CEM phases: For emergency management systems, organizational learning occurs throughout the four phases of emergency management (mitigation, preparedness, response, and recovery). It is an ongoing process using a range of opportunities for the learning to occur. Approaches may differ when incorporating **programmatic change** versus **response and recovery plan** changes. For example, recommendations for response guidance change developed from an AAR may be analyzed and incorporated during the recovery phase, whereas changes made to preparedness plans (altered training courses or schedules and others) or mitigation plans (change in mitigation priorities and others) take place during their annual review and revisions. New or newly recognized issues that are suddenly urgent are addressed as they arise.

- EM committee responsibility: All of these program and plan changes are accomplished through the emergency management committee and EM program. It is therefore imperative that appropriate attention and support be assigned to developing effective organizational learning methods.

Different terms in emergency management have been used to describe organizational learning activities. They are all in general agreement on their scope and focus.

- Terminology across the range of EM: A range of terms have been used to refer to elements of the organizational learning, or the sources entire process for conducting system improvement after issues were identified. Some of the more prominent and pertinent include:

  - SEMS: SEMS used the term "Action Plan for Improvement" (see Textbox 4.4.2.1) to describe the organizational changes selected after review of response and recovery. In SEMS, this is presented as the final component of the After Action Report (AAR) process. This text, in contrast, treats organizational learning as a separate activity.

Textbox 4.4.2.1

Standardized Emergency Management System (SEMS) Guidelines[83]

Action Plan for Improvements
(This section of the report can be done separately or included as appropriate.)

It should describe for each of the principal recommendations:

- Description of actions to be taken

- Assignments

- Associated costs and budget

- Timetable for completion

- Follow-up responsibility.

  - HSEEP: HSEEP (see Lesson 4.3.3) addresses improvements after exercise evaluation as separate but closely related to the AAR, and uses the term "Improvement Plan" (IP).[84] Both HSEEP and SEMS describe the importance of incorporating systems enhancements and describe it in the context of the AAR process.

[83] *Standardized Emergency Management Systems (SEMS) Guidelines*, Part III. 1994, Supporting Documents, p. 9. California Office of Emergency Services (now California Emergency Management Agency, Sacramento, CA.
[84] US Department of Homeland Security. Homeland Security Exercise and Evaluation Program. *Volume III: Exercise Evaluation and Improvement Planning Revised February 2007*. Chapter 1, page 4 accessed April 3, 2010 at https://hseep.dhs.gov/support/VolumeIII.pdf

HSEEP also uses another term, "Corrective Action Process" for the toolkit to facilitate the conduct of actions from the completed Improvement Plan.[85]

- Other: Beyond HSEEP, a number of organizations have utilized the term "Corrective Action Process" (CAP) to describe their entire process for planning, conducting and completing system improvements see textbox 4.4.2.2). This process is also closely associated with the development of the AAR and the tracking and incorporation of the changes to improve the system.

Textbox 4.4.2.2

A Sample Corrective Action Process

The VHA has in the past presented the following Corrective Actions Process (CAP) in its guidebook. There are eight steps described in this process:

1. Develop a problem statement that states the problem and identifies its impact. [Part of the AAR.]
2. Review the past history of corrective action issues from previous evaluations and identify possible solutions to the problem.
3. Select a corrective action strategy and prioritize the actions to be taken.
4. Provide authority and resources to the individual assigned to implementation so that the designated change can be accomplished.
5. Identify the resources required to implement the strategy.
6. Check on the progress of completing the corrective action.
7. Forward problems that need to be resolved by higher authorities to the level of authority that can resolve the problem.
8. Test the solution through exercising once the problem is solved.

- The magnitude of EM program change: EM programmatic and component plan changes are generally evolutionary rather than revolutionary, assuming the program and plans are originally based upon sound management principles, such as ICS, SEMS, NFPA 1600, and others presented in Unit 2. Most indicated change will, therefore, be definable at the "issue" and "action" level, rather than as strategic reorganization or major function overhaul.

In effective systems management, indicated change should rarely be revolutionary or transformational.

[85] US Department of Homeland Security. *HSEEP Toolkit: Corrective Action Process (CAP) System;* Web site accessed April 3, 2010 at https://hseep.dhs.gov/support/CAPSOverviewandFAQ.pdf

- A defined process for organizational change: For effective learning organizations, the process of analyzing, prioritizing, and incorporating change across the organization is so critical that it should be recognized as a **distinct** process. This text uses the term "organizational learning" to emphasize that the improvements range beyond a focus on personnel performance.

  - Standardized expectations: This allows standardization of the change process for all recommended change actions, no matter what source (see below) generates the recommendation.

  - Consistent guidance: Detailed guidance can be developed that can promote optimally effective change methods and reflect the ongoing nature of change through all EM program phases.

  - Knowledge distribution: Notification and explanation of all significant changes to the EM program and component plans should be disseminated in a standard fashion. This serves to maintain awareness and involvement at all levels of the organization, as highlighted in the discussion of the "learning organization" (see Lesson 4.4.1).

  - Process improvement: The organizational learning process can itself be evaluated and improved.

EM programs may receive an indication that there is a need for organizational learning from multiple sources. These apply to both the overall EM program and to the EOP.

- Information sources: Multiple "sources" provide information to healthcare system emergency managers that could indicate need for improvement to emergency management systems. These sources are active throughout the life cycle of emergency management (i.e., the periods of non-response, as well as during emergency operations). Examples of the more important sources for needed change include:

  - After Action Reports: AARs are generated after exercises, formal evaluative drills, and response to actual incidents (see Lesson 4.3.3). While primarily focused on emergency response and recovery plans, mitigation and preparedness may also be affected (e.g., a proposed change to training or education).

  - EM Program Reviews and Formal Programmatic Evaluations: These performance-based program evaluations (see Lesson 4.3.2) provide data that may be considered for changes to all the component plans of the EM program but most specifically to the mitigation and preparedness plans (mitigation and preparedness plans are typically reviewed annually – see Unit 1).

  - HVA revisions: An HVA revision or new hazards and/or

vulnerability recognition may necessitate a change to any or all of the EM program component plans. As this may occur at anytime, the organizational learning process must be capable of addressing these changes as they arise.

- External prompts: Recommendations and mandates that result from new regulatory requirements, outside investigation of an adverse outcome, funding mandates, new threat advisories, and other urgent prompts may indicate a need for change.

- Technology and knowledge evolution: EM program activities may encounter new information exclusive of the above processes that indicate the need for urgent change outside of the normal program review and revision process. This may be the discovery of a newly available resource of any type (e.g., a template process, a physical item, a knowledge resource), and could come from a source internal or external to the organization.

The Organizational Learning Process for Healthcare System Emergency Management

- Organizational learning assignment: The responsibility for conducting the EM program organizational learning process is held by the emergency program manager, but the authority and day-to-day direction to oversee it may be delegated to another individual as the direct coordinator. **Organizational learning is in fact a primary objective of the emergency management committee in developing and maintaining an optimal EM program.** The responsibility for analyzing, processing, tracking, and acting on suggested systems changes should be specifically delineated within the context of the EM program. The process for accessing the appropriate in-house and external expertise when considering unusual, technically advanced, or very expensive change should also be described.

Organizational learning is a primary activity of the Emergency Management Committee.

- Characteristics of the organizational change process: An effective organizational learning process in emergency management should have the following characteristics:

  - A standardized submission method: It is important to establish a standardized method for easily submitting recommendations (from managers, employees, and others). This should include a centralized location/person for collection and collation. This may be a member of the EM committee or the healthcare system emergency manager. The collection resource should have a

Standardized methods for submitting proposed changes promote a more efficient organizational learning process.

publicized e-mail and postal address, drop box, Website submission procedure, and any other contact method that assures a single, easily accessible portal.

- A standardized proposal format: Wherever possible, change proposals should be submitted using the standardized format used by the organization for delineating issues in the AAR and program evaluation reports (see Lessons 4.3.2 and 4.3.3). This categorized approach (issue, background, proposed action, and proposed responsible party) is relatively simple but encourages objective issue description and actionable recommendations. Proposed changes coming into the system from nonstandard sources (funding mandates, regulatory announcements, and others) should be converted to this format by the collection portal prior to further processing.

A standardized system for processing proposed changes is also advantageous.

- Standardized processing of proposed changes: Each proposed change should be processed through the consistent series of steps:

  - A group is assigned the responsibility of processing the recommended change: The processing of each proposed change is typically assigned to a designated group of individuals intimately involved with the EM program. A subcommittee or the full EM committee may suffice, depending on the size and nature of the organization. Additional personnel may be added as necessary for specific topics.

  - Analysis of the clarity of the proposed change: Each proposed change should be evaluated first for the clarity of how the issue has been presented. Before considering the merits of any proposal, it is important that the original intent of the proposed change is understood by all involved. Clarification from the source should be sought as necessary.

  - Revision of the proposal: Once well understood by the committee members, the proposal may require additional revisions so that the proposed change is appropriately objective, measurable, actionable, and "trackable" (i.e., able to be tracked through the acceptance and incorporation process). For example, at this stage, the "Proposed Actions" should comprehensively describe all that is necessary to address the issue as proposed. This is critical for the follow-on step to be accurate.

  - Assess EM program implications: Full consideration should be

given to the program implications of **each** of the proposed changes. What appear to be a relatively straightforward change can actually have unintended consequences on the EM program component plans. This step includes considering the following implications:

- System design
- Equipment and supplies
- Position qualifications and training
- Financial impact
- Regulatory compliance of accepting the proposed changes.

For example, changing the responsibilities of a specific response position in the EOP necessitates changes in the documented EOP, changes in training for that position, and potentially changes to the competencies for that and other response positions. This consideration is not meant to be prohibitive, but is designed to more accurately reflect the required steps to fully implement the system change for sustained improvement.

As part of the analysis of any proposed change, the impact of the change on the system must be considered. If this is not addressed, unexpected and unintended consequences may diminish the value of an organizational change.

- Manage the decision on proposed change: A specific disposition should be made for each proposed change. It is contradictory for a learning organization to develop and collect proposed system enhancements and then never make a final decision as to how and whether the action will be accomplished. The following distinct disposition categories may be helpful in standardizing this process:

  - Accept as written: Accept the proposed change and the actions to accomplish it.
  - Accept with revision: Accept the proposed change but with revised implementation actions.
  - Declining proposed change: Deciding to not accept the suggested change. There are many reasons that a proposal may be declined. It is imperative that this decision be accompanied with a reasoned explanation and not an excuse. The explanation is important beyond providing a rationale to the individual(s) who developed the recommendation. If the issue is raised during subsequent

Decision categories may be used to standardize the change decision process.

programmatic evaluations or AAR processes, the explanation should provide context (circumstances) and an understanding at that time for why the issue was declined.

- Deferring decisions: This category is used when an issue is deferred to a future time period (specified in the deferral), for implementation during a scheduled programmatic revision, during future construction, pending further **specific** study or availability of funds, and so on. During the action tracking activities (see below), these deferred actions should periodically be reviewed for continued relevancy, for update of the planned actions, or for change in prioritization. This category should be rarely used, and the specific deferment reason documented with a time designation for when the deferment reason should be resolved. A final decision should be made at that time.

Prioritization of recommended changes can help with strategic implementation. Specific characteristics (see text) can help with selection of the "high priority" issues for change.

- Prioritizing issues for implementation: A relative priority should be assigned to each accepted change action. After AARs and programmatic evaluations, multiple proposed changes may be accepted and they cannot all be accomplished simultaneously. Providing some ranking of issues and their related actions can be helpful in scheduling organizational learning activities and in determining final disposition of deferred actions. This curriculum does not propose any overly prescriptive methods be used to assign issues to a specific prioritization scheme (e.g., high, medium, low priority). Most implementation actions, in fact, may be designated as "routine." Many of these may be collected and implemented during a deliberate EOP or Recovery Plan revision, or during the annual development and execution of the follow-on year's mitigation or preparedness planning.

- High priority issues: Some issues, however, may be high priority and having a method to indicate this may be helpful (e.g., flagging some specific considerations as "high priority" as appropriate and then providing a relative ranking for the reminder). Some considerations for assigning a high priority to an issue include:

  - Life-safety issues: Issues that create a higher than acceptable risk to healthcare system personnel, other responders, or to patients and their families (i.e., "life-safety issues") are of particular importance and generally should receive the highest priority attention.

- Legal and regulatory issues: Some legal or regulatory issues may carry significant legal, financial, and/or reputation risks for the organization and require a degree of higher prioritization above "routine." For example, changes recommended to the Preparedness Plan that promotes compliance with The Joint Commission accreditation standards (e.g., planning for managing volunteers) could be significant. Compliance with the requirements of preparedness funding programs, such as those promulgated by the national Hospital Preparedness Program,[86] are included in this consideration.

- Criticality for incident response: Proposed changes that affect system response near the onset of the Response Phase, as opposed to changes to the end of the Response Phase, may take higher priority. For example, proposed changes to mobilization procedures may be assigned a higher priority than demobilization procedures since the former could impede effective response. This does not negate, however, the importance of the latter's issues.

- Implementing accepted change: The process for implementing the accepted change actions should be delineated in the work plan, commonly called the **Improvement Plan (IP)**. It should include:

  - Assigning actions to the responsible parties

  - Establishing a work plan with timeline for incorporation of the change

  - Developing a budget (as applicable)

  - Determining the methodology and timing for evaluating the change once implemented (as applicable).

- Decision authority for organizational change: Many decisions for EM systems change can be made at the level of the emergency program manager and EM committee, but some enhancements may require acceptance and approval from higher authorities within the system for (e.g., capital expenditures). The presentation to these authorities should clearly describe the risks of not acting on the recommendation as well as the costs and benefits with the proposed change. A clear

The authority to accept proposed changes may rest with different entities within the organization. In many situations, changes are easily selected and implemented by the EM program committee. In others, executive approval may be necessary.

[86] U.S. Department of Health and Human Services, Assistant Secretary for Preparedness and Response. *Hospital Preparedness Program;* accessed March 26, 2010 at http://www.hhs.gov/aspr/opeo/hpp/

decision should be rendered and recorded. Lesser proposed changes may be reported in aggregate or per the senior administrators' (chief executive and operating and financial officers) directives. Guidelines for what needs approval and what needs to be reported and when should be sought when developing the organizational change process.

- Tracking the disposition of accepted change: The organizational learning process is ongoing throughout the year and must maintain accountability for the issues and actions under consideration or implementation. This requires that a means for adequate tracking be built into the organizational learning process. Otherwise, critical as well as routine improvements may be lost or unnecessarily delayed.

  A suggested template for tracking systems enhancement, according to the discussion above, is provided (See Exhibit 4.4.2.1 below).

Exhibit 4.4.2.1 Organizational Learning Tracking Template. The "Final Status" column should be completed for all "accepted" actions.

Issue	Proposed Actions	EMP Implica-tions & Decision	Priority	Work Plan & Timeline	Budget	Assigned respon-sibility	Interval status	Final Status	Re-evaluation Date & Methods

Dissemination of Systems Enhancements

Changes to any of the EM program component plans must be adequately publicized within the appropriate areas of the EM program, and a wide dissemination is encouraged wherever appropriate to maintain situational organizational awareness as much as possible. Several considerations are applicable to this concept:

Selected and incorporated changes are only effective if they are appropriately disseminated.

- Urgent versus routine: Depending on the change, the method of dissemination may be urgent or routine. In some situations, the Baseline Situation Unit could be utilized to announce certain critical EM program changes, such as major resource acquisitions or major revisions to a facility's Occupant Emergency Procedures (OEP). This type of announcement could be made as an EM program advisory as described in Unit 3. In other situations, changes can be announced in less urgent methods through EM committee meetings and reports or other methods.

- Targeted dissemination: Many accepted and incorporated changes will be for targeted audiences. Changes that affect **only** a very specific function or position can be disseminated in a targeted fashion.

- Tracking receipt of dissemination: For particularly critical changes, a method for tracking receipt of the change should be considered. A common method is for the indicated personnel to sign a sheet indicating they have read and understand the systems change, and this can be treated as a certification activity as discussed in the lesson on training (see Lesson 1.5.8).

Evaluation of Change

- Within organizational learning, evaluation of change is important to:
    - Assure that it has been adequately accomplished.
    - Assure that the change is sustained.
    - Assess the change's effect in terms of addressing the issue that prompted the change action.
    - Assess the value of the change to the organization.
    - Determine if any unforeseen adverse impacts were created by the system change.
- This evaluation may be formal or informal as indicated by the magnitude and importance of the change. The evaluation may be accomplished through multiple methods, including:
    - Exercise.
    - Evaluative drill.
    - An objective of a future routine programmatic evaluation.
    - Through interviews, surveys, and other programmatic evaluation methods.

Summary

Using defined, objective evaluation and standardized organizational learning processes will assure that organizational change is based upon

balanced and accurate operational and cost-effectiveness considerations. This should minimize the political, personality, and narrow financial influences that can otherwise dominate emergency management programs.

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