

Emergency Medical Services: Quality Management

EMS:QM-Student Manual

1st Edition, 6th Printing-October 2016



FEMA

FEMA/USFA/NFA
EMS:QM-SM
October 2016
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***Emergency Medical Services: Quality
Management***



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U.S. DEPARTMENT OF HOMELAND SECURITY

UNITED STATES FIRE ADMINISTRATION

NATIONAL FIRE ACADEMY

FOREWORD

The U.S. Fire Administration (USFA), an important component of the Department of Homeland Security (DHS) Preparedness Directorate, serves the leadership of this Nation as the DHS's fire protection and emergency response expert. The USFA is located at the National Emergency Training Center (NETC) in Emmitsburg, Maryland, and includes the National Fire Academy (NFA), National Fire Data Center (NFDC), and the National Fire Programs (NFP). The USFA also provides oversight and management of the Noble Training Center in Anniston, Alabama. The mission of the USFA is to save lives and reduce economic losses due to fire and related emergencies through training, research, data collection and analysis, public education, and coordination with other Federal agencies and fire protection and emergency service personnel.

The USFA's National Fire Academy offers a diverse course delivery system, combining resident courses, off-campus deliveries in cooperation with State training organizations, weekend instruction, and online courses. The USFA maintains a blended learning approach to its course selections and course development. Resident courses are delivered at both the Emmitsburg campus and its Noble facility. Off-campus courses are delivered in cooperation with State and local fire training organizations to ensure this Nation's firefighters are prepared for the hazards they face.

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TABLE OF CONTENTS

	PAGE
Foreword	iii
Table of Contents	v
Grading Methodology	vii
Final Project Gradesheet.....	xi
Schedule	xiii
Firefighter Code of Ethics	xv
A Student Guide to End-of-course Evaluations.....	xvii
UNIT 1: INTRODUCTION.....	SM 1-1
UNIT 2: HISTORY AND QUALITY MANAGEMENT MODELS	SM 2-1
UNIT 3: SCOPE OF QUALITY MANAGEMENT	SM 3-1
UNIT 4: CULTURE OF QUALITY	SM 4-1
UNIT 5: ORGANIZATIONAL IMPROVEMENT	SM 5-1
UNIT 6: INTRODUCTION TO THE DMAIC METHOD.....	SM 6-1
UNIT 7: THE DMAIC METHOD--"DEFINE" PHASE	SM 7-1
UNIT 8: THE DMAIC METHOD--"MEASURE" PHASE	SM 8-1
UNIT 9: THE DMAIC METHOD--"ANALYZE" PHASE.....	SM 9-1
UNIT 10: THE DMAIC METHOD--"IMPROVE" PHASE.....	SM 10-1
UNIT 11: THE DMAIC METHOD--"CONTROL" PHASE.....	SM 11-1
UNIT 12: IMPLEMENTING THE QUALITY MANAGEMENT PLAN.....	SM 12-1

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GRADING METHODOLOGY

Final Grade

The student's final grade for EMS Quality Management is comprised of evening assignments and a final project presentation.

Evening assignments: 8 assignments up to 10 points each = 80 possible total.

Final project presentation: 20 points possible total.

Numerical Score	Letter Grade
100-90	A
89-80	B
79-70	C
69 or below	F

Evening Assignments

All evening assignments are individual assignments. Each evening assignment should be submitted via NFA Online Mediated electronic dropbox or turned in first thing in the morning of the following day as identified by the instructors. The instructors will read and comment on students' work during the next day's class session. Instructors will remind students that they should upload their work onto the classroom shared drive if NFA Online Mediated is not being used. At the end of the course, students should download all of the other students' completed projects.

Criteria used to determine scores are outlined in the rubric.

EMERGENCY MEDICAL SERVICES: QUALITY MANAGEMENT

Criteria used to determine scores are outlined in the rubric below:

Criteria	Excellent	Marginal	Poor	Total
	Points 8-10	Points 4-7	Points 1-3	
Timely and Thorough	<ul style="list-style-type: none"> On time submission. Followed all directions. 	<ul style="list-style-type: none"> On time submission. Followed most directions. 	<ul style="list-style-type: none"> Late submission or not turned in. 	
Demonstration of Knowledge	<ul style="list-style-type: none"> Assignment clearly demonstrate that readings/ assignments were understood and well incorporated into responses. Correctly used terminology and concepts from course materials and lecture. Displayed thinking on one of the highest levels: critical, evaluative, integrative, scientific, etc. 	<ul style="list-style-type: none"> Assignment indicated a basic understanding of readings and assignments. 	<ul style="list-style-type: none"> Lacked basic comprehension of subject matter. 	
Writing	<ul style="list-style-type: none"> No errors, or minor errors, in punctuation, grammar, and spelling. Utilized professional writing skills. Used and maintained a positive and constructive tone throughout assignment. 	<ul style="list-style-type: none"> Few errors, in punctuation, grammar, and spelling. Utilized professional writing skills. Used a positive and constructive tone somewhere in the assignment. 	<ul style="list-style-type: none"> Numerous errors, in punctuation, grammar, and spelling. Failed to utilize professional writing skills. Failed to use a positive and constructive tone in the assignment. 	
Total				

Note: Use the included Grading Sheet for official recordkeeping of students' total scores. Turn the Grading Sheet and Student Final Project grading pages in to the Training Specialist at the conclusion of the course.

Final Presentation

The final project presentations are scored as follows based on Assignment 8:

Content Area	Good Points 3-4	Satisfactory Points 1-2	Unsatisfactory Points 0
Define	<ul style="list-style-type: none"> • Thoroughly identified a problem or improvement opportunity. • Thoroughly broke down a large problem or opportunity into smaller parts. • Associate a problem or improvement opportunity with specific processes. • Gave financial and nonfinancial examples that illustrate the idea of "return on investment." • Provided a clear problem statement. 	<ul style="list-style-type: none"> • Identified a problem or improvement opportunity. • Broke down part of a problem or opportunity into smaller parts. • Associate a problem or improvement opportunity with specific processes. • Gave financial or nonfinancial examples that illustrate the idea of "return on investment." • Provided a problem statement. 	<ul style="list-style-type: none"> • Failed to identify a problem or improvement opportunity. • Did not break down part of a problem or opportunity into smaller parts. • Did not discuss specific processes. • Gave no financial or nonfinancial examples that illustrate the idea of "return on investment." • Did not provide a problem statement.
Measure	<ul style="list-style-type: none"> • Identify customer needs. • Illustrated a process performance indicator. • Effectively discussed and interpreted a statistical process control chart. 	<ul style="list-style-type: none"> • Identify customer needs. • Illustrated a process performance indicator. 	<ul style="list-style-type: none"> • Failed to identify customer needs. • Failed to show a process performance indicator.
Analyze	<ul style="list-style-type: none"> • Identified all factors that have an impact on performance. • Determined all primary factors. • Included scatterplots, Pareto diagram or a cause-and-effect diagram. 	<ul style="list-style-type: none"> • Identified some factors that have an impact on performance. • Determined most primary factors. 	<ul style="list-style-type: none"> • Failed to identify factors that have an impact on performance. • Failed to determine primary factors.

EMERGENCY MEDICAL SERVICES: QUALITY MANAGEMENT

Improve	<ul style="list-style-type: none"> • Applied the principles of the scientific method to test changes. • Used an appropriate experimental design to test an improvement intervention. • Correctly determined how to implement pilot testing as part of an improvement intervention. • Evaluated results of an improvement intervention. 	<ul style="list-style-type: none"> • Applied some of the principles of the scientific method to test changes. • Used an experimental design to test an improvement intervention. • Discussed how to implement pilot testing as part of an improvement intervention. 	<ul style="list-style-type: none"> • Did not apply any of the principles of the scientific method to test changes. • Did not use any experimental design to test an improvement intervention.
Control	<ul style="list-style-type: none"> • Identified mechanisms for ongoing monitoring of performance. • Discussed the need for contingency plans in the event that performance deteriorates. • Defined what should be archived for future reference. 	<ul style="list-style-type: none"> • Identified mechanisms for ongoing monitoring of performance. • Discussed the need for contingency plans in the event that performance deteriorates. 	<ul style="list-style-type: none"> • Failed to identify any mechanisms for ongoing monitoring of performance. • Failed to discuss the need for contingency plans in the event that performance deteriorates.
Total			

Instructors will share grade sheets, including any comments/recommendations, with the student after completion of the presentation and grading.

All students' projects will be electronically provided on the shared drive or copied for each student and provided to them at the end of the class.

Note: Use the included Final Project Gradesheet for official record keeping of students' scores. Turn the Final Project Gradesheet pages and Grading Sheet in to the Training Specialist at the conclusion of the course.

FINAL PROJECT GRADESHEET

Student Name: _____

Course Date: _____

	Meets expectations	Minor recommendations		Significant recommendations	Incomplete	
	10	8	5	3	0	Mark
Technical Content						
1. The student presented a problem definition.						
2. The student presented a measurement process.						
3. The student presented an analysis process.						
4. The student presented an improvement process.						
5. The student presented a control process.						
Presentation Time (minutes)	4 to 6	3 or 7	2 or 8	1 or 9	0 or over 9	
The student's presentation was 4 to 6 minutes.						
Final Grade: (Total points x2)						

Comments/Recommendations: _____

(continue on reverse if necessary)

Instructor: _____

Instructor: _____

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SCHEDULE

	DAY 1 Sunday	DAY 2 Monday	DAY 3 Tuesday	DAY 4 Wednesday	DAY 5 Thursday	DAY 6 Friday
Morning	Unit 1: Introduction Unit 2: History and Quality Management Models	Unit 4: Culture of Quality Unit 5: Organizational Improvement	Debrief on Activities 5.1 and 5.2 Unit 6: Introduction to the DMAIC Method Unit 7: The DMAIC Method--"Define" Phase	Unit 8: The DMAIC Method--"Measure" Phase (cont'd) [Performance Indicators and Interpreting Results] Unit 9: The DMAIC Method--"Analyze" Phase	Unit 10: The DMAIC Method--"Improve" Phase (cont'd)	Final Activity Presentation
	Lunch	Class Pictures Lunch	Lunch	Lunch	Lunch	Lunch
Afternoon	Unit 2: History and Quality Management Models (cont'd) Unit 3: Scope of Quality Management	Unit 5: Organizational Improvement (cont'd)	Unit 8: The DMAIC Method--"Measure" Phase [through Value Stream Timeline]	Unit 9: The DMAIC Method--"Analyze" Phase (cont'd) Unit 10: The DMAIC Method--"Improve" Phase	Unit 11: The DMAIC Method--"Control" Phase Unit 12: Implementing the Quality management Plan	Final Activity Presentations Graduation
Evening Session	Students may work on evening assignments with the aid of the instructors. Students may also use this time to discuss questions and feedback on evening assignments from a previous day with instructor(s).					
Evening Assignments	Needs Assessment ("Define", U3, U7) Self-Assessment (U5)	Cultural Issues (U4) Reading: "Body Ritual Among the Nacirema" (U4) Activity 5.1: WISQARS Activity 5.2: Identifying National Trends Using NEMESIS National Reports	Project Charter ("Define", U7)	Performance Indicator ("Measure", U8) Cause-Effect Diagram (Analyze", U9)	Design an Intervention ("Improve", U10) Finish preparation for Final presentation	

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FIREFIGHTER CODE OF ETHICS

Background

The Fire Service is a noble calling, one which is founded on mutual respect and trust between firefighters and the citizens they serve. To ensure the continuing integrity of the Fire Service, the highest standards of ethical conduct must be maintained at all times.

Developed in response to the publication of the Fire Service Reputation Management White Paper, the purpose of this National Firefighter Code of Ethics is to establish criteria that encourages fire service personnel to promote a culture of ethical integrity and high standards of professionalism in our field. The broad scope of this recommended Code of Ethics is intended to mitigate and negate situations that may result in embarrassment and waning of public support for what has historically been a highly respected profession.

Ethics comes from the Greek word ethos, meaning character. Character is not necessarily defined by how a person behaves when conditions are optimal and life is good. It is easy to take the high road when the path is paved and obstacles are few or non-existent. Character is also defined by decisions made under pressure, when no one is looking, when the road contains land mines, and the way is obscured. As members of the Fire Service, we share a responsibility to project an ethical character of professionalism, integrity, compassion, loyalty and honesty in all that we do, all of the time.

We need to accept this ethics challenge and be truly willing to maintain a culture that is consistent with the expectations outlined in this document. By doing so, we can create a legacy that validates and sustains the distinguished Fire Service institution, and at the same time ensure that we leave the Fire Service in better condition than when we arrived.



FIREFIGHTER CODE OF ETHICS

I understand that I have the responsibility to conduct myself in a manner that reflects proper ethical behavior and integrity. In so doing, I will help foster a continuing positive public perception of the fire service. Therefore, I pledge the following...

- Always conduct myself, on and off duty, in a manner that reflects positively on myself, my department and the fire service in general.
- Accept responsibility for my actions and for the consequences of my actions.
- Support the concept of fairness and the value of diverse thoughts and opinions.
- Avoid situations that would adversely affect the credibility or public perception of the fire service profession.
- Be truthful and honest at all times and report instances of cheating or other dishonest acts that compromise the integrity of the fire service.
- Conduct my personal affairs in a manner that does not improperly influence the performance of my duties, or bring discredit to my organization.
- Be respectful and conscious of each member's safety and welfare.
- Recognize that I serve in a position of public trust that requires stewardship in the honest and efficient use of publicly owned resources, including uniforms, facilities, vehicles and equipment and that these are protected from misuse and theft.
- Exercise professionalism, competence, respect and loyalty in the performance of my duties and use information, confidential or otherwise, gained by virtue of my position, only to benefit those I am entrusted to serve.
- Avoid financial investments, outside employment, outside business interests or activities that conflict with or are enhanced by my official position or have the potential to create the perception of impropriety.
- Never propose or accept personal rewards, special privileges, benefits, advancement, honors or gifts that may create a conflict of interest, or the appearance thereof.
- Never engage in activities involving alcohol or other substance use or abuse that can impair my mental state or the performance of my duties and compromise safety.
- Never discriminate on the basis of race, religion, color, creed, age, marital status, national origin, ancestry, gender, sexual preference, medical condition or handicap.
- Never harass, intimidate or threaten fellow members of the service or the public and stop or report the actions of other firefighters who engage in such behaviors.
- Responsibly use social networking, electronic communications, or other media technology opportunities in a manner that does not discredit, dishonor or embarrass my organization, the fire service and the public. I also understand that failure to resolve or report inappropriate use of this media equates to condoning this behavior.

Developed by the National Society of Executive Fire Officers

A Student Guide to End-of-course Evaluations

Say What You Mean ...

Ten Things You Can Do to Improve the National Fire Academy

The National Fire Academy takes its course evaluations very seriously. Your comments and suggestions enable us to improve your learning experience.

Unfortunately, we often get end-of-course comments like these that are vague and, therefore, not actionable. We know you are trying to keep your answers short, but the more specific you can be, the better we can respond.



Actual quotes from student evaluations:	Examples of specific, actionable comments that would help us improve the course:
1 "Update the materials."	<ul style="list-style-type: none"> The (ABC) fire video is out-of-date because of the dangerous tactics it demonstrates. The available (XYZ) video shows current practices. The student manual references building codes that are 12 years old.
2 "We want an advanced class in (fill in the blank)."	<ul style="list-style-type: none"> We would like a class that enables us to calculate energy transfer rates resulting from exposure fires. We would like a class that provides one-on-one workplace harassment counseling practice exercises.
3 "More activities."	<ul style="list-style-type: none"> An activity where students can physically measure the area of sprinkler coverage would improve understanding of the concept. Not all students were able to fill all ICS positions in the exercises. Add more exercises so all students can participate.
4 "A longer course."	<ul style="list-style-type: none"> The class should be increased by one hour per day to enable all students to participate in exercises. The class should be increased by two days so that all group presentations can be peer evaluated and have written abstracts.
5 "Readable plans."	<ul style="list-style-type: none"> The plans should be enlarged to 11 by 17 and provided with an accurate scale. My plan set was blurry, which caused the dotted lines to be interpreted as solid lines.
6 "Better student guide organization," "manual did not coincide with slides."	<ul style="list-style-type: none"> The slide sequence in Unit 4 did not align with the content in the student manual from slides 4-16 through 4-21. The instructor added slides in Unit 4 that were not in my student manual.
7 "Dry in spots."	<ul style="list-style-type: none"> The instructor/activity should have used student group activities rather than lecture to explain Maslow's Hierarchy. Create a pre-course reading on symbiotic personal relationships rather than trying to lecture on them in class.
8 "More visual aids."	<ul style="list-style-type: none"> The text description of V-patterns did not provide three-dimensional views. More photographs or drawings would help me imagine the pattern. There was a video clip on NBC News (date) that summarized the topic very well.
9 "Re-evaluate pre-course assignments."	<ul style="list-style-type: none"> The pre-course assignments were not discussed or referenced in class. Either connect them to the course content or delete them. The pre-course assignments on ICS could be reduced to a one-page job aid rather than a 25-page reading.
10 "A better understanding of NIMS."	<ul style="list-style-type: none"> The instructor did not explain the connection between NIMS and ICS. The student manual needs an illustrated guide to NIMS.

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UNIT 1: INTRODUCTION

COURSE GOAL

This course seeks to provide a framework to improve the quality of emergency medical services (EMS) in students' agencies.

TERMINAL OBJECTIVES

The students will be able to:

- 1. Orient to the course sequence and content.*
- 2. Describe the cognitive map of process improvement methodology.*

ENABLING OBJECTIVES

The students will:

- 1. Describe the course sequence.*
 - 2. Provide an overview of the course content.*
 - 3. Describe the five steps of the Define, Measure, Analyze, Improve, and Control (DMAIC) process.*
-

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COURSE GOAL AND OBJECTIVES

This course seeks to provide a framework to improve the quality of emergency medical services (EMS) in students' agencies.

While it is recognized that long-term changes on a large scale may be beyond the scope of this course, the goal still seeks to incrementally improve students' EMS systems. Further, although the course has an EMS focus, the concepts and techniques presented can be used on any fire service problem, issue, or concern.

At the completion of this unit, students will be oriented to the course sequence and content. They will be able to describe the cognitive map of process improvement methodology. Students will be able to describe the course sequence, provide an overview of the course content, and be able to describe the five steps of the Define, Measure, Analyze, Improve, and Control (DMAIC) process.

Course Completion Requirements

1. Class attendance.
2. Completion of all assignments.
3. Final presentation.

OVERVIEW OF COURSE UNITS

Course Prerequisites

You had several items to complete before attending this course. Students were asked to bring a list of Emergency Medical Services: Quality Management (EMS: QM) problems/issues/concerns with them to the course. They will each select one such item to work on throughout the course. The problem/issue/concern should directly relate to EMS: QM and be within the students' realm of influence within their agencies. You should be able to complete this project in 6 months to one year. These items will become the basis for their EMS: QM plan.

Students were also asked to read precourse material from Unit 2: History and Quality Management Models, Unit 3: Scope of Quality Management, as well as from Unit 6: Introduction to the DMAIC Method. If they have not done so already they should read these materials at their earliest convenience.

Course Units

The course is arranged into 12 units with a final project that is completed throughout the course. The units are

Unit 1: Introduction

The students will be able to:

- Orient to the course sequence and contents.
- Describe the cognitive map of process improvement methodology.

Unit 2: History and Quality Management Models

The students will be able to:

- Describe the history of QM.
- Analyze several QM models.

Unit 3: Scope of Quality Management

The students will be able to analyze the environment as it relates to the scope of QM.

Unit 4: Culture of Quality

The students will be able to describe the attributes of a quality culture.

Unit 5: Organizational Improvement

The students will be able to differentiate between organizational improvement and process improvement.

Unit 6: Introduction to the DMAIC Method

The students will be able to:

- Describe the role of the National EMS Information System (NEMSIS) in EMS Quality Improvement (QI).
- Identify the goal of each step in the DMAIC process.

Unit 7: The DMAIC Method--"Define" Phase

The students will be able to write a performance improvement project charter.

Unit 8: The DMAIC Method--"Measure" Phase

The students will be able to document a current process.

Unit 9: The DMAIC Method--"Analyze" Phase

The students will be able to analyze factors that affect output.

Unit 10: The DMAIC Method--"Improve" Phase

The students will be able to test an improvement intervention.

Unit 11: The DMAIC Method--"Control" Phase

The students will be able to implement steps to monitor and maintain performance.

Unit 12: Implementing the QM Plan

The students will be able to:

- Develop a Quality Management Plan.
- Determine strategies for change management.

Student presentations and course closing: In addition to the 12 units, there are student presentations and a course closing on the last class day.

Student Materials

Students receive the following materials:

- The activity worksheets are used during each activity as a guide to the purpose of the activity and how to accomplish the activity.
- The background text is used as an out-of-class reading to add detail to what is covered during class time.
- A CD will be distributed with templates and resource material.

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Activity 1.1

Student Introductions

Purpose

To have students introduce themselves to their classmates.

Directions

Report the following information:

1. Name, organization (career/volunteer, basic life support/advanced life support (BLS/ALS), etc.), and place (city/State) of employment.
2. What is your past and current experience with EMS: QM?
3. Is this your first National Fire Academy (NFA) resident class?
4. What are your expectations, if any, for this class?
5. What problem/issue/concern will you address?

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Activity 1.1 (cont'd)

Questionnaire

Name: _____ Your Title: _____

Name of Your Organization: _____

Size of your Organization

Total number of EMS Calls Per Year: _____

of EMS Transport Units: _____ # of Non-Transport Units: _____

Personnel: Career / Volunteer / Combination (circle one)

What is your past and current experience with EMS: QM? Please include both training and educational coursework.

Is this your first NFA resident class? Yes / No (Circle one) If not, what other classes have you attended at NFA?

What are your expectations, if any, for this class?

INTRODUCTION

Statement of EMS: QM Problem/Issue/Concern:

PROJECT INTRODUCTION

What follows is pertinent information on the Quality Management (QM) Plan.

Overview

Each student will work on a QM problem/concern/issue that he/she has identified that is within the realm of his/her responsibility. The project should be able to be completed within 6 months to 1 year.

Divisions

The work is divided into sections that are completed each evening of Days 1 to 5. This evening work taken collectively becomes the major portion of the final presentation on Day 6.

At the end of each class day the instructor will review the work that must be completed that evening and turned in the next morning. If you are asked for more information or to revise your material, that must be completed and returned to the instructor that same day.

Presentation

On Day 6 each student will make a 5-minute presentation on his/her project. Some flexibility may be needed on the last few class days. Instructors will adjust content, as needed, to ensure that students have sufficient preparation time for their presentations.

Format

The format of the evening work assignments is included at the end of the last unit of each work day. For example, the evening work assignment for Day 1 is included at the end of Unit 3: Scope of Quality Management.

The format should be followed in completing each day's assignment, using the provided assignment sheets, found in the Student Manual (SM) appendix. Be sure to include your name on the form.

Methodology

1. Each student works independently on his or her project. Collaboration between students, their "home" agencies, other students on campus, Learning Resource Center (LRC) staff, etc., can be useful and is encouraged.

INTRODUCTION

2. Students turn their completed work assignments in each morning on Days 2 to 5. There will be a box labeled "Assignments" in the back of the classroom for that purpose.
3. The instructors will review students' assignments, making any constructive comments they feel are needed. Often instructors will request clarifications and/or further information. This additional information must be returned to the instructor no later than the end of that same class day.

Each evaluated assignment receives a score. The criteria used to determine these scores are

- | | |
|----|--|
| 10 | On time; assignment questions/tasks addressed with appropriate thoroughness and depth. |
| 8 | On time; assignment questions/tasks addressed with moderate depth and thoroughness. |
| 6 | Late; or assignment questions/tasks addressed with appropriate or moderate depth and thoroughness. |
| 3 | Late; and/or assignment questions/tasks addressed with minimal depth or thoroughness. |
| 1 | Late and incomplete. |
| 0 | Assignment not turned in. |
-
4. Students will make a 5-minute presentation on the morning of Day 6. The presentation will describe the Define, Measure, Analyze, Improve, and Control (DMAIC) process and upcoming "next steps" to implement the changes/improvements needed. In essence, each of the evening assignments is included in the final presentation; there is a direct connection between what is done in the evening assignments and the final presentation. The format should be followed using the provided assignment sheets, found in the SM appendix. Be sure to include your name on each form.
 - a. The Final Project (Assignment 8) presentations will be scored as follows:
 - The format of the document includes all of the elements listed in the requirements of Assignment 8.
 - The student's presentation orally covers all of the elements listed in the requirements of Assignment 8.
 - The presentation time is at least 4 minutes and no more than 6 minutes.
 - b. Instructors will share grade sheets, including any comments/recommendations, with the student after completion of the presentation and grading.

5. A "sign-up sheet" will be posted at the end of Day 5 so that students can determine who will present first, second, and so on.
6. All students' projects will be electronically provided on the share drive or copied for each student and provided to them at the end of the class.

Presentation

On the morning of Day 6 each student will make a 5-minute presentation. Given the tight time constraints on that last class day it is important for each student to be brief.

Essentially, the presentation will consist of the following DMAIC parts:

1. An overview of the problem/issue/concern that the student has identified. (Define)
2. Measure customer needs and how well performance factors are being met. (Measure)
3. The project's evaluation plan, including how Critical to Quality (CTQ) factors will be addressed. (Analyze)
4. The actions needed to correct or improve this problem/issue/concern. (Improve)
5. A description of the "next steps" to be taken to implement the plan and integrate it into daily practice when a student returns to his/her "home" agency. (Control)

This presentation is the **major** student evaluation tool of this course and is built with the evening activities that students complete. In addition, it provides students with an opportunity to convert what they learned into practical "next steps" when they return to their agencies.

FINAL COURSE GRADE

The student's final grade for *EMS Quality Management* will be computed as follows:

Assignment points (8 assignments up to 10 points each) + Final Project points (up to 10 points x2) = Grade

90-100 = A

80-89 = B

70-79 = C

0-69 = F

SUMMARY

This introductory unit provided information on administrative procedures, the course goal, and the unit objectives.

In addition, it described the units of the course and provided an overview of the EMS: QM project.

**APPENDIX:
PRECOURSE ASSIGNMENTS
WITHOUT READINGS**

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PRECOURSE ASSIGNMENT LIST

I. Complete the following worksheets to be turned in on the morning of the first day of class.

- Questionnaire (p. 5)
- EMS Quality Management Problem/Issue/Concern (pp. 7-8)

II. Complete the following readings:

- Readings that accompany lecture on the first day of class (included in this packet):
 - "Introduction to the DMAIC Process"
 - "History and Quality Management Models"
 - "Scope of Quality Management"
- National Highway Traffic Safety Administration. *A Leadership Guide to Quality Improvement for Emergency Medical Service Systems*. U.S. Government, 1996.

Please obtain this document at

www.nhtsa.dot.gov/people/injury/ems/leaderguide/index.html

- Myers, B. J., Slovis, C. M., Eckstein, M., Goodloe, J. M., Isaacs, M. S., Loflin, J. R., et al. (2008). *Evidence-Based Performance Measures for Emergency Medical Services Systems: A Model for Expanded EMS Benchmarking*. *Prehospital Emergency Care*, 12:2, 141 – 151.

III. Optional Assignment--Organizational Self-Assessment

The Organizational Self-Assessment on pp. 37-52 of this packet is a tool for you to evaluate your organization on Baldrige's seven key action areas:

1. Leadership.
2. Information and Analysis.
3. Strategic Quality Planning.
4. Human Resource Development and Management.
5. EMS Process Management.
6. EMS System Results.
7. Satisfaction of Patients and Other Stakeholders.

The assessment can be completed a number of ways. Here are two for your consideration:

1. The primary method is for you to have it completed by **only** the senior leader of your fire/EMS organization or a member of the leadership team responsible for developing your organization's focus on EMS quality.
2. Another more extensive method--time and necessary approvals permitting--is to have your entire EMS leadership team (including you) complete the self-assessment.

When "yes" can be honestly answered to all of the questions in a particular stage, you can be confident that your organization is ready to move into the next stage of development. You should also strive to move forward stage by stage in all seven Baldrige areas simultaneously. You will notice that action areas in one category reference activity in another category. For example, a human resources section task may affect or emanate from the strategic quality plan section.

When you arrive at the NFA for your course you'll find that having already completed the self-assessment will provide "food for thought" during classroom discussions. Also, in Unit 5: Organizational Improvement, we will be directly referencing in broad terms what you learned as a result of completion of the survey.

Note that during the EMS:QM course, instead of Stages I through III, we use the term "Phases" with the three descriptors being "Initiation," "Deployment," and "Integration."

IV. Optional Reading:

Walton, Mary. *Deming Management Method*. New York: Perigree/Penguin Putnam, 1986.

INTRODUCTION

Questionnaire

Name: _____ Your Title: _____

Name of Your Organization: _____

Size of Your Organization:

Total Number of EMS Calls Per Year: _____

of EMS Transport Units: _____ # of EMS Nontransport Units: _____

Personnel: Career/Volunteer/Combination (circle one)

Location of Organization: _____

What is your past and current experience with Emergency Medical Services quality management? Please include both training and educational coursework.

Is this your first NFA resident class? Yes/No (Circle one)
If not, what other classes have you attended at NFA?

What are your expectations, if any, for this class?

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EMS QUALITY MANAGEMENT PROBLEM/ISSUE/CONCERN

Select a problem/issue/concern that you think is within your realm of influence to address. Write a short description of your problem/issue/concern in the space provided below.

You will need to turn in this worksheet within the first hour of class; therefore, it is important to have this done prior to class. Your problem/issue/concern will become the basis of the Quality Management Plan you will develop in this course.

Your problem/issue/concern must be

- of appropriate scope; and
- addressable by a Quality Management Plan with a timeline of **6 months to 1 year**.

As you consider which problem or opportunity to bring to class, we would like to offer some guidance. It is hard to pick a problem/issue/concern that is **too** small for a quality management project. On the other hand, it is very easy and tempting to pick something too big or complicated. Try to avoid the temptation to choose a problem that is too big or complex. It is strongly suggested that your first several projects be small, straightforward, and within your own span of control. This may not always be possible, but have a bias towards these more manageable projects. Your early projects should be as much about learning the model and tools for the process improvement process as the project itself. As you and your organization's management team get more comfortable with the tools and processes of process improvement, you can take on progressively larger projects. Even then, organizations that are very successful and mature in their learning and implementation of process improvement know that it is better to eat an elephant one bite at a time. Big projects are often more successful when they are broken down into a series of smaller 'bite-sized' projects.

So what might a big project broken down in to bite sized projects look like? Consider an elephant-sized project to improving response intervals on medical calls. Smaller bite-sized projects that work to this ultimate goal might include the following:

- improving the call processing interval;
- improving the data capture rate in the communication center for response event times;
- improving the validity of the event time data collected in the communications center;
- improving field data reporting or recording rate for the en route to scene time;
- improving validity of the en route to scene time;
- improving field data reporting or recording rate for the at scene time;
- improving validity of the at scene time;
- improving the field data reporting or recording rate for the patient contact time;
- improving the validity of the patient contact time;
- improving the process for analyzing and reporting event response time interval data;
- improving the process for selecting which unit to assign a call;
- improving apparatus placement to match geographic demand patterns;
- improving scheduling policies to match temporal (timing) demand patterns; and/or
- improving the process for setting response interval targets.

(over)

Statement of EMS Quality Management Problem/Issue/Concern

Organizational Self-Assessment

This organizational self-assessment is extracted from the NHTSA's "A Leadership Guide to Quality Improvement for Emergency Medical Service Systems" and modified for use in this National Fire Academy course.

This self-assessment can be completed a number of ways. Here are two for your consideration:

- The primary method is for you to have it completed by only the senior leader of your Fire/EMS organization or a member of the leadership team responsible for developing your organization's focus on EMS quality.
- Another more extensive method – time and necessary approvals permitting -- is to have your entire EMS leadership team (including you) complete the self-assessment.

When "yes" can be honestly answered to all of the questions in a particular stage, you can be confident that your organization is ready to move into the next stage of development. You should also strive to move forward stage by stage in all seven Baldrige areas simultaneously. You will notice that action areas in one category reference activity in another category. For example, a human resources section task may impact or emanate from the strategic quality plan section.

When you arrive at the NFA for your course you'll find that having already completed the self-assessment will provide "food for thought" during classroom discussions. Also, in Unit 5, Organizational Improvement, we will be directly referencing in broad terms what you learned as a result of completion of the survey.

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Leadership

Stage I: Building Potential for Success

- Is the senior leader (Fire Chief, EMS Chief) of your Fire/Organization knowledgeable regarding quality management theory and the benefits for your organization to the point where he/she could effectively explain and endorse these topics to others in your organization or elsewhere in the EMS system?
- Has your senior leader established a new strategic quality planning group within your organization? OR Has an existing group (such as your senior management committee, the executive committee, or quality council) taken on new focus and responsibility with respect to strategic quality planning?
- Does the senior leader (or designee) of your organization lead the meetings of the strategic quality planning group?
- Are all other leaders of your organization knowledgeable about Quality Improvement (QI) theory and the benefits for your organization? Can they effectively explain and endorse QI and its operation to others in your organization or elsewhere in the EMS system?
- Does your organization have a set of documents that describes the EMS mission, vision, and values? Are these posted or distributed in such a way that all can see them?
- Did all the members of your organization have input into the development of the mission, vision and values statement?
- Are the leaders developing a systematic approach for evaluating their own leadership effectiveness and involvement in QI?
- Are the criteria that the leaders use to evaluate their own leadership and involvement compatible with your organization's vision and values statements?

Stage II: Expanding Knowledge

- Do leaders effectively communicate your organization's vision and values to all workforce members? Are most, if not all, leaders directing or participating in educational efforts to increase QI knowledge and awareness throughout the entire organization?
- Have the leaders supported the implementation of programs that demonstrate your organizations community citizenship? For example, are workforce members organizing public CPR courses, injury prevention educational programs including, e.g., violence prevention, bike safety, fire prevention and safety or other EMS related community service programs?

Stage III: Integration and Commitment

- If necessary, has the leadership restructured your EMS operations or organizational to promote a constant focus on efficiency, high performance, and meeting internal and external customers?
- Do leaders take an active role in regularly reviewing all performance measures related to strategic quality planning goals and objectives?
- Is your organization active in general community support activities that go beyond EMS? For example, do your workforce members participate in and/or organize charity fund raisers, newspaper drives, holiday toy collection or repair, housing rehabilitation for the poor and elderly, adult literacy programs, or other charitable or service activities?

Information and Analysis

Stage I: Developing Potential for Success

- Has your organization designed data collection and reporting systems around the needs of those who use the data to plan and make decisions?
- Does the data collection strategy identified in the strategic quality plan include a broad focus on information needs including: customer satisfaction, employee satisfaction, financial performance (if applicable), service quality, supplier performance, and operational performance?
- Has an assessment been completed of your organization's ability to collect data and process information for each key performance indicator listed in the strategic quality plan?
- As a result of the assessment, have objectives been listed in the strategic quality improvement plan, that are directed at improving the availability and reliability of data used in key performance indicators?

Stage II: Expanding Knowledge

- Do all EMS managers, employees or volunteers understand the correlation between different types of measures of key performance objectives and customer satisfaction, financial performance (if applicable), or patient health status?
- Has your organization been successful at collecting information on at least several key performance indicators and successful at processing that data into information and feeding it back to employees, volunteers and managers on a regular basis?
- Has your organization continued to question managers, employees and volunteers about how better to meet their decision making needs with improved data collection and information processing?
- Has your organization made plans to collect data that will facilitate comparisons of performance with other organizations providing similar services, especially in the areas of service quality, patient care, customer satisfaction, supplier performance, employee data and internal operations and support?

Stage III: Integration and Commitment

- Has your organization evaluated and made many major improvements in its measures and data collection and reporting methods over the last few years?
- Does your organization regularly collect competitive (if appropriate) and benchmark data on: 1) service quality, including patient care; 2) customer satisfaction; 3) supplier performance; 4) employee data; 5) internal operations and support functions; and 6) other appropriate processes and functions? Is all bench marking data reliable?
- Does your organization systematically evaluate and improve the scope, sources, and uses of its competitive (if appropriate) and benchmark data?
- Is data from all areas of your organization and on all aspects of performance summarized into a few key indices, and results analyzed to identify trends and opportunities for improvement?
- Is there evidence that all key organization decisions and plans are based upon analysis of performance data?

Strategic Quality Planning

Stage I: Developing Potential for Success

- Has an initial strategic quality plan for your organization been completed?
- Does the strategic quality plan use as a key reference your organization's mission, vision, and values statements?
- Does the strategic quality plan reflect the opinions and feedback of members of your organization beyond those actually involved in the drafting of the plan?
- Does the strategic quality plan include a list of internal and external customers and their requirements for quality of services?
- Does the strategic quality plan describe 12-month goals and objectives for expanding the knowledge and use of QI techniques throughout your organization?
- Has an initial list of key drivers of your organization been developed and included in the strategic quality plan?
- Does the initial list of key drivers also include at least one key performance indicator for each key driver?

Stage II: Expanding Knowledge

- Has the strategic quality plan been improved over the initial Phase 1 version?
- Was the revision to the initial strategic quality plan based on a thorough analysis of customer needs, competition (if applicable) and potential risks to your organization if internal and external customer needs were not met?
- Does the revised strategic quality plan describe the needs of internal and external customers? Is there a clear connection between customer needs and your key EMS drivers?
- Does the strategic quality plan include a list of performance measures for each of the key drivers of your organization?
- Does the strategic quality plan identify long and short-term goals, objectives and strategies for each performance measure?

Stage III: Integration and Commitment

- Has your organization evaluated and improved its strategic quality planning process several times over the last several years?
- Has your organization developed and included in the plan specific projections or forecasts illustrating how performance will compare to benchmark organizations? Is performance in key driver areas projected to be superior?

Human Resource Development and Management

Stage I: Developing Potential for Success

- Has the level of worker satisfaction been determined on multiple dimensions, including compensation, opportunity for self-improvement, work safety, and job satisfaction?
- Has your organization made a review of all its operational goals and strategies to see if adequate human resource support exists to meet these goals?
- Did the review of human resource needs and the worker satisfaction survey include consideration of the need to improve selection, training, involvement, empowerment and recognition plans?
- Within the strategic quality plan, does your organization have specific quality goals and improvement strategies identified for human resource processes, such as hiring, career development including training, education, and recognition programs?
- Does your organization have a structured training/education curriculum for training all levels and functions of workers; is that curriculum based upon a thorough analysis of worker training needs?
- Are training needs derived from an analysis of competencies needed to meet key organizational goals as defined in the strategic quality plan?
- Does your organization employ systematic and effective mechanisms to promote on-the-job reinforcement of skills learned in training?
- Does your organization tailor the message and medium used for training to the audience and content?

Stage II: Expanding Knowledge

- Has your organization begun the process or already implemented a number of innovative approaches to job and work design such as self-directed teams wherever appropriate in your organization?
- Are there new goals and strategies in place for improving worker satisfaction, safety, health, and ergonomics?
- Has your organization developed a strategy to evaluate the effectiveness of its training programs and has it begun to evaluate at least some of them?
- Has your organization determined the needs for special services to workers, e.g., counseling, recreation, day care, cross-training, re-training, basic education, special benefits, drug/alcohol treatment, etc.?

Stage III: Integration and Commitment

- Does your organization use several different approaches to recognizing and rewarding individuals and groups of workers?
- Do the workers feel well-recognized for their accomplishments?
- Does your organization evaluate the effectiveness of all the EMS education and training programs it conducts? Is there evidence of continuous improvements in all EMS education and training programs provided by your organization as a result of the evaluations?
- Does your organization have a well-defined and multi-faceted strategy in place for providing special services to workers such as counseling, recreational programs, day care, cross-training, re-training, basic education, special benefits, drug/alcohol treatment, etc.?
- Are several methods used to measure and improve worker satisfaction; is there evidence that worker satisfaction has improved as a result?

EMS Process Management

Stage I: Building Potential for Success

- Has your organization developed a strategy to identify and evaluate all key processes that define or support your EMS operations to insure that critical work functions are designed and operate to meet the needs of internal and external customers?
- Has your organization completed identifying and documenting via flow charts some of the key processes that define and support your EMS operations and that must function properly if internal and external customer needs are to be met?
- For documented key processes, has your organization begun to identify process quality measures (key indicators) based on customer requirements and have quality standards been identified for the measures?

Stage II: Expanding Knowledge

- Has your organization completed documenting its key processes and identified process quality measures (key indicators) and standards based on internal and external customer quality requirements?
- Has your organization considered what the future needs of internal and external customers are likely to be and used them as a driver to begin the process of designing new processes to meet new service needs?
- Has your organization thoroughly defined quality requirements for all of your key equipment, materials, and service suppliers? Have those requirements been adequately communicated to the suppliers?
- Does your organization require your suppliers to have preventive and corrective processes in place to ensure that they will be able to consistently meet your equipment, materials and service requirements?
- Are data on key process measures collected on a regular basis? Does your organization use valid control strategies to keep all process measures within standards or acceptable levels?
- Has the documentation of key organizational processes been expanded to include important support functions within your organization? Is data on process measures collected for which specific standards or goals have been set?

Stage III: Integration and Commitment

- Does your organization design new and/or improved EMS services and support processes using an approach that is based upon a thorough analysis of internal or external customer requirements?
- Does the design of new and/or improved EMS services and support processes include the use of key indicator variables that will signal if customer need is being met?
- Does the design of new and/or improved EMS services and support processes include the implementation of strategies, policies, or technology that will keep in control the amount of variation in these new or improved processes, as measured by the key indicator variables?
- Are your existing EMS services and support process designs reviewed, tested and validated by taking into consideration your service performance record, the use of your services, your process capabilities, your supplier capabilities, and the future requirements of your internal or external customers?
- Does your organization systematically appraise its evaluation process? Does your organization implement new policies and procedures to improve the process of evaluation in an effort to shorten the time between evaluation and introduction of improvements?
- Does your organization use research, bench marking, new technology, and information from customers to initiate process improvement efforts?
- Have any of your organization's key production and delivery processes been re-engineered or improved in dramatic ways over the last few years?
- Have any of your organization's key EMS support processes been re-engineered or improved in dramatic ways, resulting in improvements in cycle time, productivity, and customer satisfaction?
- Has your organization implemented cooperative efforts to improve supplier quality such as partnerships, joint training for vendors and buyers, contractual incentives, supplier certification programs, and recognition for exemplary results?

EMS System Results

Stage I: Building Potential for Success

- Are active steps underway to help employees or volunteers increase their focus on achieving quality goals?
- Are demonstration projects planned which will show to all personnel the relationship between quality improvement efforts and quality and service improvement outcomes?
- Do all efforts to orient employees and volunteers to achieving quality and operational results emphasize the role of measurement and how these measurements will be used?

Stage II: Expanding Knowledge

- Do all the employees or volunteers in your organization understand the purpose and meaning of the organization's increasing focus on continuous improvement of service quality, and efficiency? Are all personnel aware that these results will be clearly measured for the purpose of demonstrating the impact of quality improvement efforts?
- Within your organization, have there been some successful demonstrations of the impact of quality improvement efforts on any of your internal or external service outcomes?
- Do plans exist to allow comparison of your organization's quality improvement results with other EMS or non-EMS bench mark organization quality efforts in other geographic areas or jurisdictions?

Stage III: Integration and Commitment

- Has your organization shown steady improvements in the quality of your internal and external services over the last three or more years?
- Are improvements in quality results seen on all key indicator variables used to assess product/service quality?
- Do your organization's quality results compare favorably to those of your peer organizations and, if applicable, your major competitors?
- If applicable, do sales, cash flow, operating expenses and other financial results show significant improvement trends over multiple years and levels of performance that are superior to competitors?
- Do the trends indicate excellent gains in reducing cycle time in applicable EMS or support services?
- Is there evidence over the last three years that your organization has been able to significantly reduce operational costs without damaging quality?

INTRODUCTION

- Do measures of your EMS-related public health performance show excellent improvement trends and levels of performance that are clearly superior to other organizations in your local or regional geographic area?
- Do measures of employee or volunteer satisfaction or morale show excellent improvement trends and levels of performance that are clearly superior to employee satisfaction levels in organizations of similar size?
- Do the measures of personnel safety show clear and impressive improvement trends and levels of performance that are better than other organizations in your local area or region?
- Does your organization have data to demonstrate a trend of three years or more worth of improvements in quality or service and/or product by all of your major suppliers?
- Is the quality of your suppliers' products and/or services superior to the quality of all major competitor suppliers?

Satisfaction of Patients and Other Stakeholders

Stage I: Building Potential for Success

- Has your organization determined how it will continuously evaluate its methods for identifying customer requirements?
- Has your organization identified a set of improvements in the organization's approaches to building positive relationships with customers? Does the information collected on customers and their specific needs appear useful for decision-making on how to increase satisfaction levels?
- Are systems being developed for frequently collecting data on hard measures of customer satisfaction, such as increased public financial support or repeat business, and soft measures such as opinion surveys or focus groups?
- Do plans exist for developing ways of determining levels of customer satisfaction among peer organizations or if applicable, key competitors?

Stage II: Expanding Knowledge

- Do methods exist for determining levels of customer satisfaction among peer organizations, or if applicable, key competitors?
- Does your organization segment your customers according to common needs and characteristics, and use multiple methods to frequently determine customer needs and requirements relating to your EMS products and services?
- Does your organization have many ways to make it easy for customers to seek information, comment, or complain about your EMS products or services?
- Does a formal system exist for tracking and resolving formal and informal complaints in a timely manner?

Stage III: Integration and Commitment

- Does your organization evaluate and show evidence of continuous improvement over the last few years in your approaches to measuring customer satisfaction?
- Is there data to indicate that all major measures of customer satisfaction show a continually improving trend over at least the last three years?
- Have significant improvements been made in the levels of customer satisfaction over the last three years?
- Is there data on all major adverse indicators (e.g., complaints, unpaid bills, legal actions) that show decreasing trends?

INTRODUCTION

- Is research conducted to project future customers and predict what their key requirements are likely to be? Are customers of peer organizations or competitors also studied over at least the last three years?
- Does customer satisfaction data for all your major EMS products and services show continuous improvement over the last three years?
- Is your organization's level of customer satisfaction superior to that of your peer organizations?

UNIT 2: HISTORY AND QUALITY MANAGEMENT MODELS

TERMINAL OBJECTIVES

The students will be able to:

1. *Describe the history of Quality Management (QM).*
2. *Analyze several QM models.*

ENABLING OBJECTIVES

The students will:

1. *Define QM terms.*
 2. *Cite important milestones in QM history.*
 3. *Analyze the strengths and weaknesses of the current QM models.*
 4. *Analyze the strengths and weaknesses of the course QM model.*
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TERMS

Before discussing the history of QM, here are some terms that we'll be using throughout the course.

Benchmarking

This is the practice of setting operating targets for a particular function by studying the top performance levels, either within or outside an organization. In a broader sense, benchmarking involves searching for and copying new ideas and best practices for the improvement of processes, products, and services.

Continuous Quality Improvement

A management philosophy based on the continuous study and improvement of the processes to better meet the needs of customers and stakeholders Continuous Quality Improvement (CQI) focuses on making an entire system's outcomes better by constantly adjusting and improving the system itself, instead of searching out and getting rid of "bad apples" (outliers). **Synonyms and near-synonyms:** Continuous Improvement (CI); Quality Improvement (QI); and Total Quality Management (TQM).

Kaizen

Kaizen (Japanese for "improvement") refers to philosophies or practices focusing on continuous improvement. It came into usage in the 1950s.

Lean Manufacturing or Lean Production

Lean manufacturing or lean production, which is often known simply as "Lean", is focused on improving efficiency, decreasing waste, and using empirical methods to decide what matters, rather than uncritically accepting pre-existing ideas.

Malcolm Baldrige Criteria for Performance Excellence

A set of highly flexible sets of criteria to use in assessing an organization's level and capacity for performance excellence. Versions of these criteria are offered in three realms: general business, healthcare, and education. At the State and national levels, these criteria are used in an external assessment and recognition process--which can culminate in State or national award for achievement towards performance excellence. At the national level, the Malcolm Baldrige National Quality Award is managed by the U.S. Department of Commerce's National Institute of Standards and Technology (NIST) and is presented to the winners by the President of the United States. Malcolm Baldrige was the Secretary of Commerce after whom the award was named. The Baldrige criteria were used in the development of the National Highway Traffic Safety Administration (NHTSA) Leadership Guide materials used in this course.

Quality

- A character, characteristic, or property of anything that makes it good or bad, commendable or reprehensible; thus the degree of excellence that a thing possesses.
- The total quality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.

Quality Assurance

- All planned or systemic actions necessary to provide adequate confidence that a service or product will satisfy given requirements for quality.
- Designing a product or service, as well as controlling its production, so that quality is inevitable.
- In health care, the activities and programs intended to provide adequate confidence that the quality of patient care will satisfy stated or implied requirements or needs.
- The components of a QM program focused on measuring and improving compliance to process specifications (e.g., a process for determining the level of compliance to steps in an EMS patient care protocol or fireground SOP were properly followed along with the actions taken over time to improve the level of compliance).

Quality of Care

The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.

Quality Control

- The process through which actual performance is measured, the performance is compared with goals, and the difference is acted on.
- The use of operational techniques and statistical methods to measure and predict quality.

Quality Improvement

The process of working towards higher level of performance or quality associated with changes in system or process design rather than improving process compliance (QA).

Six Sigma

1. A methodology for improving the performance of processes based on the Define, Measure, Analyze, Improve, and Control (DMAIC) model that will be used in this course.
2. A process performance level of 3.4 defects per million opportunities.
3. A statistical term referring to six standard deviations from the mean.

Stakeholder

Individuals and organizations, other than the patient who receives the EMS services, that have some interest in the operation of the EMS organization, e.g., the patient's family, the community in which the EMS system operates, government officials, the patient's insurer/third-party, and health care providers.

Total Quality Management

A CQI management system directed from the top, but empowering employees and focusing on systemic, not individual, employee problems.

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Activity 2.1

High Quality Versus Low Quality

Purpose

To illustrate that most people have intuitive ideas about what products and services are high quality and low quality.

Directions

Divide into table groups. Each table group will briefly provide one example of high quality and one example of low quality non-fire service/EMS products or services. Discuss why the quality was high or low.

1. High quality product or service.

2. Low quality product or service.

Note: you will have 2 minutes for **each** of your two anecdotes. Please be brief.

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HISTORY

Based on the material already covered, and Activity 2.1, most of us have firm intuitive ideas about what constitutes both high and low quality. This section, on the history and models of QM, lays the groundwork for a more conscious and structured process on QM.

As EMS is a relatively young profession, it is easy to forget that studying its history can prove insightful. However, there are other programs that describe the history of EMS. This section looks at another history, that of the history of QM. Indexed into this QM history, though, mention is made of the National Fire Academy's (NFA's) EMS programs to provide context.

Pre-Industrial Revolution

Craftsmen formed associations or guilds based on their trades; these confraternities of locksmiths, textile workers, masons, jewelers, carpenters, carvers, glassworkers, etc., controlled the secrets of their traditionally imparted technology, the "arts" or "mysteries" of their crafts. These skilled craftsmen managed their own high quality through hard-earned pride of workmanship.

Internships

Crafts guilds had long "internships" of many years, low (or no) pay, and demanding requirements. After being employed by a master for several years, and after producing a qualifying piece of work, an apprentice became a "journeyman."

Journeyman

The apprentice was granted the rank of "journeyman" and was given documents that certified him as such. These documents entitled him to travel to other towns and countries to learn the art from other masters **and** to practice his craft.

Frederick Taylor, Henri Fayol, and Scientific Management (Early 1900s)

Scientific Management was based on the concept of humans as economic beings, motivated by money and tangible rewards only. It was called "scientific" because actual research, particularly observation of workers and time-motion studies, were done.

Four Basic Principles of Scientific Management

As a result of the research, conclusions were made about what motivates workers and how best to manage them:

1. Scientific task performance: any task can be studied to determine the one best way to do it. This included the belief that workers had unique insights into the tasks they performed. One management theorist noted "Let the worker design the shovel."
2. Workers should be scientifically selected and trained. This continued to the extent that the assessment center process that many fire departments use today for promotional selection was, essentially, used in World War II to select operatives for the U.S. Office of Strategic Services (the forerunner of American Special Operations Forces).
3. Management and workers need to cooperate because employees are valuable and adaptable and will learn what is expected of them and why.
4. There is a clear division of work and responsibility; managers must manage while workers perform the tasks. This led to specialization. However, it also led to isolation of the two groups from each other.

Scientific Management Views an Organization as Highly Structured

Each individual has specific duties. These duties were taught in training programs. On the job people were responsible for specific tasks.

Managers organize and control the entire operation. Managers made the decisions; workers worked. This left a disconnect: as noted earlier, there was the belief that workers had unique insights into the tasks they performed. Yet, they had no venue to communicate these "lessons learned" to management.

Little interaction between employees and management. Managers stayed in offices; workers were on the factory floor. They worked separately and they lived separately.

Employees have no input, as it is not "part of their job." Again, the workers may have acquired unique knowledge about how best to perform a task. But, if they were not observed as part of a management research effort, their knowledge was not incorporated into the developing job tasks.

Jobs are strictly defined and are task-based. Given this, an employee was expected to complete the assigned tasks...and that is all. Further, a worker attitude developed that he or she was only responsible for that assigned part of the job. This ultimately stunted responsibility for quality.

Common Features of Scientific Management

- Unity of Command;
- delegation of authority;
- span-of-control; and
- specialization.

These common features are still in use today and, in fact, form part of the basis for the Incident Command System (ICS).

Fayol is Credited with Developing the Familiar Five Steps of the Manager's Role

1. Planning.
2. Organizing.
3. Staffing.
4. Coordinating.
5. Controlling.

The five steps were viewed as a management model: If the five steps were followed, each in turn, then a positive result would occur. The advantage of this early model was that it described management as a process with a scientific basis. Until this time, management was viewed as an art with no demonstrable steps; rather than an art with a scientific foundation. The disadvantage of this model was that people believed that you followed these steps, and **only** these steps, in order. There was no iteration cycle.

W. Edwards Deming Introduces Statistical Process Control to Japan (1950s)

Deming considered his 14 Points essential to ensuring quality. The 14 Points are

1. Create constancy of purpose for improvement of product and service.
2. Adopt the new philosophy.
3. Cease dependence on mass inspection for quality control (QC).
4. End the practice of awarding business on price tag alone.
5. Constantly and forever improve the system of production and service.
6. Institute more thorough, better job-related training.
7. Institute leadership.
8. Drive out fear.
9. Break down barriers between departments.
10. Eliminate slogans, exhortations, and targets of the work force.
11. Eliminate work standards on the factory floor.
12. Remove barriers that rob people of pride of workmanship.
13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the organization to work to accomplish the transformation.

Deming also is credited with developing the Plan, Do, Check, Act (PDCA) model that will be discussed under "Models," that follows.

National Fire Academy Opens Emmitsburg Campus (January 1980)

The NFA is this country's preeminent Federal fire training and education institution. The original purpose of the NFA as detailed in a 1973 report to Congress was to "function as the core of the Nation's efforts in fire service education...model programs, curricula, and information..."

"Management of EMS for the Fire Service" Pilots as an NFA 2-Week Resident Program (August 1980)

This course was built around a virtual city, Metropolis. Students developed an EMS system for this "jurisdiction." Since in many cases EMS was still in its infancy as a fire service function, the focus of the course was on designing an EMS system, rather than improving an existing one. Little actual class time addressed "quality." However, in one unit students were encouraged to do more than merely review the incident "run sheets" to determine how EMTs actually were performing.

"EMS Administration" Pilots as an NFA 2-Day Field Program (September 1984)

This off-campus course was conducted all around the Nation with the intent being to serve as a "teaser" to entice EMS personnel to attend the much more extensive resident version of the course. If students could not later attend the resident course, then it was hoped that this 2-day condensed version still could serve as an idea-generator for developing an EMS system.

Malcolm Baldrige National Quality Award is Established (1987)

Baldrige was the Secretary of Commerce in the 1980s and was known for his managerial excellence. This national award, named for him, has seven key categories:

1. Leadership.
2. Information and analysis.
3. Strategic quality planning.
4. Human resource management.
5. Process management.
6. System results.
7. Customer and stakeholder satisfaction.

There have been several hospital and health care winners of the award over the years. And, it has brought interest from all sectors: business, healthcare, government, nonprofit organizations, etc. Winning the award is extremely prestigious. However, the real value of it is that it sets an organization on a quest for excellence. The Baldrige criteria were used to develop the NHTSA "Leadership Guide" (see next term).

National Highway Traffic Safety Administration's "A Leadership Guide to Quality Improvement for Emergency Medical Services Systems" (Published 1996)

This is the precourse reading and it represents an attempt to focus EMS leaders on the need for and the methods that can be used to improve EMS quality. There is a wealth of usual material--theoretical as well as practical in this document.

Quality Programs Spread to Service Industries (1990s to the 2000s)

A proliferation of quality programs and concepts, introduced earlier, has "caught on": TQM, Six Sigma, Kaizen, Benchmarking, CQI, etc. (All of these are included in the "Terms" section, above.) A component of Six Sigma, the DMAIC model, will be used extensively throughout this course, starting with Unit 6.

Several NFA management course address quality issues. These include Fire Service Organizational Theory in Practice, Interpersonal Dynamics, Executive Development, and Executive Leadership, to name a few. Upon completion of this course, you may wish to consider enrolling in further management training.

2008--Congress Passes the U.S. Fire Administration Reauthorization Act of 2008

Congress amended the Federal Fire Prevention and Control Act of 1974 with the U.S. Fire Administration (USFA) Reauthorization Act of 2008. This affected NFA training programs, especially training programs for EMS. Specifically, NFA was authorized to develop "advanced emergency medical services training" (USC 2206(d)(1)).

Additionally, Section 9 "Coordination Regarding Fire Prevention and Control and Emergency Medical Services" of the Federal Fire Prevention and Control Act of 1974 was amended by Congress as follows:

"The Administrator is authorized to conduct, directly or through contracts or grants, studies of the operations and management aspects of fire service-based emergency medical services and coordination between emergency medical services and fire services. Such studies may include the optimum protocols for on-scene care, the allocation of resources, and the training requirements for fire service-based emergency medical services. (15 USC 2207(c)(2))"

The United States Fire Administration Reauthorization Act of 2008 lays the groundwork for model programs to be developed for fire-based emergency medical services at the national level.

MODELS

Models are simplified graphical summaries of reality, designed to aid further study or action. In our situation using QM models has several advantages:

- It ensures that no important steps are left out or missed. In fact, some organizations have developed checklists, much like the ones used in EMS to check off the supplies and equipment on an ambulance. As a project transpires, the checklist is used to ensure completion of each step: when it was done, who completed it, and so forth.
- There is a better chance of unity of work effort. Since everyone knows the steps, using a model provides a better guide for the goal and the process to be used to get there.
- Team members know what is being attempted and why. Specific training and assignments are completed. In addition, everyone knows how the tasks fit into the "big picture."

A "Process Model"

A "process model" simply uses a model to explain a process. This implies that there are steps that must be followed, the steps are arranged in a particular order, and completion of these steps in that specific order increases the chances of a successful outcome. Often these process models use acronyms and graphical representations to increase understanding and retention.

The Define, Measure, Analyze, Improve, and Control Model

The DMAIC model, a component of Six Sigma, has five phases:

1. Define the problem, the Voice of the Customer (VOC), and the project goals, specifically.
2. Measure key aspects of the current process and collect relevant data.
3. Analyze the data to investigate and verify cause-and-effect relationships. Determine what the relationships are, and attempt to ensure that all factors have been considered. Seek out root cause of the defect under investigation.
4. Improve or optimize the current process based upon data analysis using techniques such as design of experiments, and standard work to create a new, future State process. Set up pilot runs to establish process capability.
5. Control the future State process to ensure that any deviations from target are corrected before they result in defects. Control systems are implemented such as statistical process control, production boards, and visual workplaces and the process is continuously monitored.

Strengths

Strengths of DMAIC: This model provides a robust QM system, with iteration built in. It has gained a wide following and has many historical precedents, such as the "ReACT" problem-solving model that was taught in the NFA's 1982 EMS Administration course: Recognize the problem, Analyze the situation, Consider the options, Take action. As mentioned earlier the DMAIC model will be used extensively throughout this course, starting with Unit 6.

Weaknesses

Weaknesses of DMAIC: On the face of it the model does not clearly show the role of either the internal or the external environment. However, these elements actually are referenced in the model.

The Focus, Analyze, Develop, Execute, and Evaluate Model

The Focus, Analyze, Develop, Execute, Evaluate (FADEE) model, developed by Organizational Dynamics Institute of Wakefield, MA, has five phases:

1. Focus: Define and verify the process to be improved.
2. Analyze: Collect and analyze data to establish baselines, identify root causes and point toward possible solutions.
3. Develop: Based on the data, develop action plans for improvement, including implementation, communication, and measuring/monitoring.
4. Execute: Implement the action plans, on a pilot basis as indicated.
5. Evaluate: Install an ongoing measuring/monitoring (process control) system to ensure success.

Strengths

Strengths of FADEE: It has similarities to other QM Models (such as DMAIC, above) and it encourages the use of pilot programs. By their nature pilot programs imply that their purpose is to gather information to "fine tune" a product or process. After the pilot is concluded improvements are made as needed.

Weaknesses

Weaknesses of FADEE: On the face of it the model does not clearly show the role of either the internal or the external environment.

The Plan, Do, Check, Act Model

The PDCA model, developed by Deming, has four phases:

1. Plan: Plan a change or test of how something works.
2. Do: Carry out the plan.
3. Check: Look at the results. What did you find out?
4. Act: Decide what actions should be taken to improve.

Strengths

Strengths of PDCA: It is simple and it is easy to remember. Given that, PDCA has a wide following.

Weaknesses

Weaknesses of PDCA: a strong case can be made that more analysis needs to be done earlier, such as during the first or second step. It does not appear that there is an ongoing review process after taking action.

Activity 2.2

Using Models

Purpose

You will use a model as you work on how to improve an EMS function. This will provide an opportunity to analyze the strengths and weaknesses of the assigned model.

Directions

1. You will be divided into table groups. Each table group will be provided with one example of an EMS function and with one model.
2. Within your groups, you will use the assigned model to lay out how you would improve quality.
3. You should assess the strengths and weaknesses of the model as a method for QM.
4. You are to act as though you have been given full authority to suggest whatever actions you deem necessary as you use the model.
5. You will make a brief, oral presentation using an easel pad to lay out the model's steps, its strengths/weaknesses, and the associated ideas you have for QM.

Note: You are free to select a subcategory or particular aspects of the functions that are problems/issues/concerns for your respective agencies. For example, if "Support Services" was the assigned function, your table group may decide that a problem you've experienced is with a lack of ongoing support services perhaps due to budget constraints. You would then use the assigned model to determine how to improve support services.

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SUMMARY

This unit has covered many of the QM terms that will be used throughout the course. In addition, the unit discussed the history of QM in an abbreviated fashion. This included the early development of EMS management programs at the NFA.

Finally, the unit went on to a discussion of models, process models, and the strengths and weaknesses of QM models such as DMAIC, FADEE, and PDCA.

Precourse Reading Reminder

There is a precourse reading associated with this Unit. It is the U.S. National Highway Traffic Safety Administration's "A Leadership Guide to Quality Improvement for Emergency Medical Services (EMS) Systems," available on the Internet at: <http://www.nhtsa.dot.gov/people/injury/ems/leaderguide/index.html>

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UNIT 3: SCOPE OF QUALITY MANAGEMENT

TERMINAL OBJECTIVE

The students will be able to analyze the environment as it relates to the scope of Quality Management (QM).

ENABLING OBJECTIVES

The students will:

- 1. Describe the advantages of multidisciplinary collaboration.*
 - 2. Determine the organizations and agencies involved in emergency medical services Quality Management (EMS QM).*
 - 3. Analyze the role of outside agencies.*
 - 4. Identify the impact of laws and regulations.*
 - 5. Identify the impact of labor-management organizations.*
 - 6. Identify the impact of the political structure.*
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MULTIDISCIPLINARY COLLABORATION

Definitions

Given the array of people, agencies, levels of private and public sector interaction, concepts, regulations, laws, etc., which emergency medical service (EMS) must deal with, it should be clear that identifying these interrelated processes and groups is necessary to address Quality Management (QM). Let's break our definition into several manageable parts.

Definition of Multidisciplinary

In framing our understanding, the word multidisciplinary, it will be used in its broadest, most inclusive sense. "Multidisciplinary" is defined as "multiple organizations and roles that affect your ability to perform your job effectively.

Definition of Collaboration

The etymology of the word, "collaboration" has a Latin base (com + laborare), which essentially means to "labor with" someone. Our definition of collaboration is working with people.

Definition of Multidisciplinary Collaboration

Now, let's put "multidisciplinary" and "collaboration" together. Our definition of this term is "the process of working effectively with people from multiple career fields to accomplish EMS goals."

As it pertains to our definition of multidisciplinary collaboration, the phrase "working effectively with people" is worth closer examination. It implies reciprocal communication, tact, trust, and a comprehensive understanding of how all of the pieces fit together to produce an effective, high-quality system.

Advantages of Multidisciplinary Collaboration

There are many advantages of multidisciplinary collaboration that affect QM directly. They include

- Greater "buy-in" as people become involved in the process.
- Ability to draw on a larger range of skills, resources, experiences, and backgrounds.
- Development of reciprocal relationships that can be used in the future. Some of these will be the result of formal networks and others of informal networks. Both can bring resources to bear on future issues.

Of course, an additional advantage is the synergy that builds when motivated people bring diverse skill sets to bear on a QM problem. This can provide that extra, almost intangible, "something" that takes a work effort over the top.

Internal and External Collaboration

Multidisciplinary collaboration can be further broken down into "internal collaboration" and "external collaboration".

Internal Collaboration

Internal collaboration means the daily, face-to-face effective interaction that must occur within your organization. If internal collaboration does not already exist--essentially, if you are "at war" with others in your primary work unit--you will be unable to devote much time or effort to external collaboration.

External Collaboration

External collaboration refers to the effective interaction that must occur outside of your organization. One way to identify these external collaborators is to determine who--outside of your organization--has similar goals, patient interaction, legal or regulatory authority, etc., that touch on your specialty. Fire departments do not exist in a vacuum and must be keenly aware of the impact of the external world.

Stakeholders

Stakeholders: All of these people and organizations--internal and external, formal and informal--together can be considered "stakeholders". A working definition of that term is "a person, group, organization, or system that positively or negatively affects or can be affected by an organization's actions." No QM project should be undertaken without a clear understanding of what the stakeholders think and feel about that QM project.

Organizations and Agencies

Many organizations and agencies can have a positive- or negative-impact on EMS QM. Any quick "laundry list" would include State regulatory agencies, regional EMS Councils, Local Emergency Planning Committees (LEPC), mutual-aid agencies, labor-management committees, training organizations, and so on.

Each agency will probably have a different list of other such agencies. Yet, there are clearly commonalities, such as regulatory and training groups. In addition, local hospitals, medical directors, the American Red Cross (ARC) and other disaster planning and response groups, medical examiners, law enforcement, etc., all would also be included.

Role of Outside Organizations and Agencies

Roles will vary to some extent, but usually include regulatory, grant or funding distribution, and planning. However, a useful way of looking at these roles is from a four-part format.

Federal

These would include regulatory and grant-distributing agencies, such as the National Highway Traffic Safety Administration (NHTSA). In addition, the training function of the National Fire Academy (NFA) and the Emergency Management Institute (EMI) also should be considered. As it relates to terrorism countermeasures, the National Domestic Preparedness Consortium, which is managed by the Department of Homeland Security (DHS), includes both governmental and nongovernmental member/training organizations.

Tribal

These include all federally-recognized tribes under Public Law 93-638 or the Indian Self-Determination and Education Assistance Act of 1975.

State

These would include regulatory and grant-distributing agencies, such as the State agency that oversees these items (usually the State's Health Department). Similar to the Federal level, there also may be training agencies at the State level.

Local

These would include any planning groups (such as an LEPC), mutual-aid associations, etc. These groups perform valuable functions, beyond the planning work itself, as formal networks become informal as well. Trust--that difficult-to-obtain commodity--often develops.

Other

These would include nongovernmental organizations, such as a regional EMS Council, National Association of Emergency Medical Technicians (NAEMT), National Registry of Emergency Medical Technicians (NREMT), a hospital disaster planning group, or a Voluntary Organizations Active in Disasters (VOAD). Each area has its own such groups.

Although not all roles will be "captured" by using these four terms, a significant number will be. Part of understanding your environment involves knowing who the "players" are and working with them.

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Activity 3.1

Identifying Stakeholders

Purpose

To provide you with an opportunity to identify the many different stakeholders of an EMS system while using a simulated work situation.

Directions

1. You will be assigned work groups to discuss all of the different stakeholders.
2. You will be assigned a scenario that will require interaction with other agencies, as well as with the staff. You may use the group's combined knowledge of EMS to develop the scenario; however, you may not change the basic facts.

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Activity 3.1 (cont'd)

Identifying Stakeholders

Scenario 1: Support Services

As the EMS Division Chief you have been notified that the drug box exchange program used successfully for the past 10 years is now encountering resistance from a newly opened area hospital. Since the hospital is new, you have not yet formed personal or trusting relationships with all staffers. This facility's chief pharmacist does not believe that her facility should be responsible for purchasing the initial supply of medications and boxes that it is planned will be initially stored there. Efforts to convince her otherwise have stalled. She points out that her "old" hospital didn't do it that way.

1. List the stakeholders you have discussed on an easel pad under two headings: "Internal Stakeholders" and "External Stakeholders."

Internal _____

External _____

2. Indicate any stakeholders that are in **both** categories ("Internal" and "External") with an asterisk.

Scenario 2: Administrative

Your department, for the first time, will use an assessment center process for promotions. In the past, promotions were based on passing a written exam and an oral interview. The new process will include those activities plus an in-basket exercise, an EMS "tactical" exercise, a troubled employee exercise, and a citizen complaint exercise. You have been tasked with leading a group in the development of a first-line EMS supervisors' promotional exam that will include all of these new activities as well as the written exam and oral interview. Assessors will be drawn from local area departments.

1. List the stakeholders you have discussed on an easel pad under two headings: "Internal Stakeholders" and "External Stakeholders."

Internal _____

External _____

2. Indicate any stakeholders that are in **both** categories ("Internal" and "External") with an asterisk.

Scenario 3: Prevention

The fire chief has assigned a group of EMS personnel to develop a community-wide "drown-proofing" program for delivery at local swimming pools and other venues. Early research indicates there's a robust organization, Drowning Prevention Coalition of Arizona, already conducting such offerings in that State (you are from a different, but nearby, State).

1. List the stakeholders you have discussed on an easel pad under two headings: "Internal Stakeholders" and "External Stakeholders."

Internal _____

External _____

2. Indicate any stakeholders that are in **both** categories ("Internal" and "External") with an asterisk.

Scenario 4: MCI/Disaster Preparedness

Your area is subject to periodic hurricanes, several per year. Most have been "nonevents," but two have been catastrophic. You have been assigned as your department's representative on the regional EMS Council's Disaster Planning Committee. The committee is now working on a regional hurricane plan that will address preparedness, response, and recovery.

1. List the stakeholders you have discussed on an easel pad under two headings: "Internal Stakeholders" and "External Stakeholders."

Internal _____

External _____

2. Indicate any stakeholders that are in **both** categories ("Internal" and "External") with an asterisk.

IMPACT OF LABOR-MANAGEMENT ORGANIZATIONS

Labor-management organizations also can have a positive or negative impact on your EMS system.

Positive Example

Both labor and management have keen interests in personnel safety and potentially could work effectively on any such issues.

Negative Example

Labor and management may disagree, however, on whether a specific type of PPE is as effective as another type, perhaps citing different research sources, cost factors, training required, maintenance needed, etc.

Clearly, any attempt to address EMS QM should include representation from both labor and management. You must recognize the history and personalities involved, and at the same time, be open to continuing to work together, if prior relationships have not been productive. On the positive side, you can build on that goodwill as you move into new areas.

IMPACT OF LAWS, STANDARDS, AND REGULATIONS

Laws and regulations may also affect EMS QM. To clarify:

- **Laws** are enacted by elected officials, such as the U.S. Congress or a State legislature.
- **Standards**, although they do not have the mandatory effect of law, do indeed set an environment that implies compliance.
- **Regulations** are written by governmental agencies to clarify how laws are specifically applied to those regulated.

Laws and regulations frequently change, so it is important to monitor them on at least an annual basis, if not more often, for their potential impact on EMS QM and other facets of EMS. Further, laws and regulations require interpretation. If needed, have your jurisdictional attorney or State's Attorney General provide guidance.

IMPACT OF POLITICAL STRUCTURE

By "political structure" is meant **all** of those elected groups that may affect EMS QM. Traditionally, this has referred only to elected Federal, tribal, State, and local jurisdictional officials. Our focus is broader. There may be an elected board of directors of your regional EMS council, an elected board of directors of your VOAD, etc.--all of these groups and people may affect EMS QM.

Often jurisdictions will have a committee of elected officials whose specific task is monitoring public safety, including EMS. If that is the case in your jurisdiction, you should work closely with this committee. In other jurisdictions, the function is performed by a sole elected official. Meet that person and work with him or her.

EVENING ASSIGNMENT

Working individually this evening complete Part 1 of the Implementation Plan using the format as specified in Activity 3.2. Turn in this assignment on Day 2 **before** class start time in the designated collection box, which is located in the back of the classroom. Your assignment will be reviewed by an instructor and returned to you at the end of Day 2 with the instructor's constructive comments, as needed.

Each evaluated assignment receives either a "pass" or a "no pass" grade. The criteria used to determine these grades are 1) Did the student comprehensively answer the assignment's questions? 2) Did the student comprehensively address all issues associated with his/her response? 3) As a professional, is the student's assignment appropriately written with grammar, punctuation, and spelling all at the collegiate level?

Complete the assigned reading on Define, Measure, Analyze, Improve, and Control (DMAIC). This reading lays the foundation for Day 2's final afternoon session, Unit 6, The DMAIC Process.

Activity 3.2

Needs Assessment

Purpose

To provide you with an overview of how to conduct a needs assessment as it relates specifically to the evening assignment you will complete tonight as part of your EMS: QM Plan.

Directions

1. Review the format for the EMS: QM Plan as your instructor discusses it with you.
2. You may begin to fill in parts of the format as time permits. Be sure to include your name in the indicated spot.
3. You will complete the document and submit it on Day 2, before class start time. Your instructor will then evaluate your assignment.

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Activity 3.2 (cont'd)

Needs Assessment

EMS:QM Plan

Student Name: _____

1. Describe the problem/issue/concern you have selected to work on for the implementation plan. This should be within your realm of influence to accomplish and its completion should positively affect EMS: Quality Management (EMS:QM) in some way.

2. Assess the situation and determine the signs and symptoms of the problem/issue/concern.

Signs and symptoms:

3. Also, describe the results of the current situation. Specifically, how does this situation have a negative impact on EMS:QM?

Negative impacts:

4. List the internal and external stakeholders.

SCOPE OF QUALITY MANAGEMENT

a. Internal stakeholders:

b. External stakeholders:

Each evaluated assignment receives either a "pass" or a "no pass" grade. The criteria used to determine these grades are 1) Did the student comprehensively answer the assignment's questions? 2) Did the student comprehensively address all issues associated with his/her response? 3) As a professional, is the student's assignment appropriately written with grammar, punctuation, and spelling all at the collegiate level?

Remember to upload your completed work on the classroom shared drive.

SUMMARY

This unit has defined and addressed multidisciplinary collaboration as well as the difference between internal and external collaboration. To have high quality EMS you need to work to develop both of these.

Also discussed were the organizations, agencies, and other stakeholders that could affect an EMS system, positively or negatively. Stakeholders, formal and informal, can be an asset of high value. Considering their opinions and feeling before starting a QM project will pay benefits later.

The role of outside agencies was discussed with special reference to their impact on EMS quality. Obtaining their buy-in up front is better than attempting to obtain it later.

The impact of labor-management organizations, laws and regulations, and political structures also was discussed. All can affect a QM project and, thus, all must be considered and involved.

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UNIT 4: CULTURE OF QUALITY

TERMINAL OBJECTIVE

The students will be able to describe the attributes of a quality culture.

ENABLING OBJECTIVES

The students will:

- 1. Define the term "culture".*
 - 2. Differentiate between organizational culture and anthropological culture.*
 - 3. Indicate how organizational culture affects Quality Management (QM).*
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DEFINITION OF CULTURE

Background

Culture as a concept was first studied by anthropologists. For example, in 1952, Alfred Kroeber and Clyde Kluckhohn compiled a list of 164 definitions of "culture". The result of their research was an attempt to standardize the anthropological definition.

It was clear that most of the many, early, definitions were concerned with the culture of people in foreign countries and a common definition began to be accepted.

Ultimately there was even recognition that cultures could be studied in our own country and even in organizations.

Anthropological Definition

This definition is now commonly accepted: Culture is the set of **shared** attitudes, values, goals, and practices that characterizes a particular group of people.

The people who shared a common culture could be from a certain geographical area, religion, family grouping, living style (hunter-gathers or nomads, for example), etc.

Cultural characteristics were not to be viewed positively or negatively; rather they were viewed as merely "different" from the anthropologists' upbringing and background. In point of fact, early anthropologists were cautioned to try to view other cultures with "new eyes;" that is, to view other cultures without filtering them through the observer's own upbringing, culture, and background.

ORGANIZATIONAL VERSUS ANTHROPOLOGICAL CULTURE

Initially, organizational culture was viewed as a subset of an anthropological group. This is, a culture could have some overarching organization. For example, a matriarchal culture was one organized around women, especially mothers, as the leaders. Over time, the realization developed that organizational culture can be studied and understood as a separate entity.

Organizational Culture

Here's the definition: Organizational culture is the set of values, norms, assumptions, guiding beliefs, attitudes, and feelings shared by people in an organization. This culture invariably has core values that are resistant to change as well as other facets of its culture that change more rapidly. Thus, constant assessment of organizational culture is wise.

Related Concepts

Enculturation

A related anthropological concept has pertinence to our discussion: "Enculturation" is the anthropological term for activities designed to cause people who are new members of a cultural group to internalize that group's values and beliefs. Sociologists call this "socialization". Whichever term is used, note that in order for it to have the most success, these activities should occur when people are new members of a group.

Cultural Thickness: Thick Versus Thin

Thick or strong organizational cultures have many layers of shared values, norms, assumptions, guiding beliefs, attitudes, and feelings. Alignment to organizational values is deeply embedded. In such environments, these attributes help organizations to operate like well-oiled machines. There are many examples of such cultures, the U.S. military being a prime one, where there is direct alignment with organizational values, norms, assumptions, guiding beliefs, attitudes, and feelings. Off-duty behaviors refer back to the military (such as the use of vehicle decals, apparel with military themes, etc.).

Thin or weak organizational cultures, on the other hand, have people who have little alignment with organizational values, norms, assumptions, guiding beliefs, attitudes, and feelings. An example of a weak organizational culture would be one where people are motivated primarily by money, such as sales positions. Generally, the other aspects of organizational culture that would be seen in a strong culture, such as a tight alignment with organizational values, norms, assumptions, guiding beliefs, attitudes, and feelings is absent. Off-work behaviors do not relate back to the organization.

Thick and thin cultures have inherent advantages and disadvantages, sometimes dependent on circumstances. An example of an advantage is that these cultures have members who adhere tightly to the group's mission. Here's an example of a disadvantage: several NFA courses address "groupthink," which is the tendency of cohesive groups to accept the group's or leader's beliefs uncritically because of a desire to avoid conflict. This could cause the group to "tamp down" internal, helpful criticism to "keep the peace".

Activity 4.1

Cultural Differences

Purpose

To give you an opportunity to focus on how an EMS organizational culture may be different from other organizational cultures.

Directions

1. Within your assigned group select a non-fire/EMS service organizational culture to compare and contrast with an EMS culture.

2. List 10 examples of elements of the differences between an EMS organizational culture and a nonfire/EMS culture and their impact on the organization. (For example, a group such as accountants.)

EMS	Nonfire/EMS
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

3. Prepare an easel pad of the above. Since each group is probably working with a different nonfire/EMS culture, please give a quick overview of which organizational culture you selected when you present your findings to the rest of the class.

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Cultural Factors that Affect Quality Management

- Having a detailed understanding of the existing organizational culture. Bear in mind what was noted earlier: sometimes culture only becomes obvious when you attempt to view it with "new eyes".
- Providing staff with extensive training and support on Quality Management (QM). Untrained people cannot be expected to know what to do. Further, training often has a motivational result as well as causing an uptake of knowledge.
- Having a strong customer focus (internal and external customers). Addressing the needs and expectations of internal customers first, will help to address the needs and expectations of external customers.
- Providing QM-focused leadership (and leadership at all levels); rather than leadership going from pillar to post on various issues, problems, and concerns.
- Using core values to zero in on QM goals. Understanding those core values and making them congruent with QM goals ensures a better, more consistent result.
- Citing of traditions as indicators of past QM. This shows that the change-maker has done his or her homework. In addition, it indicates that you are building on past successes.
- Celebrating QM successes. All too often people work very hard to accomplish a task, only to find that no one has noticed. Celebrate your successes...that also builds morale.
- Having stakeholder involvement in decisions ensures buy-in; this equates to higher motivation, more participation, and--ultimately--a better result.
- Understanding of the stories of how innovators who failed were treated. If an innovator failed, and was viewed as being punished for failure, then that will affect how willing people will be to be involved in innovation.
- Factoring in resistance to change (from historical and other sources) will affect deadlines, quality, and several other areas. Resistance to change is normal, even in highly innovative, excellent organizations.

Constant assessment of the organizational culture is critical to determining whether it is affecting QM positively or negatively. This is especially true, since you are making a long-term commitment to QM. Your assessments of organizational culture need to be equally long-term. In total, the implications are clear: Organizational culture is a critical consideration in QM.

SUMMARY

This unit began with a discussion about basic definitional differences between anthropological culture and organizational culture. Over time it became clear that organizations could be studied in a fashion similar to how anthropologists study cultures in foreign countries.

Then the unit compared strong cultures versus weak ones. Most fire service cultures would be characterized as strong cultures. Understanding the fire service culture, especially its core values, can be critical to the success of QM efforts.

The last section of the unit addressed how culture affects quality. The implications are clear: Organizational culture is a critical consideration in QM. There is an evening assignment and an optional reading.

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**APPENDIX:
OPTIONAL READING: "BODY RITUAL
AMONG THE NACIREMA"**

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Optional Reading

"Body Ritual Among the Nacirema"

Most cultures exhibit a particular configuration or style. A single value or pattern of perceiving the world often leaves its stamp on several institutions in the society. Examples are "machismo" in Spanish-influenced culture and "face" in Japanese culture. Here Horace Miner demonstrates that "attitudes about the body" have a pervasive influence on many institutions in Nacirema society.

The anthropologist has become so familiar with the diversity of ways in which different people behave in similar situations that he is not apt to be surprised by even the most exotic customs. In fact, if all of the logically possible combinations of behavior have not been found somewhere in the world, he is apt to suspect that they must be present in some yet undescribed tribe. The point has, in fact, been expressed with respect to clan organization by Murdock (1949: 71).[2] In this light, the magical beliefs and practices of the Nacirema present such unusual aspects that it seems desirable to describe them as an example of the extremes to which human behavior can go.

Professor Linton [3] first brought the ritual of the Nacirema to the attention of anthropologists twenty years ago (1936: 326), but the culture of this people is still very poorly understood. They are a North American group living in the territory between the Canadian Cree, the Yaqui and Tarahumare of Mexico, and the Carib and Arawak of the Antilles. Little is known of their origin, although tradition states that they came from the east.... [4]

Nacirema culture is characterized by a highly developed market economy which has evolved in a rich natural habitat. While much of the people's time is devoted to economic pursuits, a large part of the fruits of these labors and a considerable portion of the day are spent in ritual activity. The focus of this activity is the human body, the appearance and health of which loom as a dominant concern in the ethos of the people. While such a concern is certainly not unusual, its ceremonial aspects and associated philosophy are unique.

The fundamental belief underlying the whole system appears to be that the human body is ugly and that its natural tendency is to debility and disease. Incarcerated in such a body, man's only hope is to avert these characteristics through the use of ritual and ceremony. Every household has one or more shrines devoted to this purpose. The more powerful individuals in the society have several shrines in their houses and, in fact, the opulence of a house is often referred to in terms of the number of such ritual centers it possesses. Most houses are of wattle and daub construction, but the shrine rooms of the more wealthy are walled with stone. Poorer families imitate the rich by applying pottery plaques to their shrine walls.

While each family has at least one such shrine, the rituals associated with it are not family ceremonies but are private and secret. The rites are normally only discussed with children, and then only during the period when they are being initiated into these mysteries. I was able, however, to establish sufficient rapport with the natives to examine these shrines and to have the rituals described to me.

The focal point of the shrine is a box or chest which is built into the wall. In this chest are kept the many charms and magical potions without which no native believes he could live. These preparations are secured from a variety of specialized practitioners. The most powerful of these are the medicine men, whose assistance must be rewarded with substantial gifts. However, the medicine men do not provide the curative potions for their clients, but decide what the ingredients should be and then write them down in an ancient and secret language. This writing is understood only by the medicine men and by the herbalists who, for another gift, provide the required charm.

The charm is not disposed of after it has served its purpose, but is placed in the charm-box of the household shrine. As these magical materials are specific for certain ills, and the real or imagined maladies of the people are many, the charm-box is usually full to overflowing. The magical packets are so numerous that people forget what their purposes were and fear to use them again. While the natives are very vague on this point, we can only assume that the idea in retaining all the old magical materials is that their presence in the charm-box, before which the body rituals are conducted, will in some way protect the worshiper.

Beneath the charm-box is a small font. Each day every member of the family, in succession, enters the shrine room, bows his head before the charm-box, mingles different sorts of holy water in the font, and proceeds with a brief rite of ablution.[5] The holy waters are secured from the Water Temple of the community, where the priests conduct elaborate ceremonies to make the liquid ritually pure.

In the hierarchy of magical practitioners, and below the medicine men in prestige, are specialists whose designation is best translated as "holy-mouth-men." The Nacirema have an almost pathological horror of and fascination with the mouth, the condition of which is believed to have a supernatural influence on all social relationships. Were it not for the rituals of the mouth, they believe that their teeth would fall out, their gums bleed, their jaws shrink, their friends desert them, and their lovers reject them. They also believe that a strong relationship exists between oral and moral characteristics. For example, there is a ritual ablution of the mouth for children which is supposed to improve their moral fiber.

The daily body ritual performed by everyone includes a mouth-rite. Despite the fact that these people are so punctilious [6] about care of the mouth, this rite involves a practice which strikes the uninitiated stranger as revolting. It was reported to me that the ritual consists of inserting a small bundle of hog hairs into the mouth, along with certain magical powders, and then moving the bundle in a highly formalized series of gestures.[7]

In addition to the private mouth-rite, the people seek out a holy-mouth-man once or twice a year. These practitioners have an impressive set of paraphernalia, consisting of a variety of augers, awls, probes, and prods. The use of [505 begins ->] these objects in the exorcism of the evils of the mouth involves almost unbelievable ritual torture of the client. The holy-mouth-man opens the client's mouth and, using the above mentioned tools, enlarges any holes which decay may have created in the teeth. Magical materials are put into these holes. If there are no naturally occurring holes in the teeth, large sections of one or more teeth are gouged out so that the supernatural substance can be applied. In the client's view, the purpose of these ministrations [8] is to arrest

decay and to draw friends. The extremely sacred and traditional character of the rite is evident in the fact that the natives return to the holy-mouth-men year after year, despite the fact that their teeth continue to decay.

It is to be hoped that, when a thorough study of the Nacirema is made, there will be careful inquiry into the personality structure of these people. One has but to watch the gleam in the eye of a holy-mouth-man, as he jabs an awl into an exposed nerve, to suspect that a certain amount of sadism is involved. If this can be established, a very interesting pattern emerges, for most of the population shows definite masochistic tendencies. It was to these that Professor Linton referred in discussing a distinctive part of the daily body ritual which is performed only by men. This part of the rite includes scraping and lacerating the surface of the face with a sharp instrument. Special women's rites are performed only four times during each lunar month, but what they lack in frequency is made up in barbarity. As part of this ceremony, women bake their heads in small ovens for about an hour. The theoretically interesting point is that what seems to be a preponderantly masochistic people have developed sadistic specialists.

The medicine men have an imposing temple, or *latipso*, in every community of any size. The more elaborate ceremonies required to treat very sick patients can only be performed at this temple. These ceremonies involve not only the thaumaturge [9] but a permanent group of vestal maidens who move sedately about the temple chambers in distinctive costume and headdress.

The *latipso* ceremonies are so harsh that it is phenomenal that a fair proportion of the really sick natives who enter the temple ever recover. Small children whose indoctrination is still incomplete have been known to resist attempts to take them to the temple because "that is where you go to die." Despite this fact, sick adults are not only willing but eager to undergo the protracted ritual purification, if they can afford to do so. No matter how ill the supplicant or how grave the emergency, the guardians of many temples will not admit a client if he cannot give a rich gift to the custodian. Even after one has gained and survived the ceremonies, the guardians will not permit the neophyte to leave until he makes still another gift.

The supplicant entering the temple is first stripped of all his or her clothes. In everyday life the Nacirema avoids exposure of his body and its natural functions. Bathing and excretory acts are performed only in the secrecy of the household shrine, where they are ritualized as part of the body-rites. Psychological shock results from the fact that body secrecy is suddenly lost upon entry into the *latipso*. A man, whose own wife has never seen him in an excretory act, suddenly finds himself naked and assisted by a vestal maiden while he performs his natural functions into a sacred vessel. This sort of ceremonial treatment is necessitated by the fact that the excreta are used by a diviner to ascertain the course and nature of the client's sickness. Female clients, on the other hand, find their naked bodies are subjected to the scrutiny, manipulation and prodding of the medicine men.

Few supplicants in the temple are well enough to do anything but lie on their hard beds. The daily ceremonies, like the rites of the holy-mouth-men, involve discomfort and torture. With ritual precision, the vestals awaken their miserable charges each dawn and roll them about on their beds of pain while performing ablutions, in the formal movements of which the maidens are highly trained. At other times they insert magic wands in the supplicant's mouth or force him to

eat substances which are supposed to be healing. From time to time the medicine men come to their clients and jab magically treated needles into their flesh. The fact that these temple ceremonies may not cure, and may even kill the neophyte, in no way decreases the people's faith in the medicine men.

There remains one other kind of practitioner, known as a "listener." This witch-doctor has the power to exorcise the devils that lodge in the heads of people who have been bewitched. The Nacirema believe that parents bewitch their own children. Mothers are particularly suspected of putting a curse on children while teaching them the secret body rituals. The counter-magic of the witch-doctor is unusual in its lack of ritual. The patient simply tells the "listener" all his troubles and fears, beginning with the earliest difficulties he can remember. The memory displayed by the Nacirema in these exorcism sessions is truly remarkable. It is not uncommon for the patient to bemoan the rejection he felt upon being weaned as a babe, and a few individuals even see their troubles going back to the traumatic effects of their own birth.

In conclusion, mention must be made of certain practices which have their base in native esthetics but which depend upon the pervasive aversion to the natural body and its functions. There are ritual fasts to make fat people thin and ceremonial feasts to make thin people fat. Still other rites are used to make women's breasts larger if they are small, and smaller if they are large. General dissatisfaction with breast shape is symbolized in the fact that the ideal form is virtually outside the range of human variation. A few women afflicted with almost inhuman hyper-mammary development are so idolized that they make a handsome living by simply going from village to village and permitting the natives to stare at them for a fee.

Reference has already been made to the fact that excretory functions are ritualized, routinized, and relegated to secrecy. Natural reproductive functions are similarly distorted. Intercourse is taboo as a topic and scheduled as an act. Efforts are made to avoid pregnancy by the use of magical materials or by limiting intercourse to certain phases of the moon. Conception is actually very infrequent. When pregnant, women dress so as to hide their condition. Parturition takes place in secret, without friends or relatives to assist, and the majority of women do not nurse their infants.

Our review of the ritual life of the Nacirema has certainly shown them to be a magic-ridden people. It is hard to understand how they have managed to exist so long under the burdens which they have imposed upon themselves. But even such exotic customs as these take on real meaning when they are viewed with the insight provided by Malinowski [10] when he wrote (1948: 70)

Looking from far and above, from our high places of safety in the developed civilization, it is easy to see all the crudity and irrelevance of magic. But without its power and guidance early man could not have mastered his practical difficulties as he has done, nor could man have advanced to the higher stages of civilization.[11]

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1. From "Body Ritual among the Nacirema," *American Anthropologist* 58 (1956): 503-507.
2. George Peter Murdock (1897-1985), famous ethnographer.
3. Ralph Linton (1893-1953), best known for studies of enculturation (maintaining that all culture is learned rather than inherited; the process by which a society's culture is transmitted from one generation to the next), claiming culture is humanity's "social heredity."
4. Missing text as follows:

According to Nacirema mythology, their nation was originated by a culture hero, Notgnihsaw, who is otherwise known for two great feats of strength - the throwing of a piece of wampum across the river Pa-To-Mac and the chopping down of a cherry tree in which the Spirit of Truth resided.

5. A washing or cleansing of the body or a part of the body. From the Latin *abluer*e, to wash away.
6. Marked by precise observance of the finer points of etiquette and formal conduct.
7. It is worthy of note that since Prof. Miner's original research was conducted, the Nacirema have almost universally abandoned the natural bristles of their private mouth-rite in favor of oil-based polymerized synthetics. Additionally, the powders associated with this ritual have generally been semi-liquefied. Other updates to the Nacirema culture shall be eschewed in this document for the sake of parsimony.

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UNIT 5: ORGANIZATIONAL IMPROVEMENT

TERMINAL OBJECTIVE

The students will be able to differentiate between organizational improvement and process improvement.

ENABLING OBJECTIVES

The students will:

- 1. Identify the three phases of organizational improvement.*
 - 2. Describe the relationship between process improvement and organizational improvement.*
 - 3. Identify tools for organizational assessment and improvement. Locate State statistics on death and injury*
 - 4. Locate State statistics on death and injury.*
 - 5. Identify common causes of death and injury.*
 - 6. Use mapping process to determine injury and death statistics.*
 - 7. Identify the National EMS Information System (NEMSIS).*
 - 8. Describe the structure of NEMSIS.*
 - 9. Conduct a query of the current NEMSIS data.*
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PHASES OF ORGANIZATIONAL IMPROVEMENT

The Three Phases of Organizational Improvement

1. Phase 1: Initiation.
2. Phase 2: Deployment.
3. Phase 3: Integration.

Note, too, that there are other formulations of the "three phases" that are associated with organizational improvement.

The broad actions we identify in each phase can be carried out in many ways, allowing flexibility in implementation. However, the key concepts that these actions represent are critical for successful implementation:

PHASE 1: INITIATION

Leadership

You must have commitment from the top leadership as well as from the informal leaders.

Supportive Organizational Culture

There should be a supportive organizational culture, one that values quality, cares for its personnel and its public, works hard for and expects success, and so forth.

A Strategic Plan

There should be a strategic plan. This plan provides the basis for integrating and aligning an organization's work processes with its strategic direction. Stakeholder involvement in plan development is critical for success.

Provide Orientation and Training

You should provide orientation and training, not just for those directly involved, but for the entire organization.

Those directly involved should have the most extensive orientation and training. They need detailed information to carry out their roles.

But even those with the most peripheral involvement should be given information and updates. This provides them an opportunity for inclusion, feedback, and other positive results.

Initial Development

There should be an initial development of goals, roles, responsibilities, reporting mechanisms, evaluation processes, etc. All of these should be developed with the understanding that **further** development will occur.

Serious Commitment to Hard Work

There should be a serious commitment to hard work. Sometimes managers think that if they just read the newest management books ("management by bestseller"), use the correct processes, and say the right things, all will turn out well.

As they initiate a project--and all throughout the project--managers must make a commitment to work as hard as is needed to bring the project to fruition.

Leaders must lead by example.

PHASE 2: DEPLOYMENT

Initial steps are important steps. Thus, they should be carefully thought out before implementation.

Evaluation is ongoing. You planned your evaluation processes in the Initiation Phase. But, evaluation in the Deployment Phase is not a one-time thing.

Implement standard procedures for employee, customer, and stakeholder input. Input can be obtained in various ways:

- Suggestion boxes.
- Focus groups.
- Stakeholder forums.
- Implement communication methods.

How will you tell people important information, how often will you communicate, what are your alternative communication methods? These all must be determined.

Analyze agency-wide trends and data to identify areas for **ongoing** improvement. Sources of data could include the following performance measures:

Are emergency medical (EMS) services timely? How does EMS performance compare with other, nearby systems as well as regional and national standards? Are changes in one critical area impacting positively or negatively on another area?

Measuring Quality of Care

The outcome that is most important in terms of EMS effectiveness and improvement is patient health results from care rendered. There is little consensus in the literature, however, as to what constitutes "quality" patient care, and it is difficult to pinpoint with assurance the cause of a good patient outcome. The most commonly accepted definition of quality care is an increased rate of survival from a life-threatening event. Other, broader patient health care results also are important and include a variety of changes in the patient's health status.

The 5 D's

Focusing on the "5 D's" will help EMS systems examine the results of the care they render:

1. Death: Did the patient survive to hospital discharge?
2. Disability: Was there an improvement in the patient's functional status as a result of patient care rendered?
3. Discomfort: Was there improvement in the patient's symptoms (e.g., alleviation of pain, improved breathing)?
4. Dissatisfaction: Was the patient (and/or family) satisfied with service rendered?
5. Destitution: Was the treatment provided at lowest cost to the patient, the payer and to society as a whole? (Precourse reading, page 51.)

Internal/External assessments may be crafted by the EMS Division or be part of another effort. Surveys and/or focus groups also may be crafted by the EMS Division or be part of another effort.

Employee suggestions are a source of information for external assessment. Customer complaints can provide valuable information. Such "satisfaction data" can provide useful information, a snapshot of a particular EMS unit or person. However, note that complaints may represent only a minority of opinions. Robust data systems find ways to collect both complaints and compliments.

The quality-oriented EMS system has communication procedures for receiving, reviewing, and responding to praise, complaints, and comments in all the many forms in which they may arrive, e.g., phone calls made to individual providers or departments; comments made to field providers during the course of their work; newspaper articles; and other information-sharing events. The challenge is to process this information in ways that build and preserve relationships and increase knowledge about specific patient and stakeholder needs and expectations. (Precourse reading, page 49.)

Often audit report findings are overlooked. In one case, a financial audit (the first in many years) found that a trusted EMS employee had been embezzling for years. Identify vital areas for improvement by answering the following questions:

- What is the level of employee, customer, and stakeholder satisfaction?
- How does the agency's performance compare to its own past performance levels and to commonly accepted benchmark levels, State or national averages?
- How might changes in one critical performance measure impact other areas?

PHASE 3: INTEGRATION

Integration refers to the process of fully accepting something and smoothly meshing it within an existing system.

During this phase continue to monitor the effects of improvements, including agency-wide trends and data.

Naturally, you would implement improvements and then document the results.

Analyze effectiveness in meeting goals and objectives. Here's an example of analysis:

Where compliance falls short of the performance objective/indicator, an analysis must be completed to determine the cause of the problem. EMS is a highly complex system, and analyses (as well as the action plans that grow from the analyses) must account for this complexity. As an example, an EMS system has as one of its objectives (performance indicators) the following:

Seventy-five percent of all patients suffering a witnessed cardiac arrest and who are in ventricular fibrillation will be defibrillated within 3 minutes of the arrest.

Analysis of the Situation

Compliance is determined to be only 10 percent, however. A careful analysis of the situation might identify the existence of one or more of the following reasons for the noncompliance, each of which may ultimately require action steps at different levels of the EMS system.

First responders are not permitted to defibrillate.

Local: The local fire chief will not permit the fire service personnel to defibrillate.

Local: The medical director will not authorize first responders to defibrillate.

State: State law or administrative rules prohibit defibrillation by First Responders.

There are insufficient numbers of automated external defibrillators on ambulance services and rescue squads.

Local: The city council has not provided funding to purchase defibrillators for the first responders.

Local: The fire chief does not include a request for AEDs in the annual budget.

State: The EMS licensing rules do not require an AED to be present in licensed non-transporting units in urban areas.

State: The State grant-in-aid program for local services cannot be used to procure defibrillators in an urban area.

9-1-1 coverage is available to only fifty percent of the population.

Local: The county commissioners have eliminated funding for expanding 9-1-1 coverage throughout the county.

Local: The telephone company cites technical difficulties and antiquated equipment as a barrier to expanding 9-1-1 coverage.

State: There is no State law mandating 9-1-1 coverage.

State: There is no statewide dedicated funding source earmarking revenue to assist with 9-1-1 coverage.

The general public does not know when and how to call 9-1-1.

Local: There are no 9-1-1 stickers to place on telephones because they were eliminated from the communications budget by the mayor.

Local: There is no on-going effort to educate the public about 9-1-1 coverage in the community.

State: The State telecommunications agency or state EMS agency has not instituted the "Make the Right Call" campaign designed by the National Highway Traffic Safety Administration (NHTSA).

State: The State legislature diverted funding from 9-1-1 public information to the State Medicaid program.

EMS personnel are not complying with established protocols.

Local: There is no ongoing system of Quality Improvement (QI) or retrospective medical direction in the local EMS system.

Local: The system has a "phantom" medical director who only signs re-certification, but is not involved with actual medical direction.

Local: EMS personnel are not familiar with the defibrillation protocols.

Local: There is no ongoing continuing education program for EMS personnel.

State: There is no statewide protocol for early defibrillation.

State: There is no mandated continuing education in the use of the Automated External Defibrillator.

(Precourse reading, page 29.)

Communicate Results to All Parties

If things went well, they need to know. If things didn't go so well, they also need to know.

Celebrate Accomplishments!

Yes, you read that correctly: Celebrate. All too often hard work and commendable results are glossed over.

Continue to Evaluate

Such ongoing evaluations often produce minor--and on occasion, major--incremental changes that help the organization to adapt to changing conditions.

RELATIONSHIP BETWEEN PROCESS IMPROVEMENT AND ORGANIZATIONAL IMPROVEMENT

There is a relationship between process improvement and organizational improvement. However, organizational improvement to its fullest extent implies organization-wide improvement; not just in the EMS Division of a fire department.

Organization-wide improvement may be beyond the scope of what you had planned to address with your current project. Yet, we must consider integration again, especially the "smoothly meshing" part of the definition, if we want our process improvement to be sustainable.

TOOLS FOR ORGANIZATIONAL ASSESSMENT AND IMPROVEMENT

Here are Some Examples of Helpful Tools

Education and training: The first place to look is the National Fire Academy (NFA). Here are some education and training suggestions:

1. NFA Online, *Fire Service Supervision* (Q138) at: <http://www.nfaonline.dhs.gov/browse/ms.shtml>
2. NFA resident programs:
 - a. *Executive Development* (R123).
 - b. *Executive Leadership* (R125).
 - c. *Fire Service Financial Management* (R333).
 - d. *Strategic Organizational Issues in Fire and EMS* (formerly *Organizational Theory in Practice*), (R331).
 - e. *Effective Leadership Skills for Fire and EMS Organizations* (formerly *Interpersonal Dynamics in Fire Service Organizations*), (R332).
 - f. The emergency medical services courses, especially:
 - *Management of Emergency Medical Services* (R150).
 - *Advanced Leadership Issues in Emergency Medical Services* (R151).

Other NFA courses could be useful to you: check the NFA course catalog and speak to the other members of your class. They may have attended a course recently and can provide you with fresh insights.

3. There are other training programs (resident, off-campus, and online):
 - a. The Emergency Management Institute (EMI) has several management and supervision courses, especially in its off-campus programs. It is co-located with NFA in Emmitsburg, MD.
 - b. The Internet: there are a surprising number of free online training programs available. Try typing in "free Quality Management (QM) training" and see what comes up. Just be sure to read the fine print, since some organizations have a rather elastic understanding of what the word "free" means.

Information Resources

- The NHTSA's Office of Emergency Medical Services, has a wealth of free materials at www.ems.gov
- Another excellent resource is the U.S. Fire Administration Publications Center (USFAPC) at: <https://www.usfa.dhs.gov/applications/publications/> This facility is located in I Building on the NFA campus.
- Also on campus is the Learning Resource Center (LRC) at <http://www.lrc.fema.gov> This facility is located in N Building on the NFA campus.
- An excellent online resource is the DHS Lessons Learned Information Sharing site at <https://www.llis.dhs.gov/index.do>

Self-Assessment

This is an excellent tool for QI, professionally and personally.

The precourse reading has a very comprehensive self-assessment tool. The self-assessment has also been included in your Evening Assignments handout.

You are encouraged to complete the self-assessment in your out-of-class time and to recommend that the rest of your EMS leadership also complete it.

ESTABLISHING A BASELINE

As part of the Define, Measure, Analyze, Improve, and Control (DMIAC) process the "defining a problem" requires a baseline to be established. (DMIAC will be introduced in the next unit.) While many agencies have State and local statistics for their agencies it helps to paint a detailed picture of the problem that a QI process is going to be applied to. Some sources of the data can include the database from the agency, State EMS Office, and the National EMS Information System (NEMSIS). Many of these data collection initiatives lack a funding source to supply financial support. Federal initiatives and health care money funds programs based on National numbers. For example the amount of money directed toward traumatic brain injury is a result of the national numbers on traumatic brain injury significantly impacting the Federal Health Care system.

WEB-BASED INJURY STATISTICS QUERY AND REPORTING SYSTEM

The **WISQARS** is an interactive database system that provides customized reports of injury-related data from the Centers for Disease Control and Prevention (CDC). WISQARS provides fatality data based on death certificate data obtained from the National Vital Statistics System--deaths, death rates, and years of potential life lost (a measure of premature death) by specific

causes of injury mortality and common causes of death. These data are intended for a broad audience--the public, the media, public health practitioners and researchers, and public health officials--to increase their knowledge of injury. The data provide information about what types of injuries are leading causes of deaths, how common they are, and whom they affect. In addition, the mortality data help Federal, State, and local public health officials to:

- characterize and monitor injury trends;
- identify persons at risk; and
- provide reliable surveillance data for program and policy decisions.

WISQARS also provides national estimates of injuries treated in U.S. hospital emergency departments from the **National Electronic Injury Surveillance System--All Injury Program (NEISS-AIP)** which measures nonfatal injuries and nonfatal injury rates. Data from the **National Violent Death Reporting System (NVDRS)** are available to track violent incidents and deaths, death rates, and causes of injury mortality. The data provided for violent deaths are only for 16 States and are not nationally representative.

WISQARS is a good starting point to get an idea of the leading causes of death in a State. The database lags behind a couple of years. A color-coded chart is easy to produce and can provide further analysis to determine cause of death for each age range.

WISQARS mortality reports provide tables of the total numbers of injury-related deaths and the death rates per 100,000 populations. The report lists deaths according to cause (mechanism) and intent (manner) of injury by State, race, Hispanic origin, sex, and age groupings. In the leading causes of death reports certain categories in color have additional information that can be obtained identifying more specific causes. These causes are now linked to the subcategories of the ICD-10 code series to track the origin of an injury or fatality.

**Ten Leading Causes of Death, United States
2007, All Races, Both Sexes**

Rank	Age Groups										All Ages
	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	
1	Congenital Anomalies 5,785	Unintentional Injury 1,588	Unintentional Injury 965	Unintentional Injury 1,229	Unintentional Injury 15,897	Unintentional Injury 14,977	Unintentional Injury 16,931	Malignant Neoplasms 50,167	Malignant Neoplasms 103,171	Heart Disease 496,095	Heart Disease 616,067
2	Short Gestation 4,857	Congenital Anomalies 546	Malignant Neoplasms 480	Malignant Neoplasms 479	Homicide 5,551	Suicide 5,278	Malignant Neoplasms 13,288	Heart Disease 37,434	Heart Disease 65,527	Malignant Neoplasms 389,730	Malignant Neoplasms 562,875
3	SIDS 2,453	Homicide 398	Congenital Anomalies 196	Homicide 213	Suicide 4,140	Homicide 4,758	Heart Disease 11,839	Unintentional Injury 20,315	Chronic Low. Respiratory Disease 12,777	Cerebro-vascular 115,961	Cerebro-vascular 135,952
4	Maternal Pregnancy Comp. 1,769	Malignant Neoplasms 364	Homicide 133	Suicide 180	Malignant Neoplasms 1,653	Malignant Neoplasms 3,463	Suicide 6,722	Liver Disease 8,212	Unintentional Injury 12,193	Chronic Low. Respiratory Disease 109,562	Chronic Low. Respiratory Disease 127,924
5	Unintentional Injury 1,285	Heart Disease 173	Heart Disease 110	Congenital Anomalies 178	Heart Disease 1,084	Heart Disease 3,223	HIV 3,572	Suicide 7,778	Diabetes Mellitus 11,304	Alzheimer's Disease 73,797	Unintentional Injury 123,706
6	Placenta Cord Membranes 1,135	Influenza & Pneumonia 109	Chronic Low. Respiratory Disease 54	Heart Disease 131	Congenital Anomalies 402	HIV 1,091	Homicide 3,052	Cerebro-vascular 6,385	Cerebro-vascular 10,500	Diabetes Mellitus 51,528	Alzheimer's Disease 74,632
7	Bacterial Sepsis 820	Septicemia 78	Influenza & Pneumonia 48	Chronic Low. Respiratory Disease 64	Cerebro-vascular 195	Diabetes Mellitus 610	Liver Disease 2,570	Diabetes Mellitus 5,753	Liver Disease 8,004	Influenza & Pneumonia 45,941	Diabetes Mellitus 71,382
8	Respiratory Distress 789	Perinatal Period 70	Benign Neoplasms 41	Influenza & Pneumonia 55	Diabetes Mellitus 168	Cerebro-vascular 505	Cerebro-vascular 2,133	HIV 4,156	Suicide 5,069	Nephritis 38,484	Influenza & Pneumonia 52,717
9	Circulatory System Disease 624	Benign Neoplasms 59	Cerebro-vascular 38	Cerebro-vascular 45	Influenza & Pneumonia 163	Congenital Anomalies 417	Diabetes Mellitus 1,984	Chronic Low. Respiratory Disease 4,153	Nephritis 4,440	Unintentional Injury 38,292	Nephritis 46,448
10	Neonatal Hemorrhage 597	Chronic Low. Respiratory Disease 57	Septicemia 36	Benign Neoplasms 43	Three Tied 160	Liver Disease 384	Septicemia 910	Viral Hepatitis 2,815	Septicemia 4,231	Septicemia 26,362	Septicemia 34,828

WISQARS™

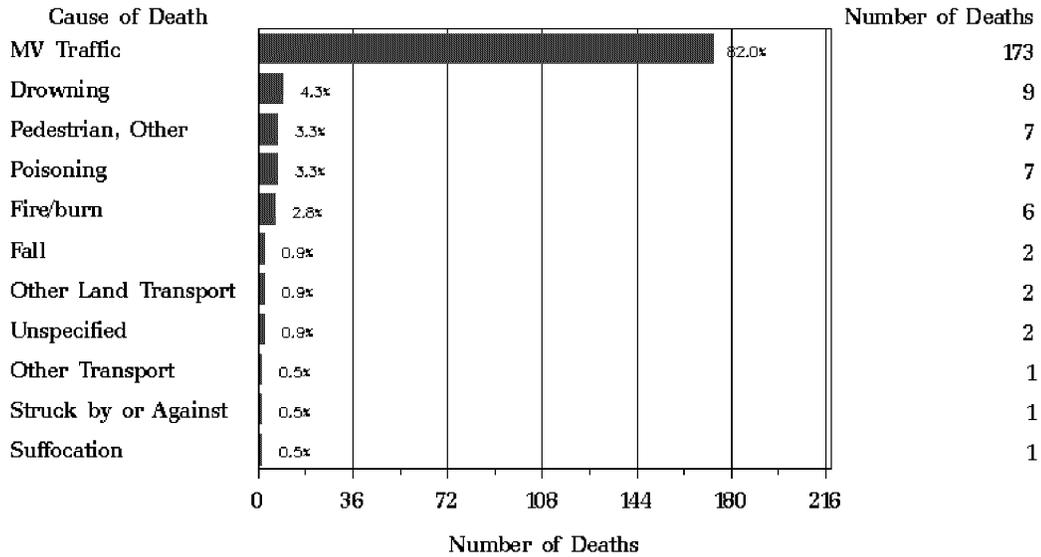
Produced By: Office of Statistics and Programming, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention

Data Source: National Center for Health Statistics (NCHS), National Vital Statistics System

Mortality data come from the National Center for Health Statistics (NCHS), CDC annual mortality data files. NCHS mortality data are derived from the Multiple Cause of Death data. The system calculates age-adjusted rates by the direct method and standardizes them to the total U.S. population. You may select one of five standard years: 1940, 1970, 1980, 1990, and 2000. WISQARS Fatal age-adjusted death rates may differ slightly from those of NCHS. WISQARS uses 5-year age categories for calculations.

**2007, Maryland
Unintentional Injuries
Ages 15-24, All Races, Both Sexes
Total Deaths: 211**

Click on the colored bars to drill down to the ICD code level



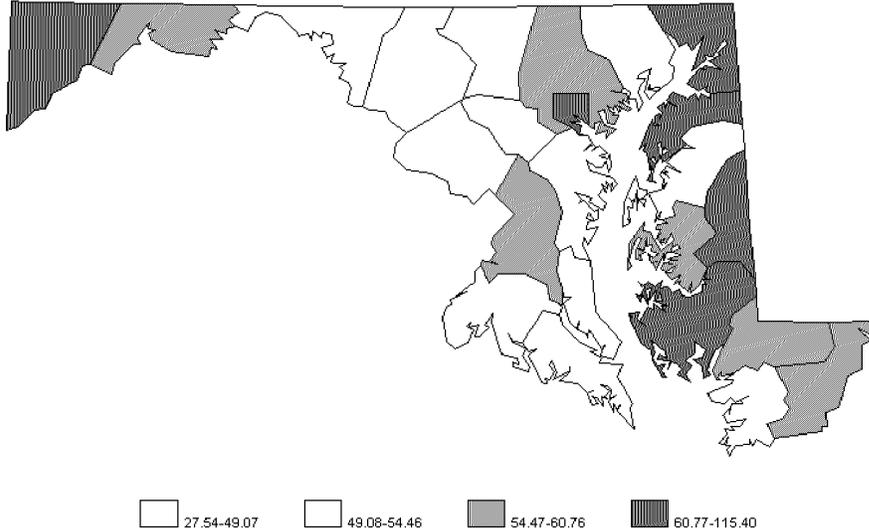
WISQARS provides death and death rate data for as many categories as possible. WISQARS also has a mapping feature that can be used to generate State maps that indicate death rates for each county. A very robust search engine and database is able to compare and contrast a variety of injuries, actions, and demographics for causes of death and injury for each State. This is a powerful tool to secure State and Federal grant money to reduce injuries and increase the safety of the population in an EMS agencies service area. The mapping feature breakdown county by county the selected problem.

**2000-2006, Maryland
Death Rates per 100,000 Population**

All Injury, All Intents, All Races, All Ethnicities, Both Sexes, All Ages

Annualized Crude Rate for Maryland: 55.63

Maryland Estimated Average Annual Medical Costs of \$24,771,175 and Work Loss Costs of \$3,118,694,403



Reports for All Ages include those of unknown age.

* Rates based on 20 or fewer deaths may be unstable. These rates are suppressed for counties (see legend above); such rates in the title have an asterisk.

Medical and work loss cost estimates are expressed in year 2005 dollars.

Cost estimates are not comparable across states; county-level cost estimates should only be used for comparisons within this state.

Produced by: Office of Statistics & Programming, National Center for Injury Prevention & Control, CDC
Data Sources: NCHS National Vital Statistics System for numbers of deaths; US Census Bureau for population estimates.

Since 1999, mortality data has been coded using *International Classification of Disease-10th Revision* (ICD-10). Mechanism and cause of injury are based on ICD-10 external cause of injury codes. These codes are used by other health care providers, insurance companies, and health care administrators to track patients and their cost longitudinally through the health care system. The ICD-10 codes are now also being linked to the NEMESIS. These codes are no longer considered supplemental codes as they were in ICD-9, and they are no longer referred to as "E-codes." The external cause of injury codes have been incorporated into the ICD-10 alphanumeric classification system as ICD-10 external cause of injury codes begin with the letter V, W, X, or Y followed by a two-digit whole number (e.g., W25). Some external cause of injury codes also have a decimal followed by another number (e.g., V30.4).

Be aware that ICD-10 is a completely different coding system than ICD-9. Cause (mechanism) of injury categories defined using ICD-9 E-codes for deaths in 1981 through 1998 are different from those defined by ICD-10 external cause of injury codes for deaths in 1999. National Center for Health Statistics does **not** recommend combining 1999 and later data in WISQARS with previous years by cause (mechanism) categories to obtain average annual numbers of death and death rates. Also, when looking at trends in annual numbers of deaths and death rates by mechanism/cause of injury, you should consider that changes in results from 1998 to 1999 could be a result of the change in code definitions and coding rules.

The Preliminary External Cause of Injury Mortality Matrix for ICD-10 is changed from the Recommended Framework for Presenting Injury Mortality data based on ICD-9 codes. For example, the subcategory of "Bites and Stings" in the ICD-9 framework was dropped from the ICD-10 matrix because in ICD-10 "bitten by" has been combined with "contact with" and/or "struck by" for some relevant codes. Also, ICD-10 transportation-related codes have been expanded considerably, including the addition of a new category called "Other land transport." To see other important changes, visit the NCHS website on the ICD-10 matrix. Because of the distinct changes in code definitions and coding rules from ICD-9 to ICD-10, WISQARS Fatal presents mortality data for 1999 and beyond separately from data for 1998 and earlier. EMS providers must understand the ICD-10 codes to integrate EMS operations into the overall efforts of the US Health Care System.

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Activity 5.1

Web-based Injury Statistics Query and Reporting System

Purpose

You will use the WISQARS database to identify the most common causes of death in your home State.

Directions

1. After identifying your State select one of the unintentional injuries categories in the age group of your choice.
2. Obtain more detail on the causes in that category.
3. Select one of the causes and go to the mapping function and map that cause in for your State using the WISQARS database.
4. Identify your county on the map.
5. Print the three items: a chart, a bar graph, and a map.

Fatal Injury Data

1. Click on Learn More and Query Fatal Data.
2. Fatal injury 1999-2007.
3. Scroll down to Census tract/State select Maryland from pull down.
4. Click submit.

Leading Causes of Death

1. Select Leading Causes of Death.
2. Click on Census Region/Data and select Maryland.
3. Submit request.
4. From the chart click on Unintentional Injuries Age 15-24.

5. Click on the red line MV Traffic.
6. Click upper right item 2 ICD Codes.

Fatal Injury Mapping

1. Click on Interactive Fatal Injury Mapping.
2. Select pull down on Mechanism of Injury.
3. Select Poisoning.
4. Select State or census tract pull down Maryland.
5. Click on cost estimates.
6. Click submit.

THE NEED FOR A NATIONAL EMERGENCY MEDICAL SERVICE DATABASE

EMS systems vary in their ability to collect patient and systems data and to put these data to use. There are currently several national EMS or EMS-related databases. Three government-sponsored databases are housed or sponsored by NHTSA and the USFA. These are

- NFIRS--National Fire Incident Reporting System;
- NEMSIS--National EMS Information System; and
- FARS--Fatal Accident Reporting System.

Several national quasigovernment databases are collecting data, as they are research-oriented and operated under the management of associations or research organizations. These databases are fed by off-the-shelf software programs that transmit data from the user in the field or from inputs in a station to an agency database. The data then can be transmitted to a State portal and finally up to a national database.

National Highway Traffic Safety Administration Uniform PreHospital Dataset Version 3.0

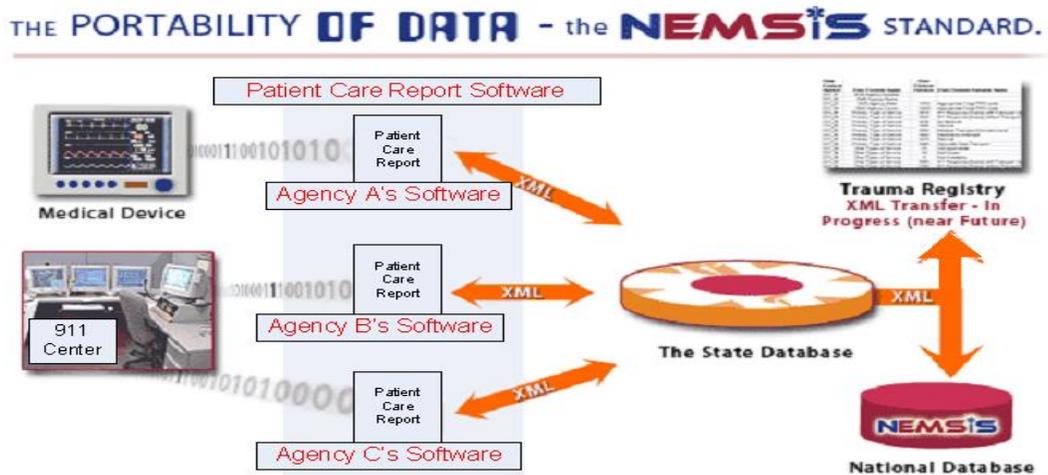
In 1994, NHTSA founded the first Uniform Prehospital EMS Dataset which would become known as NEMSIS Version 1.0. This was based on the realization that different data fields across all EMS systems exist for the same issue or event and that there is a need for standardization.

In 2003, the Memorandum of Understanding (MOU) "recognized the need for EMS data collection at the national level" as well as the assignment of "specific definitions to a set of data elements identified as desirable to be collected on a national level." Fifty-two States and territories signed the memorandum. A 2-year project funded by NHTSA is established to develop a coding system for EMS as well as a uniform description for the reason for an EMS encounter. It is based on EMS curricula and the NHTSA dataset. The creation of a National Data Dictionary or dataset provides information about each of the data elements, the variables, and the definitions associated with that data element as well as how to deploy the element in a database. The current data dictionary is Version 3.0.

National EMS Database

Currently there exists an easy link for EMS databases to allow analysis at a local, State, and national level. The National Association of State EMS Officials with its Federal partners at the NHTSA and the Trauma/EMS Systems program of the Health Resources and Services Administration's (HRSA) Maternal Child Health Bureau and the CDC developed a national EMS database known as the National EMS Information Management System or NEMSIS. This database was developed to help focus nationwide EMS training curricula; evaluate patient and EMS system outcomes; facilitate research efforts; determine national fee schedules and reimbursement rates; address resources for disaster and domestic preparedness; and provide valuable information on other issues or areas of need related to EMS care.

EMS data systems such as a State EMS database or the National EMS Database use the NEMSIS Dataset in several ways. NEMSIS is designed to provide and build on a uniform national EMS dataset, with standard terms, definitions, and values, as well as a national EMS database, with aggregated data from all states on a limited number of data elements. Forty-eight of the States, the District of Columbia, and three territories signed a memorandum of agreement documenting support for the NEMSIS project and expressing a desire for full implementation of the NEMSIS dataset.



NEMSIS Structure

The entering of data into the NEMSIS database can begin with the 911 center, as dispatch computers have the ability to transfer patient and call information into an electronic patient care report. Portable EMS equipment such as cardiac monitors and other point of care devices can transmit patient vital signs and other diagnostic to the patient care report. Local agencies then chose a patient care reporting system that is NEMSIS-compliant at the silver or gold level to be able to transmit the data to a State database or portal that populates the NEMSIS database.

NEMSIS also provides a technical assistance center to provide assistance to State, territory, and local EMS agencies. The NEMSIS TAC also provides assistance to commercial software vendors. Biannually all States and territories are assessed to determine their capabilities to provide data to the national EMS database explanations and validity documentation. NEMSIS data is accumulated into what is known as the data cub. The cub has national and State data to be used to create a report. Each report allows the user to drill down and filter the material for more concise and accurate data.

EMS performance measures are often associated with patient encounters that are either time-sensitive, treatment- sensitive, or both. NEMSIS (and non-NEMSIS) variables may be used to build evidence-based performance assessments for sentinel patient conditions. The patient conditions currently addressed with NEMSIS templates are: acute myocardial infarction (AMI), ST-segment elevation myocardial infarction (STEMI), acute stroke, and severe trauma. It is hoped that use of these lists of data variables will promote the development and standardization of performance measurement, leading to enhanced benchmarking and sharing of best practices.

Activity 5.2

Identifying National Trends Using National EMS Information System Reports

Purpose

To conduct a query of the current NEMESIS data and perform an analysis of data retrieved from NEMESIS.

Directions

1. Going around the room, you will count off by fours, and form groups based on your common numbers.
2. Perform the query assigned to your group.
3. Prepare a one-page memo answering the questions assigned to your group. The memo will be collected for evaluation by the instructor(s) as the first item of business the following morning.
4. Computers are available in the classroom, K building basement, and the LRC.

Group 1

Research cardiac arrest etiology by frequency in "National Reports". Determine if there are any seasonal variations between Q1, Q2, Q3, and Q4 2009 and the same quarters in 2010.

Group 2

Research disposition of trauma under "National Reports" and compare the volumes between Q4 2009 and 2010 and note any different trends.

Group 3

Research EMS incidents location type by frequency under "National Reports". Are there any seasonal variations identifiable in the data in all four quarters of 2009 and 2010?

Group 4

Review CMS Service Level under the "National Reports". Can the group identify a specific quarter in which there are more ALS emergency patients?

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SUMMARY

This unit discussed the phases of organizational improvement:

1. Phase 1: Initiation.
2. Phase 2: Deployment.
3. Phase 3: Integration.

It then looked at the relationship between process improvement and organizational improvement. The interrelationship was clear. Yet, you must insure that you consider the entire organization when you develop a process improvement method.

Finally, the unit ended with some tools for Organizational Assessment and Improvement including WISQARS™ and NEMESIS.

WISQARS provides a resource to identify community and State based problems. It employs a robust set of search tool to establish a baseline for a QM program.

NASEMSD decided there was a NEED for uniform data collection that standardizes reporting of EMS events and demographic data of reporting agency. Participation will further EMS performance benchmarking, education, research, reimbursement

You can always use more tools in your managerial toolkit. The suggested ones are a great starting point.

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UNIT 6: INTRODUCTION TO THE DMAIC METHOD

TERMINAL OBJECTIVE

The students will be able to identify the goal of each step in the Define, Measure, Analyze, Improve, and Control (DMAIC) method.

ENABLING OBJECTIVES

The students will:

- 1. Describe the steps in the DMAIC method.*
 - 2. List the tools they will apply in the DMAIC method.*
-

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INTRODUCTION TO DEFINE, MEASURE, ANALYZE, IMPROVE, AND CONTROL

Our main objective for this section is that you be able to recall the steps used in the Define, Measure, Analyze, Improve, and Control (DMAIC) method. It will help you put the rest of the units on DMAIC into proper context. This provides you with a consistent sequence of steps to follow when conducting performance improvement projects.

The DMAIC method is one of several models that can be used to organize and manage performance improvement projects. DMAIC is one of the most popular and successful of these as it represents the results of efforts to improve process improvement. It can be applied widely to all sectors of enterprise--public, private, services, manufacturing--including healthcare, EMS, and the many administrative, support, and operational facets of the fire service.

This acronym is commonly pronounced as "Da-may-ick".

D FOR DEFINE

Identify a problem or an opportunity to make an improvement.

Observations of a problem or improvement opportunity have to be taken beyond a simple idea to the next level to make a proposal for a performance improvement project.

The document format used for proposing a performance improvement project is called a project charter. It outlines the problem or opportunity, along with the plan for making the improvement. Developing a project charter is the main goal of the define phase.

The project charter document is brought before the senior management team of your organization.

They have the responsibility of evaluating all of the projects being proposed. They will triage them in accordance with the organization's priorities, and then select which ones to approve.

Once a project is approved, the members of project team are specified and other project details are refined and finalized. This concludes the define phase and the project team is then ready to begin.

M FOR MEASURE

The main goals of the measure phase are to get a thorough understanding of how the process currently is designed and operates, along with a baseline measurement of its current level of performance.

Specifically, this phase identifies in what process or processes the problem or improvement opportunity exists or resides.

The team then will document how the process operates in several ways that might include flow charts and time studies as well as the use of process performance indicators to measure how well and how efficiently the process or processes currently operate.

If such measures are not already in place, the team will create them. The performance indicators are used to get a baseline measurement for how well and how efficiently the process is performing currently.

This baseline level of performance will be compared to performance after changes are made in the improve phase. Appropriate comparisons between the performance levels before changes are made and the level after changes are made allows objective assessment of whether or not the changes did or didn't accomplish what was hoped for. The measuring tools include

- process flow charts;
- value stream time analysis;
- performance indicators; and
- statistical process control charts.

Once the baseline studies of the process have been completed for the measure phase, the project can move into the analyze phase.

A FOR ANALYZE

The main goal of the analyze phase is to identify what problems or other factors are holding the process back from higher levels of performance.

If we are trying to fix a problem in our project, we will be looking for potential causes of the problems and which of those causes seem to have the most impact. Analysis tools include

- cause-effect diagrams;
- Pareto Plot (Pareto Chart); and
- scatter plots.

Now that we know what is holding the process back from higher performance, we are ready to move into the improve phase.

I FOR IMPROVE

The main goal of the improve phase is to test ideas for improvement and find what actually makes significant positive change.

The first step is to generate ideas for what to change. From the ideas, choose the ones to try based on practical consideration of:

- circumstances;
- time;
- money;
- politics; and
- available resources.

The next step is to make a change. Start on a small scale in a pilot project. Change should be accomplished in small pieces in a very specific fashion.

Evaluate results from the changes using appropriate data analysis to determine if the change caused an improvement. If it did not make enough change to reach the desired level of performance, try something else. Add another component to the change and re-evaluate. Keep trying until you get the results you are looking for. If it did work, take it out of pilot status and incorporate it across the entire department.

Now that you have found something that made a significant positive change in performance, you are ready to go into the control phase.

C FOR CONTROL

The main goals of the control phase are taking steps to prevent performance from deteriorating and then preplanning steps to take in case it does; and archiving information from the project for future reference.

- Address how to make sure those improvements are sustained over time.
- Develop some way to monitor performance of the process over time.

You want to be alerted if the performance backslides so you will be prepared to intervene to get things back on track.

Document data and knowledge. This is useful for future related problems and necessary if the process performance degrades.

Share learned information with the rest of the organization so they will understand how DMAIC works and make sure team efforts can be appropriately recognized.

SUMMARY

The DMAIC method is used to correct problems and improve the performance of processes. Keep this big picture in mind as we move through each of the five phases in more detail in the units that follow.

Define problem

Measure current process

Analyze factors affecting output

Improve process

Control performance

UNIT 7: THE DMAIC METHOD--"DEFINE" PHASE

TERMINAL OBJECTIVE

The students will be able to write a performance improvement project charter.

ENABLING OBJECTIVES

The students will:

- 1. Identify a problem or improvement opportunity.*
 - 2. Break down a large problem or opportunity into smaller parts.*
 - 3. Associate a problem or improvement opportunity with one or more specific processes.*
 - 4. Identify process customers.*
 - 5. Give in financial and nonfinancial examples that illustrate the idea of "return on investment".*
 - 6. Write a problem statement.*
-

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DEFINE

This unit will begin our exploration of each phase of the DMAIC process in greater detail. We will begin here with the define phase. The other four DMAIC phases will be covered in separate units.

The main goal of the define phase is to define the project clearly and write it up in the form of a project charter.

The DMAIC method usually begins in one of two ways. It may be a problem that has come to someone's attention, or it may be something someone might have an idea for improving, even though it may not be broken.

If you believe the old saying, "If it isn't broken, don't fix it" you will pass up lots of big opportunities to make your organization more effective and efficient. For example, the propeller-driven airplane was not "broken", but engineers saw an opportunity to improve the process for moving an airplane faster than would ever be possible with that propeller-driven technology. That led to the development of jet engines.

Improvement projects are the mechanism the DMAIC method uses to get things done. It is important to define an appropriate scope of the problem or improvement opportunity. It is hard to pick something too small but easy to pick something too big. It is very tempting to try and tackle some of the big problems that the organization is currently grappling with, but the organization would be wise to consider the adage of learning to crawl before walking.

Big problems are best handled by breaking them up into smaller problems. "Bite-sized" problems can be addressed in a much more focused manner with a much higher likelihood of success.

Complex Projects

Complex project examples:

- increase cardiac arrest survival;
- improve STEMI care;
- decrease response intervals;
- improve employee satisfaction; and
- improve public perceptions of EMS.

These are some examples of large projects with many layers of complexity. Let's look at the first one on the list--increasing survival from cardiac arrest.

Rather than trying to address the entire issue of improving survival from cardiac arrest, it can be broken into smaller, single "bites of the elephant", like the ones shown here.

- improve percent of time that CPR compressions are performed;

- optimize compression rate;
- optimize compression depth;
- optimize ventilation rate;
- optimize ventilation volume;
- improve percent of cases that receive bystander CPR rate; and
- improve percent of cases that used public access defibrillators.

If you are dealing with a big, complex issue, it is important to keep that in mind as you do the smaller projects--don't forget about "whole elephant" (the big issue) as you are taking one bite of it at a time (the individual projects).

Propose the Project

Now that you have an idea in your own mind for the problem and the scope, it is time to present the improvement project idea to the senior management team. In DMAIC, this is done with a tool called a project charter.

Not all organizations have formally adopted DMAIC (or Six Sigma) as their way of improving processes. If your department has not, the exercise of writing up a project charter is still very valuable to help **you** clarify the issues and plan how you will conduct the project. DMAIC is still a valid and useful process to use just within your own span-of-control (e.g., with your crew; with the part of the department that you manage).

If your organization does use DMAIC/Six Sigma, the senior management team will be expecting improvement project ideas to be submitted in the form of project charters.

Project charters are intended to help senior managers understand the idea and weigh the potential benefits against the investment of time, effort, and funding needed to do the project. It will also help them decide which projects to select or prioritize when more than one is being considered for the same timeframe.

Project Charters

The project charter is designed to explain clearly to the senior management team what the problem or opportunity is and what the potential return on investment (ROI) is for supporting the proposed project.

The ROI is what the organization gets in return for making the investment of its time and resources. The "return" may be in one or more forms:

- Clinical--such as better outcomes, less pain, or shorter length of stay at the hospital.
- Operational--such as faster response intervals, easier scheduling, fewer units needed, less complexity on the scene.
- Financial--such as lower cost or more revenue.

- Political--such as improved public opinion, better press coverage, more political support from appointed and elected public officials, more support from other public safety or healthcare provider organizations.

ROI is a key issue. You need to be able to answer these kinds of questions for your senior management team.

- Why should we put time, effort, and money into this project?
- What can we expect to get from doing this project?
- What should keep in mind as we debate supporting this project rather than any the others we may be considering?

The project charter will help you communicate improvement ideas effectively and concisely to management, and help senior management team choose, prioritize, and manage improvement projects.

Project Charter Elements

Process

- What process you are trying to improve?
- In what process does the problem or opportunity for improvement exist?
- What's wrong or can be improved?
- What is likely to happen if nothing changes (financially and nonfinancially)?

Anticipated Returns on Investment (ROI).

What is likely to happen if the project meets its goals (financially and nonfinancially)?

ROI in Customer Benefits

- Who are the internal and/or external customers that may benefit?
- What can be measured that reflects how well or efficiently their needs or expectations are being met?
- What changes in that measure(s) are projected from this project?

- What are the anticipated project expenses?

Other Justifications

Any other reasons why this project should be approved?

Proposed Team Members

Names and/or titles of those proposed to be on the project team.

Project Schedule

Projected start date; Projected dates for completion of each project phase. May be expressed in elapsed number of days, weeks, or months from start date.

Anticipated Deliverables

What reports, services, work products, etc., are expected to be provided during each stage of the project?

Other Support Required

Other than funding and people's time, what other resources will be needed for the project (e.g., data access, equipment, etc.).

WRITING A PROBLEM/OPPORTUNITY STATEMENT

The problem/opportunity statement addresses several parts of the project charter. It is intended to help think through the key issues of a project in preparation for writing up the project charter.

Writing a project charter begins with developing a clear problem statement. It is an exercise to help you refine and clarify exactly what you are trying to accomplish.

Problem/Opportunity statements should never place blame, presume the root cause, or presume a solution.

Problem statement: We have missed our 7:59 response interval target for the emergency response process 18.3 percent of the time in the past 12 months. Costs for correction are unknown. This may be affecting high-time-sensitive cases and patient satisfaction.

Let's review this problem statement using our criteria.

- Concise.
 - It is direct and to the point.
- Description of problem/opportunity.
 - It names a particular issue and what process is involved.
- Objective quantification:
 - Objective repeatable--Evidence of the problem can be obtained objectively and result could be replicated by others using CAD data.
 - Frequency/Magnitude--It is specified.
 - Costs--Not specified, but at least it was stated as unknown.
 - Nonfinancial impacts--Not specified in quantitative terms, but at least the type of cases affected are identified.
- It does not place blame.
- It does not presume the root cause.
- It does not presume a solution.

Problem statement: Our company's procedure for responding to calls has many delays due to communication problems.

- Concise.
 - It's concise and does specify the problem and process.
 - It is direct and to the point.
- Description of problem/opportunity.
 - It names a particular issue and what process is involved.
- Objective quantification:
 - Objective repeatable--Evidence of the problem cannot be obtained objectively and results could not be replicated by others.

- Frequency/Magnitude--Not specified.
- Costs--Not specified.
- Nonfinancial impacts--Not specified.
- It does place blame.
- It does presume the root cause.
- It does presume a solution.

Evaluate/Select Projects to Support (Senior Management Team)

Once a charter is written up, it will come before the senior management team for further consideration--assuming that the organization formally uses DMAIC/Six Sigma. Even if they do not, some projects still will need to be reviewed and approved by senior management to move forward. In either case, they will need to consider it from several perspectives.

- Does this project address a strategic or operational priority?
 - It is reasonable to expect that the senior management team will favor projects that line up with items in their strategic plan or address or address a key operational priority.
- Does this project represent a team training opportunity?
 - Is it important to do from an organizational learning and development perspective?
 - The senior management team may also favor projects that represent an opportunity to get people working together.
- Is this project a watermelon?
 - You have probably heard the phrase "low hanging fruit" used in reference to improvements or benefits that are easy to get. Now think of the kind of improvements that are so easily reached and have such big benefits that they are more than low hanging fruit--they are "watermelons". Even if watermelon projects do not line up with your immediate strategic or operational priorities, you probably will want to do those projects because of the amount of benefit for very little effort.

Activity 7.1

Write a Project Charter

Purpose

You will be able to write a project charter.

Directions

1. For this exercise, we are going to go step by step through an example project charter for the aspirin administration project we just discussed. After we review each section of the example project charter, everyone will work individually and write up the same section of a project charter--but for an issue that will be assigned to you.
2. Divide into groups and the instructor will assign each table a different topic.
 - a. Group 1: Slow Turnout Intervals.
 - b. Group 2: High Use of Overtime to Fill Shifts from Vacant Field Position.
 - c. Group 3: Long Hospital Drop Intervals.
 - d. Group 4: High Volume of Expired Drugs.
3. Look at the sample project charter in your Student Manual. You can follow along looking at the document in front of you and on the screen shorts in the slides.

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Activity 7.1 (cont'd)

Write a Project Charter

SAMPLE IMPROVEMENT PROJECT CHARTER

Project Title: Aspirin Administration Project

Element	Description	Information
Process	The process in which the problem or opportunity exists	
Problem/Opportunity	Describe the problem or improvement opportunity	
Consequences of Status Quo	Outline what is likely to happen if nothing changes. Consider financial and non-financial consequences.	
Anticipated Returns on Investment (ROI)	Outline what is likely to happen if the project meets its goals. Consider financial and non-financial benefits.	

THE DMAIC METHOD--"DEFINE" PHASE

<p>ROI in Customer Benefits</p>	<p>Who are the internal and/or external customers that may benefit? What can be measured that reflects how well or efficiently their needs or expectations are being met? What changes in that measure(s) are projected from this project?</p>	<p>Customer:</p> <p>Need/Expectation:</p> <p>Measure:</p> <p>Projected change:</p>
<p>Other Justifications</p>	<p>Any other reasons why this project should be approved</p>	
<p>Anticipated Project Expenses</p>	<p>In dollars</p>	
<p>Proposed Team Members</p>	<p>Names and titles of proposed team members. Also include organization name if external to the department.</p>	

THE DMAIC METHOD--"DEFINE" PHASE

Projected Schedule	Projected dates for completion of each phase	Projected Start Date:	
	D – Define	Define Phase Completion	
	M - Measure	Measure Phase Completion	
	A – Analyze	Analyze Phase Completion	
	I - Improvement	Improve Phase Completion	
	C- Control	Control Phase Completion	
Anticipated Deliverables	D – Define		
	M - Measure		
	A – Analyze		

THE DMAIC METHOD--"DEFINE" PHASE

	I – Improve	
	C – Control	
Other Support Required	Data access, equipment, etc.	
Review Status		<p>Submission Date:</p> <p>Initial Review Date:</p> <p>Initial Review Status: Yes No To Be Reconsidered</p> <p>Reconsideration Date:</p> <p>Final Review Status: Yes No To Be Reconsidered in Future</p>
Signature	To be signed by a Senior Management Council representative upon determination of final review status	<p>Signature:</p> <p>Printed Name and Title:</p> <p>Date:</p>

APPENDIX: SAMPLE PROJECT CHARTER

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Project Title: Aspirin Compliance Project

Element	Description	Information	
Process/Protocol	The process or protocol in which the problem or opportunity exists	Chest pain of suspected cardiac origin protocol	
Problem/Opportunity Statement	Describe the problem or improvement opportunity	Low compliance on aspirin delivery step	
Consequences of Status Quo	Financial and/or nonfinancial cost of doing nothing (<i>What will this problem cost us if it remains uncorrected? What revenue or benefits will be lost if the opportunity is not taken?</i>)	Larger infarctions (specifics unknown) with longer hospital stays (specifics unknown) will be associated with increased healthcare costs (specific costs unknown)	
Anticipated Project Expenses	In dollars, to the extent possible and appropriate	Staff costs	80 man-hrs x \$30/hr = \$2,400
Benefits to Customers	Who are the internal and/or external customers that may benefit? What can be measured that reflects how well or efficiently their needs or expectations are being met? What changes in that measure(s) are projected from this project?	<p>Customer: patient Need/Expectation: survival Measure: percent survival 30 days post-onset Projected Change: improve percent survival 30 days postevent (unknown amount)</p> <p>Customer: patient Need/Expectation: reduce cost Measure: total cost of hospital stay Projected Change: reduce cost (unknown amount)</p>	
Other Justifications	Any other reasons why this project should be approved	Will help receiving hospitals improve their aspirin compliance rate on Joint Commission/CMS Core Measures for AMI	
Proposed Team Members	Names and titles of proposed team members. Also include organization name if external to the department.	EMS quality manager (team leader) CCU nurse Field paramedic Field EMT ED nurse	
Projected Schedule	Give the key milestones/dates	Projected Start Date	March 1
	D – Define	Define Phase Completion	Week 2
	M - Measure	Measure Phase Completion	Week 8
	A – Analyze	Analyze Phase Completion	Week 10

THE DMAIC METHOD--"DEFINE" PHASE

	I - Improvement	Improve Phase Completion	Week 16
	C- Control	Control Phase Completion	Week 18
Anticipated Deliverables	M - Measure	<ul style="list-style-type: none"> • Baseline on current aspiring compliance rate • SIPOC • Process flow chart with details on aspirin administration steps 	
	A – Analyze	<ul style="list-style-type: none"> • Cause and effect chart for missed field aspirin dose • Item counts and Pareto analysis on items in cause and effect diagrams 	
	I – Improve	<ul style="list-style-type: none"> • Summaries of all attempted changes to improve aspirin compliance rate 	
	C – Control	<ul style="list-style-type: none"> • Summary of process to be used for ongoing monitoring of aspirin compliance performance indicator • Summary of contingency plans in case of deterioration in compliance rate • Summary of contents placed into the project archive 	
Other Support Required	Data access, equipment, etc.	<ul style="list-style-type: none"> • 30-day survival rate data from hospital • Length and cost of stay data from hospital 	
Review Status		<p>Submission Date: February 7, 2010</p> <p>Initial Review Date: February 14, 2010</p> <p>Initial Review Status: <u>Yes</u> No To Be Reconsidered</p> <p>Reconsideration Date:</p> <p>Final Review Status: Yes No To Be Reconsidered in Future</p>	
Signature	To be signed by a Senior Management Council representative upon determination of final review status	<p>X _____</p> <p>Printed Name and Title:</p> <p>Date:</p>	

UNIT 8: THE DMAIC METHOD--"MEASURE" PHASE

TERMINAL OBJECTIVE

The students will be able to document a current process.

ENABLING OBJECTIVES

The students will:

- 1. Identify customer needs.*
 - 2. Build a SIPOC diagram.*
 - 3. Build a value stream timeline.*
 - 4. Build a process performance indicator.*
 - 5. Interpret a statistical process control chart.*
-

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MEASURE PHASE OVERVIEW

The measure phase focus in on getting a good baseline on the current structure and performance level of the process(es) to be improved. Without a good baseline, efforts to determine what impact any change actually makes in the improve phase will be seriously undermined.

GET A BASELINE ON CUSTOMER NEEDS

"Customers" in this context are those who use the output of a process. Internal customers are those inside your organization. External customers are those outside your organization. The ultimate customers are the external customers for whom the process ultimately exists to serve.

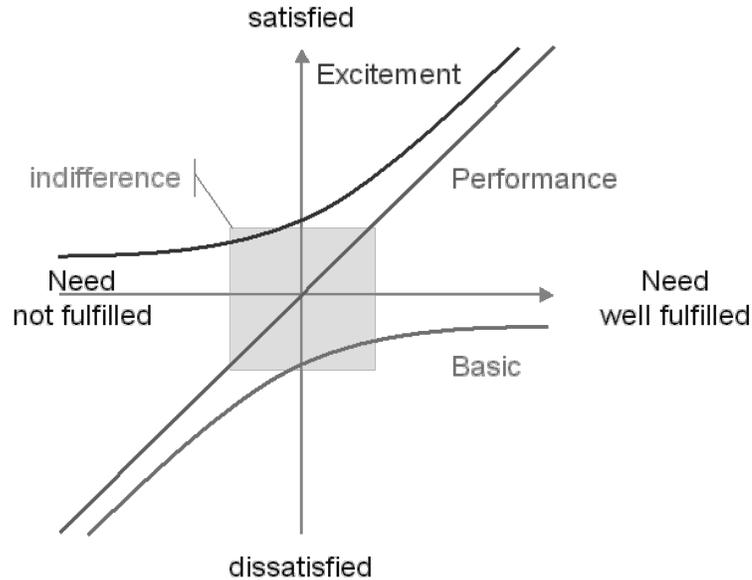
Example: FD/9-1-1 dispatcher.

- Internal customer--Fire first-response crew that gets the call.
- External customer--Ambulance service dispatcher who gets information that is passed along to allow ambulance to be dispatched.
- Ultimate customer--Patient.

You can identify customer needs by listening to the "voice of the customer". Needs are something the customer must have in order to meet their objective. Expectations are more than a need, it is something the customer expects to get and without which they will be unsatisfied. Desires are more than expectations, something extra they would **like** to have. An unrecognized desire is something that the customer is unaware of that may make their objectives easier for them to meet.

The Kano Model

The Kano Model of customer needs characterizes a product or service by three categories, according to the way the product or service satisfies a customer.



(Wikipedia contributors, "Kano model," *Wikipedia, The Free Encyclopedia*, http://en.wikipedia.org/w/index.php?title=Kano_model&oldid=401155434 (accessed December 10, 2010).)

A product or service has attributes that satisfy customer wants and needs. These attributes are categorized into:

- basic
- performance
- excitement

Basic attributes are "either/or" attributes. Basic needs are either met or are not met by the EMS service. When basic needs are not fulfilled, the customer will be dissatisfied; however, when basic needs are fulfilled, the customer is indifferent rather than satisfied, since basic needs are expected by the customer. Two examples of "basic" EMS service attributes are "don't drop the patient" and "get the patient to the hospital on time".

Performance attributes follow a continuum. As performance attributes improve, the customer is increasingly satisfied. An example of a "performance" EMS service attribute is "the fewer needle sticks, the less discomfort/dissatisfaction".

Excitement attributes are the "wow" factors. These are analogous to the "unrecognized desires" mentioned earlier. "Excitement" EMS service attributes are used to help the customer discover needs that they've never thought about before, and which, once discovered, may trigger additional wants and needs.

Kano's model also states that the attributes of a product or service which offer the "performance" and "excitement" values are also those that a customer becomes indifferent to over time, as they come to expect them with continued delivery of the same service. Over time, the current level of service becomes the status quo. This illustrates an important concept for quality improvement, which is that continual improvement and innovation are necessary to keep customers happy.

Data Collection

One-on-One Interview

- direct conversation about what they need, expect, desire from your process;
- ask about the processes they use your process output for; and
- ask how they use the output from your process--get details.

Surveys

- multiple perspectives and user types; and
- face-to-face interview, telephone, email, web form.

Focus Groups

- Small group.
- Facilitator-led.
- Interaction among participants can be helpful.
- Nominal Group Technique can be used to develop consensus.

Process Visitation

- Directly observe how they use your process output. Look for ways to add value beyond what your process does now.
- Quantify--How much and at what time do they need, expect, desire the process output?
- Format--In what format does the customer need, expect, or desire the process output?

Critical-to-Quality (CTQ) Factors

What are those few key factors that are most important to the customer?

This decision is based on what you learn about the customer and how they use your process output, and becomes the basis for building the primary set of (the most important) performance indicators.

Examples of CTQ factors:

1. Process: burn care.
 - a. Customer: burn patient.
 - b. CTQ: pain relief.
2. Process: emergency response.
 - a. Customer: emergency vehicle operator.
 - b. CTQ: incident address and map book page.
3. Process: hiring firefighters.
 - a. Customer: operations chief.
 - b. CTQ: long-term employee retention.

Activity 8.1

Voice of the Customer Analysis--Nominal Group Technique

Purpose

To conduct a Voice of the Customer (VOC) Analysis using the NGT.

Directions

The Instructor will divide the class into two groups.

- Group 1: Former patients who have suffered a broken hip and were cared for by EMS.
- Group 2: Spouses of the patients.

List all of the things EMS should do during its response and care for you or your loved one who has suffered a broken hip. List as many items as you wish. Make a second column if you have more than 10 items. Use the back of the sheet if you need even more space to write.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

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GET A BASELINE ON PROCESS STRUCTURE.

All the following tools can be used, and each provides different information about the process structure.

- SIPOC diagram;
- process flow diagram; and
- value stream timeline.

SIPOC Diagram

It is important to understand what the process does, who benefits from it, and who makes it possible.

- supplier--The person, group, or organization that provides something needed by the process;
- inputs--The item or service that the supplier provides to the process;
- process--the activity that creates something needed by the customer of the process;
- outputs--the item or service generated by the process; and
- customer--the person, group or organization that uses the output of the process.

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Activity 8.2

Build a SIPOC Diagram

Purpose

To build a SIPOC diagram.

Directions

1. The instructor will divide the class into four groups:
 - a. Group 1: Clinical--CPR guideline changes; Process: Teaching new CPR guidelines to firefighters.
 - b. Group 2: Administrative--promotional processes; Process: Interview panel process.
 - c. Group 3: Prevention--drowning; Process: Educating pool owners about ways to prevent pediatric drowning..
 - d. Group 4: MCI, Disaster/Terrorism--transport/surge capacity for explosion. Process: Immediate distribution of patients to multiple hospitals in a suburban community where an explosion has occurred.
2. On the easel pad sheet, model the diagram on the following page for your particular group's process.

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Activity 8.2 (cont'd)

Build a SIPOC Diagram

C Customer	
O Outputs	
P Process	
I Inputs	
S Suppliers	

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GET A BASELINE ON PROCESS STRUCTURE--PROCESS FLOW ANALYSIS

Step-By-Step Sequence of Steps in a Process

- Circle = A circle starts the diagram and contains a concise written description of a starting point or situation.
- Squares = Steps.
- Diamond = Decision points that break into branches or loops.
- Octagon = Stop points.

Value Stream Timeline Diagram

The purpose is to point out when and where there are times when value is not being added to the process. This identifies where improvements could be made in terms of time to complete the process.

The Value Stream Timeline Diagram maps out the sequence of steps in a process, separating those that add value from those that do not. Through the Value Stream Timeline you can add labels for how long each step takes, totals up the value-added time; nonvalue-added (delay or waste) time; total the process time, and calculates the percent of nonvalue-added time.

How much time is spent adding value versus nonvalue-added time?

This tool provides the opportunity to reduce waste and delays.

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Activity 8.3

Build a Value Stream Timeline Diagram

Purpose

To build a Value Stream Timeline Diagram.

Directions

1. You will divide up into four groups:
 - a. Group 1: Clinical--CPR guideline changes; Process: Teaching new CPR guidelines to firefighters.
 - b. Group 2: Administrative--promotional processes; Process: Interview panel process.
 - c. Group 3: Prevention--drowning; Process: Educating pool owners about ways to prevent pediatric drowning..
 - d. Group 4: MCI, Disaster/Terrorism--transport/surge capacity for explosion. Process: Immediate distribution of patients to multiple hospitals in a suburban community where an explosion incident has occurred.
2. On the easel pad, model the diagram on the following page with your group's process. Speculate on the steps and times based on your experience and imagination.

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GET A BASELINE ON PROCESS PERFORMANCE LEVEL--PERFORMANCE INDICATORS

Performance indicators are measurable items that reflect on the level of success that a process has in meeting customer needs. There are two aspects of performance to measure and monitor How **well** does it meet customer needs?--This is an expression for **quality**. How **efficiently** does it meet customer needs?--This is an expression for **cost**. The combined impact of quality and cost is value.

Two processes could have the same performance in terms of quality but one may offer better value. For example, two systems with same survival rates may differ in how much they spend to achieve the same results. The system with the lower cost and same quality offers better value.

Building a Performance Indicator

To build a performance indicator the first step is to identify a customer need and then find something measureable that varies directly with the success (quality or cost) of the process in meeting a customer need.

Inclusion criteria specify what instances to include in the measurements. For example, to measure emergency response intervals include instances where the response was originally dispatched as an emergency (lights and sirens) response.

Instances to exclude are called exclusion criteria. Exclude instances where the response was cancelled prior to arrival at scene or downgraded from emergency to nonemergency after initial dispatch.

Building the indicator formula may require a calculation.

Example: Average Response Interval= (sum of intervals for all responses*)/# responses.*

* The responses that meet an inclusion criteria and do not meet any exclusion criteria.

Example: Percent Compliant with Target Response Interval.

- Numerator: # responses in the denominator that had response intervals equal to or less than the target response interval.
- Denominator: # responses.*

Determine what pieces of data are needed. Think in terms of raw (unprocessed) data. You will usually have to do the processing yourself. Don't forget the information needed to apply the inclusion and exclusion criteria.

Example: Response interval:

- date and time call received;
- date and time unit arrived on-scene;

- dispatch mode code (Emergency--y/n);
- cancellation en route code (y/n); and
- upgrade/downgrade code (upgrade--y/n; downgrade--y/n).

Specify where and when each piece of data should be collected and in what format.

Example: Response interval:

- source: Fire CAD; and
- when: 3 a.m. for the previous day's responses.

Specify how to move data from the source to where you will perform any calculations or store them. Will it be an automated procedure that runs each night and then sends the results to a specified server location and with a data code for the file name, or manual collection of data?

Specify how often to calculate the indicator.

Monthly may not always be the best timeframe. How quickly do you need to be able to react to changes or problems with corrective actions?

- response interval problems--daily;
- within a few hours in busier systems; and
- employee turn-over rate problems--monthly.

You will need enough data points to be statistically workable. Generally, try to have at least 25 for any calculation. For infrequent or rare events there will be a longer timeframe between calculations. Use the most recent set of 25 instances. Wait until you have data from 25 events before you make the first calculation.

Make the next calculation when the 26th event occurs, with the most recent 25 values (event 2 through 26). Make the next calculation when the 27th event occurs, using events 3 through 27. And so on...

Activity 8.4

Build a Performance Indicator

Purpose

To develop measures of how well needs are being met.

Directions

1. The instructor will divide the class into four groups:
 - a. Group 1: Clinical--CPR guideline changes; Process: Teaching new CPR guidelines to firefighters.
 - b. Group 2: Administrative--promotional processes; Process: Interview panel process.
 - c. Group 3: Prevention--drowning; Process: Educating pool owners about ways to prevent pediatric drowning..
 - d. Group 4: MCI, Disaster/Terrorism--transport/surge capacity for explosion. Process: Immediate distribution of patients to multiple hospitals in a suburban community where an explosion incident has occurred.
2. On the easel pad sheet, model the diagram on the following page for your particular group's process. For this exercise and the evening assignment, you need to fill in only the essential fields designated in **boldface**.

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Activity 8.4 (cont'd)

Performance Indicator Worksheet

1.	Indicator ID	
2.	Question (e.g. What percentage of patients survive cardiac arrest?)	
3.	Indicator Name (e.g., cardiac arrest survival rate)	
4.	Key Process Path e.g., Clinical > Cardiac > Resuscitation	
5.	Patient or Customer/Need (e.g., patient/survival)	
6.	Type of Measure	
7.	Objective	
8.	Indicator Formula (e.g., (# survivors/# resuscitations attempted)*100).	
9.	Indicator Formula Description (e.g., percent of patients who survived to hospital discharge out of the total number of patients who had a resuscitation attempt)	
10.	Denominator Description (e.g., patients who received resuscitation efforts from EMS)	
10.a	Denominator Inclusion Criteria (e.g., patients who received defibrillation and/or chest compressions from EMS personnel)	
10.b	Denominator Exclusion Criteria (e.g., patients being cared for in a declared multicasualty or disaster incident)	

THE DMAIC METHOD--"MEASURE" PHASE

10.c	Denominator Data Sources	
11.	Numerator Description (e.g., patients who survived to be discharged from the hospital)	
11.a	Numerator Inclusion Criteria (e.g., patients who survived to be discharged from the hospital)	
11.b	Numerator Exclusion Criteria (e.g., patients who were transferred from one hospital to another and did not survive to discharge from their last hospital)	
11.c	Numerator Data Sources	
12.	Sampling Allowed	
13.	Sampling Description	
14.	Minimum Number of Data Points	
15.	Suggest Reporting Format: Numerical	
16.	Suggest Reporting Format: Graphical	
17.	Suggest Reporting Frequency	
18.	Testing	
19.	Stratification	
20.	Stratification Options	
21.	Current Development Status	
22.	Additional Information	
23.	References	
24.	Contributors	

GET A BASELINE ON PROCESS PERFORMANCE--INTERPRETING PERFORMANCE INDICATOR RESULTS

All process results have variation. There are two general types of variations, common cause variations which are expected to occur with normal operation of the process and random.

Special Cause Variation

Special cause variation is the result of assignable causes not associated with normal operation of the process.

It is nonrandom. If "unfavorable" special cause variations are present, intervene to prevent or mitigate future instances. If "favorable" special cause variations, seek ways to have them become a "normal" part of process operations. If there are no special cause variations, decide if the process is performing at an acceptable level. If so, leave it alone. If not, redesign the process to become capable of a higher performance level.

Statistical Process Control Charts

Statistical process control charts are used to differentiate between common and special cause variation. It is important to be able to tell the difference because remedies for problems due to special cause variation are different from remedies to problems with only common cause variation. Applying the wrong type of "remedy" often makes the performance worse. For example: One person did not receive proper training on how to perform a task. This is a special cause variation.

Making a supervisor review the item each time the task is performed assumes that everyone has the same training problem (common cause variation from poor training process design). This slows down the process and increases cost. Special cause remedy would focus on the source of that particular special cause--i.e., training for that individual.

Statistical process control chart is designed to detect statistical "signals" of nonrandom process behavior (i.e., special cause variation). There are several types of charts. Choose the type to use based on several factors such as data type, data sampling method, etc.

Use of wrong type of chart can give incorrect results.

Statistical Process Control Chart Format

Basic structure includes

- Centerline (representing the average \bar{X} or \bar{X} bar).
- Upper control limit (UCL) (generally, it is the average plus three times the standard deviation above the average).

- Lower control limit (LCL) (generally, it is the average minus three times the standard deviations).

The SPC chart usually includes lines corresponding to one and two standard deviations above and below the average. This allows for more detailed analysis.

These standard deviation lines create three zones that are used in the detection of statistical signals of special cause variation. Control chart is designed to reveal statistical signals that suggest special cause variation is taking place. Several common examples of statistical signals suggesting special cause variation on a statistical process control chart. You do not have to memorize these. Software is usually used to both generate and interpret the SPC chart, but it is important to be familiar in principle with what the software is looking for.

This is the only type of statistical signal that is valid with data collected at the same time or from unrelated sources, where the sequence of data points has no importance.

TOLL GATE REVIEW SESSION

Needs of the process customer(s) have been documented through one of more Voice of the Customer studies.

Baseline on process structure has been documented using one or more analyses that may include SIPOC diagrams, value stream timelines and process flow diagrams.

Baseline on process performance has been documented using performance indicators and statistical process control charting.

Now it is time to report back to the senior management team in a "Toll Gate" review session for the measure phase.

What was learned?

Does the charter need to be modified?

Is there continued support for moving the project into the Analyze phase? If yes, the team will move along into the analyze phase.

UNIT 9: THE DMAIC METHOD-- "ANALYZE" PHASE

TERMINAL OBJECTIVE

The students will be able to analyze factors that affect output.

ENABLING OBJECTIVES

The students will:

- 1. Identify all factors that have an impact on performance.*
 - 2. Determine primary factors.*
 - 3. Create scatter plots.*
 - 4. Build a Pareto diagram.*
 - 5. Build a cause-and-effect diagram.*
-

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IDENTIFY PERFORMANCE FACTORS: THINGS THAT INFLUENCE THE LEVEL OF PROCESS PERFORMANCE

"Critical to Quality"

What are those few key factors that are most important to the customer? These are the CTQs. In the measure phase, we built performance indicators that measured how well and how efficiently we were achieving the CTQs.

Many factors influence performance in achieving the CTQs. The performance you get from your process is a results of the combined impact of these "performance" factors. The challenge is to determine what those performance factors are and then to determine which of those are most important. That's what the analyze phase is all about.

Connecting VOC, CTQ, Performance Indicators and Performance Factors

You should be able to make a clear connection between the problem or opportunity you began with and the performance factors you are now considering. In an earlier example, we talked about the problem of not giving aspirin as often as we should to patients who may be having a heart attack. Let's follow the connection between that problem and the performance factors we will be exploring in the analyze phase:

1. Problem > Associated process.
Poor aspirin compliance > Chest pain protocol.
2. Process > Process customer.
Chest pain protocol > Chest pain patient.
3. Customer > VOC studies.
Chest pain patient > Focus groups, surveys, etc.
4. VOC studies > CTQs.
Focus group, etc. results > Correct treatment.
5. CTQs > Performance indicators.
Correct treatment > Treatment protocol compliance (aspirin).
6. Performance indicators > Performance factors.
Aspirin compliance > To be determined in analyze phase.

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Activity 9.1

What Will Affect the Measure of CTQ?

Purpose

To understand and apply the concept of Critical to Quality.

Directions

1. You will work in your groups to build a list of CTQs for the output of a process relevant to your group.
2. You then will pick one of those CTQs for the second part of the exercise, where you will list out factors that influence how well (quality) the CTQs are achieved.
3. Have someone from your table group briefly share who the customers were for your group's topic. Briefly explain what factors you identified that influence the performance of one of those CTQs. You will have no more than 3 minutes to present.

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WHY IS THE PROCESS FAILING TO ACHIEVE THE DESIRED LEVEL OF PERFORMANCE?

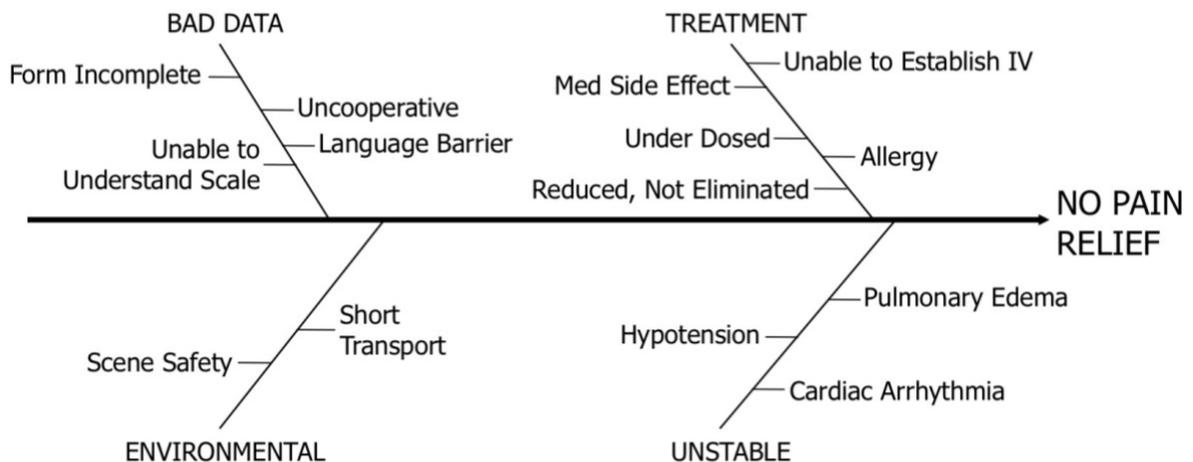
Several things may limit performance of a process. These fall into two broad categories: errors, which are events where the process design was not followed, and failure from process design Limitations. These failures are events where a process failed to meet a customer need despite an absence of errors. For these kinds of issues, the process needs to be redesigned to become more capable of meeting customer needs.

CAUSE-AND-EFFECT DIAGRAM

A cause-and-effect diagram is a powerful visual tool for indentifying the causes for errors and/or design failures. The horizontal line running across the diagram is the spine. It points to the problem (a.k.a. fishbone diagram; Ishikawa diagram) we are trying to identify causes. The angled lines extending up and down from the spine are the ribs. They identify categories to think of when listing out the potential causes.

Some commonly used categories used include the following, but it is perfectly OK to come up with your own categories based on the nature of the problem. These are there just to help organize and trigger your thoughts about possible causes:

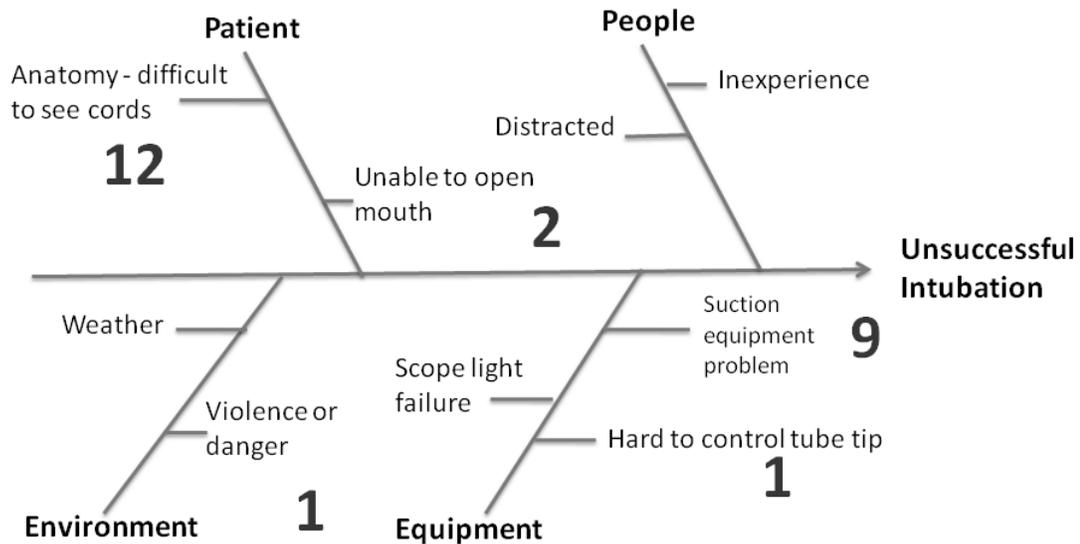
- machines/equipment;
- materials;
- method/process;
- people;
- environment/surroundings;
- financial; and
- management.



Error Item Counts

After the cause-and-effect diagram is built, count how often each item occurs on the diagram. Create tally sheets, paper worksheets, where each error item is listed next to a space where hash marks can be made each time it occurs, or that manual review of records show an occurrence.

Unsuccessful Intubations



PARETO ANALYSIS

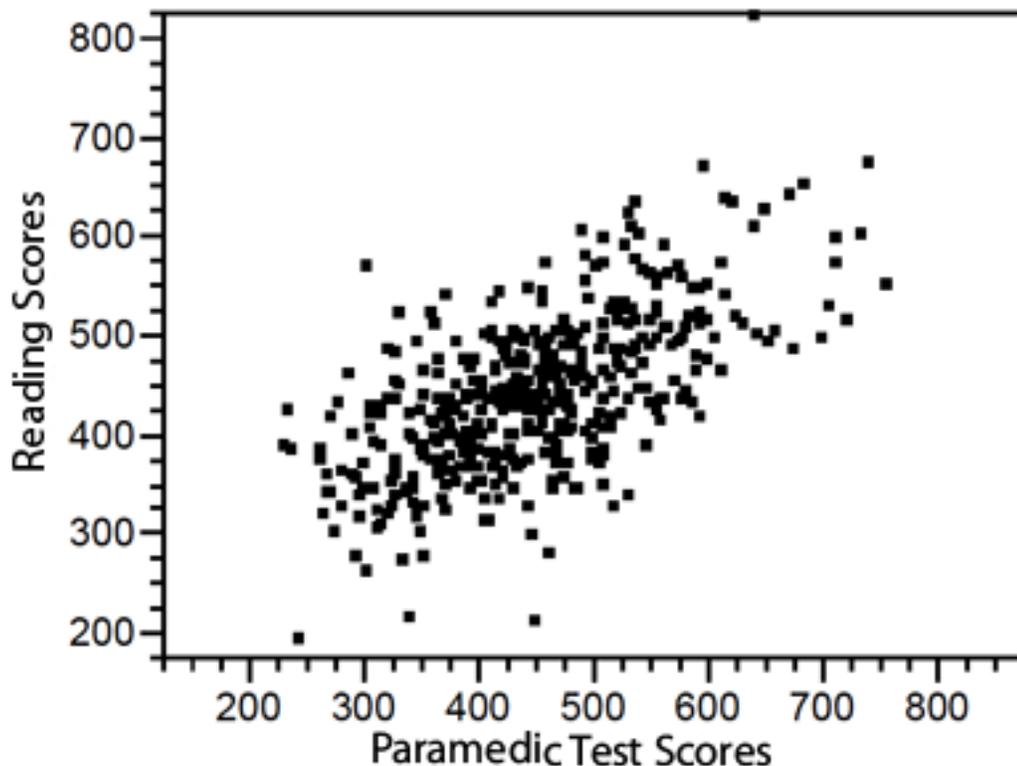
The Pareto Principle--A "general" observation about process behavior that suggests in most processes, 80 percent of the errors are caused by 20 percent of the potential causes. Pareto analysis seeks to identify the "vital few" causes to focus correction efforts, rather than diluting efforts trying to fix the "trivial many". The Pareto analysis is embodied in the creation of a Pareto Chart. It graphically presents the relative frequencies of the errors or limiting factors and what the cumulative percentages are as the factors are added together. One event (e.g., unsuccessful intubation) potentially can have more than one factor contributing to the result (e.g., unable to visualize cord **and** problem controlling direction of tube tip on the same intubation attempt).

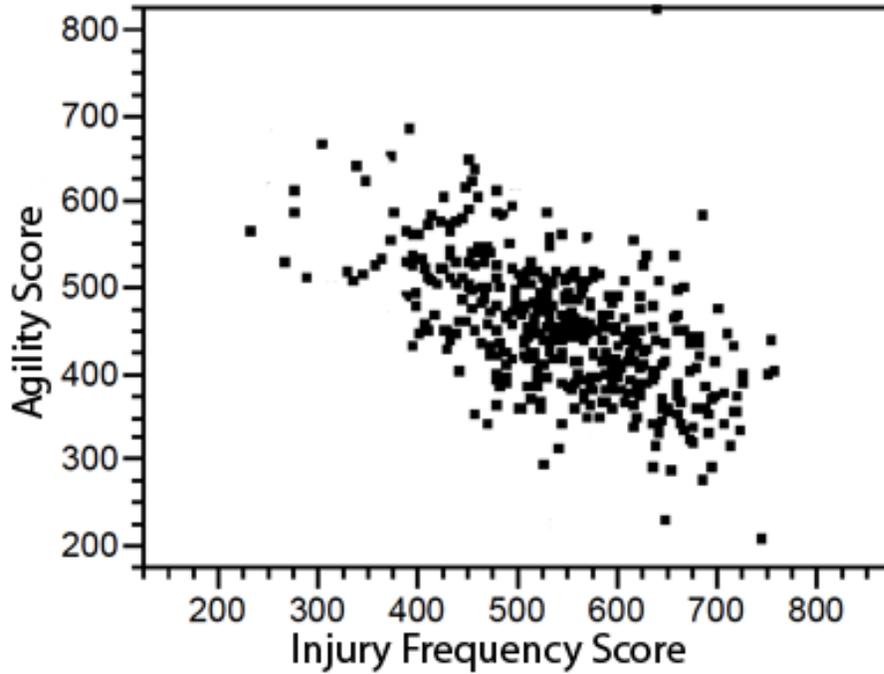
CORRELATION

The cause-and-effect diagram usually identifies performance factors based on opinion. You might think that weather has a big impact on turnout time intervals and include it on a cause-and-effect diagram. In contrast, correlation looks for relationships between performance factors and performance indicator results in a more objective manner. Both are good tools. They can be used independently or in conjunction with each other. Think of correlation as another way to look for potential causes of errors or process design failures.

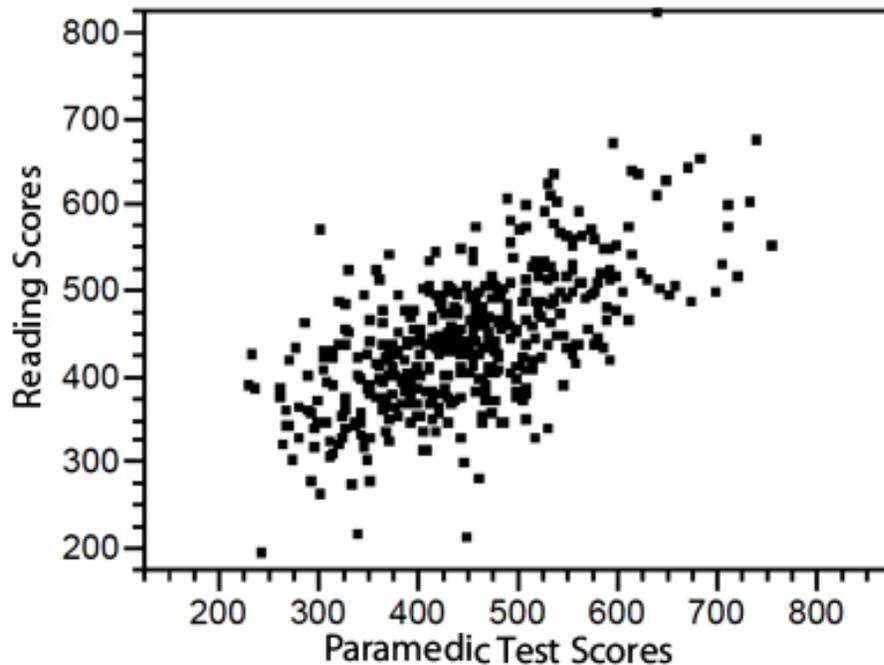
In the cause-and-effect diagram and Pareto diagram exercises, we were thinking about factors that may be causing errors or limiting the performance of our process. If the prevalence of one of those factors did have a relationship with the prevalence of the error or level of process performance, we would expect that the more often the factor occurs, the more often the error would occur, or that the effect on the performance indicator or CTQ would become more noticeable.

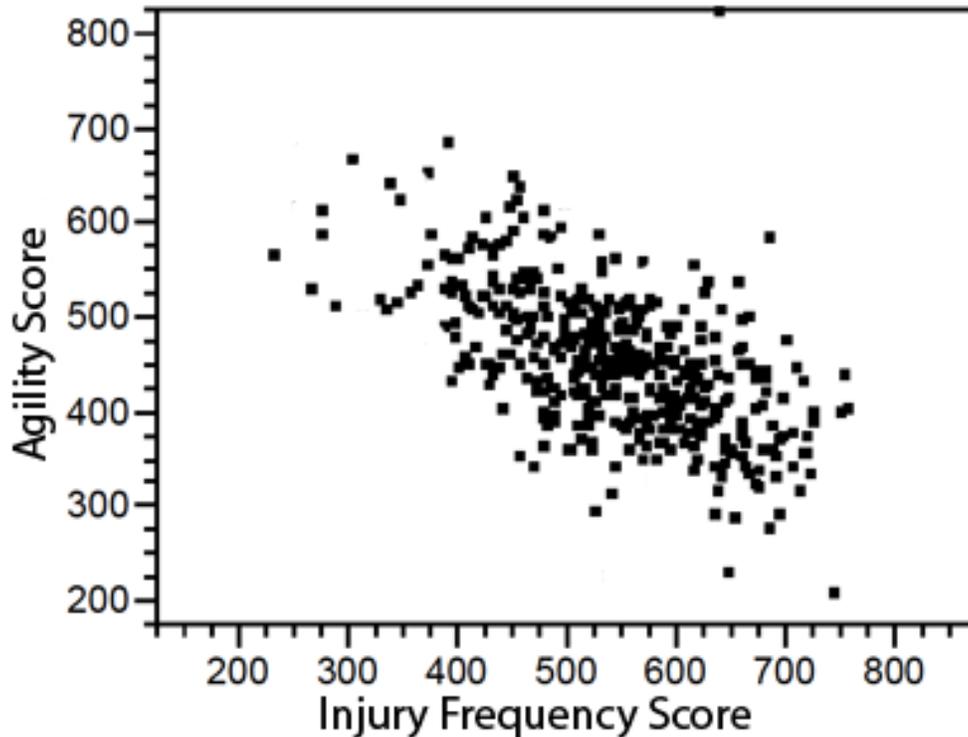
We can check for a relationship between the factor and the performance indicator visually using scatterplots. They are useful visual tools to look for correlations between a factor and a performance indicator. The following scatterplot example is of paramedic student reading level and State paramedic exam scores. Example of positive correlation--the larger the value of the factor, the larger the value of the performance indicator.





Correlation could be just coincidence. If most survivors from heart attacks have birthdates on odd numbered dates, would people with even numbered birthdates have a lesser chance for survival from heart attack? If most murderers eat ice cream, would eating more ice cream make someone more likely to become a murderer? Understanding a process is necessary to appreciate where logical connections between cause and effect may, or may not, exist.





STRATIFICATION

Sometimes, the relationships between performance factors and performance indicators may not be apparent. It may be buried within a larger data set. One way to tease it out is with stratification.

Example: Data for all responses out of Station 66 show that the average turnout time intervals are poor. But, when the data are stratified by shift, B Shift is the exception with very good turnout time intervals.

Example: Survival rates for cardiac arrest victims who received a resuscitation attempt by EMS were only 4.37 percent. However, when the data were stratified by presenting rhythm, and if patient collapse was witnessed, the combination of ventricular fibrillation as the presenting rhythm with a witnessed onset was much higher at 37.3 percent.

Think of characteristics that may influence results and try stratifying to uncover hidden information.

SUMMARY

Picking the best factors for potential improvement efforts.

The measure phase first tries to identify the factors that have the most impact on the performance of the process. The process improvement team needs to know what these factors are before moving to the improvement phase. The cause-and-effect diagrams, Pareto analysis, and scatterplots have insights on what those factors are most likely to be. That is where your efforts are most likely to yield the best results when you go into the improve phase.

UNIT 10: THE DMAIC METHOD--"IMPROVE" PHASE

TERMINAL OBJECTIVE

The students will be able to test an improvement intervention.

ENABLING OBJECTIVES

The students will:

- 1. Apply the basic principles of the scientific method to test changes.*
 - 2. Identify an appropriate experimental design to test an improvement intervention.*
 - 3. Determine when to use pilot testing as part of an improvement intervention.*
 - 4. Evaluate results of an improvement intervention to determine if it was effective.*
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THE DMAIC PROCESS--WHAT WE'VE COVERED SO FAR

Leading up to this point, you have clearly defined the process to be improved, clearly defined the customer(s) of that process, clearly defined their needs, made an improvement project proposal to senior management that clearly defined what the project was intended to provide in terms of a return on investment, measured how the process currently operates, and measured the current level of performance.

The analyze phase gave suggestions on what performance factors have the most influence on the results of a process. Early on, there should be a strong bias toward selection of performance factors to change that are simpler, faster and less expensive to change. Early on in your development of performance improvement skills using the DMAIC process, you want to learn the "process" of making improvements--the sequence of steps, the tools, the analytical techniques. Learn to crawl before you walk and walk before you run.

OVERVIEW OF THE IMPROVE PHASE

Taking into consideration all you have learned about the process up to this point in this phase you come up with ideas for what to change in an effort to measurably improve process performance.

Here you will test those ideas objectively. You will keep what works and discard what does not. It may take many tries--but that's OK. That's part of the journey in performance improvement.

If the change did not yield the desired results, consider other ways to look at and test the data. Add another component to the change and re-evaluate. Try a different intervention. Try a different factor to change. Keep trying until we get the results we are looking for or it is determined that continuing will expend more time, money, and efforts than continuing on is worth at that point.

However, if the intervention yielded the desired level results, we are ready to move into the control phase. Now let's get into the details of these steps in the improve phase.

INTERVENTIONS

During the analyze phase, you learned what performance factors seemed to have the most influence on those things that mattered most to customers--the CTQs. That's a great place to get ideas for what to change to improve process performance.

Which performance factors have the most impact? This was suggested by the Pareto charts and scatterplots. Of those, which performance factors can you influence? Which performance factors are simple to change? Which performance factors are inexpensive to change? Which performance factors are fast to change?

Once you have an idea of what performance factor you want to change, you will need to come up with ideas for how to change it--a performance improvement intervention. Like the triage of performance factors to change, triage of ideas for interventions to make should be biased towards simple, fast, and less expensive methods--especially early on. Once you know what performance factor you are going to change and what intervention to make, you will be ready to implement a change!

Categories of Interventions.

- engineering controls;
- behavior interventions;
 - training and education; and
 - enforcement;
- economic incentives; and
- cultural change.

Relating Performance Improvement to the Scientific Method

Making a performance improvement interventions and objectively testing if they were effective is a working example of using the scientific method. The process of planning and implementing performance improvement initiatives is essentially the same process used for designing and conducting scientific experiments.

- Process intervention = hypothesis.
- Performance factor that is changed = independent variable.
- Performance indicator = dependent variable.

These terms will be mingled together throughout the rest of this course. The ideas will be expanded upon later on in this unit.

ERROR-PROOFING

If the performance factor to change (hypothesis) revolves around preventing errors, there is a collection of ideas, tools, and techniques called error-proofing that can the source of many ideas. Error-proofing is a systematic approach to reducing the frequency and impact of process errors. Everyone makes errors--"To err is human". Counseling and remediating people to be more careful is a temporary remedy, at best.

Modes of Error-Proofing

Losses as a result of potential or actual errors are smallest with the first item on this list and get progressively larger with each subsequent item.

- elimination
- replacement
- facilitation
- detection
- mitigation

The first three modes of error-proofing--elimination, replacement, and facilitation--are ways to prevent human errors. The last two modes of error-proofing--detection and mitigation--are ways to minimize the negative effect of errors.

Ways to Minimize the Negative Impact of Errors

Detection--Make sure that errors are detected as soon as possible.

Mitigation--Reduce consequences of errors.

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Activity 10.1

Identify a Process for Improvement Using the Five Areas of Error-Proofing

Purpose

To apply the principles of error-proofing.

Directions

1. Working in table groups, apply error-proofing techniques to come up with ideas to address the following problems:
 - a. Group 1: Support-services-related error--items missing and incorrect in station supply order deliveries.
 - b. Group 2: Administrative error--paper PCRs filed incorrectly into file cabinets.
 - c. Group 3: Prevention-related error--registration database for CPR and first aid classes have incorrect information.
 - d. Group 4: MCI/disaster-preparedness-related error--incorrect initial triage category assignments.
2. Using each of the five areas of error-proofing, develop a list of ideas for process improvements to prevent the error and ways to minimize the impact of any errors that still might occur.
3. Have someone from your group share a summary of your ideas with the rest of the class.
4. The problem and error-proofing ideas you came up with may be very helpful to other students. Please share your worksheet with others via photocopies, thumb drives, etc.

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PROCESS REDESIGN

If a process is underperforming and the reasons are not due to errors, increasing performance will require changes to the process itself. This is the usual situation when an underperforming process only shows common cause variation. Sometimes, the current process is just not capable of desired performance level--despite not having any "errors". Supersonic flight is not possible with a propeller-driven aircraft. It required an entirely different process design for aircraft propulsion. Process redesign often requires considerable creativity to come up with new ideas on how to do thing differently and thereby become capable of higher performance levels.

Sometimes, people get stuck--they have trouble thinking in ways that are different from the current and well-established ways. Here are some ideas to try to bring in a fresh perspective.

Brainstorming with the Nominal Group Technique

1. A moderator facilitates the session--does not contribute their own ideas.
2. Each person writes down their ideas for changes to try to improve performance anonymously on a sheet of paper.
3. Papers are collected.
4. Moderator reads them aloud and someone writes them down, numbered sequentially, on easel pad papers. Start a new easel pad sheet as often as needed. Tape sheets up on the wall.
5. After all items are written onto easel pads, the group works through the facilitator to clarify what each means and combine duplicates or near duplicates.
6. Each person is given three votes to use as a means of indicating which idea they think should be tried. Votes are made anonymously on three slips of paper (to help preserve anonymity).
7. Each item getting a vote gets a hash mark on the easel pad list.
8. The top-ranked items are kept in the running. Items with no votes or very few votes are eliminated.
9. Discussion of the merits and problems of the items still in the running.
10. Conduct another round of voting.
11. Consider the top three items for implementation.
12. If more than one seems to offer strong merit, consider trying more than one idea using different pilot tests or a designed experiment.

6-5-3 Technique

1. Have six people each generate three ideas in 5 minutes.
2. Quickly read each idea aloud to group at the end of the 5 minutes.
3. Having heard the other ideas, repeat steps one and two.
4. Repeat this 5-minute cycle six times (30 minutes).
5. This process yields 108 ideas in 30 minutes.

Random Word Technique

1. Helpful to use when the group seems to be getting stuck on finding new ideas or is not being very creative or innovative in idea generation.
2. Choose a random word or phrase.
3. Each participant is asked to come up with an idea based on the random word, phrase, or sentence.
4. Random word, phrase, or sentence may come from flipping through a dictionary or encyclopedia or other book.
5. Try a random word/phrase generators.

<http://watch4snakes.com/CreativityTools/RandomWord/RandomWord.aspx>

<http://watch4snakes.com/CreativityTools/RandomWord/RandomPhrase.aspx>

<http://watch4snakes.com/CreativityTools/RandomSentence/RandomSentence.aspx>

Activity 10.3

Heat Exhaustion Scenario

Purpose

To analyze a scenario and recommend a policy.

Directions

Read this scenario and individually answer the questions that follow.

Scenario

Budget problems caused the Chief at the Lake Woebegon Fire Department to delay the start of several performance improvement projects until the new budget year, which began January 1. Last year, several firefighters were injured as a consequence of heat exhaustion. The chief wants something done to prevent or minimize the problem as soon as possible. The project charter was already approved, so the project was clear to begin on January 2.

The project team identified the CTQ for this project, from the perspective of the fire chief and the firefighters, as the reduction of heat exhaustion incidents. The performance indicator (dependent variable) for this study was the frequency of heat exhaustion incidents. The team got right to work and quickly worked through the define, measure, and analyze phases before Valentine Day! The team was ready to begin the improve phase with testing potential solutions to the heat exhaustion problem.

The team seriously considered five viable options for reducing the chances of heat exhaustion. The one thought to offer the most potential was a brand new product based on a textile and thermo-electronics device developed for NASA. It consists of a high-tech synthetic liner that attaches to an electronic device that dissipates heat out of a set of small exhaust hoses. The liner is worn underneath standard bunker gear and the small thin electronic dissipation device vents heat out four separate hoses. The hoses extend out the bottom, collar, or either sleeve of the bunker coat; and out either leg of the bunker pants. The cost of the system with the liner and electronic heat dissipation device is less than \$100 per firefighter. It is washable and reusable with a projected service life of 5 years.

The manufacturer, eager to make a sale and hoping to get a favorable article published in the fire trade magazines by the project team, has graciously agreed to provide the new equipment for your department to test over the next 3 months at no charge.

The project team gets everyone trained and equipped in just a couple of weeks. Data collection with the new gear began the second week of March. The sales rep for the manufacturer picked the gear up in mid-May, as another department was in line to test the equipment.

Data collection continued for another 3 months from mid-May through mid-August.

The data collected on each heat exhaustion incident included information about the types of activities that heat exhausted firefighters were engaged in during the hours and days prior to their heat exhaustion event.

Should the team recommend that a policy prohibiting or at least discouraging water skiing during the 48 hours prior to coming on duty? Why or why not?

How could the study be designed to eliminate or minimize the influence of ambient temperature so that the effect of use versus nonuse of the liner and heat dissipation system is the primary influence on the frequency of heat exhaustion incidents?

Are there any reasons why water skiing within 48 hrs prior to going on duty might lead to more frequent instances of heat exhaustion? (e.g., lactic acidosis may persist in the muscle tissues from strenuous exertion during water skiing).

APPLYING THE BASIC PRINCIPLES OF THE SCIENTIFIC METHOD TO TEST CHANGE IDEAS

Recall earlier in this unit when a connection between process performance improvement and the scientific method was made. We are going to expand on that here. A process design change is almost always made because the manager responsible for the process ('process owner') believes it will make the process "better" in terms of implicit "quality" or "cost" benefit. It should be treated as a hypothesis.

Use the scientific method to determine if it did or did not actually make a difference in process performance. Far too often, changes are made without a clear idea of what the problem or opportunity is, what the customer needs, what the performance is at baseline, what the performance is after the change, what the ROI was as a result of the change(s).

Far too often, product marketing and an institutional ego-driven pursuit of having the "latest" equipment, drugs, and protocols is reason why many purchases are made. Applying the ideas and tools from the improve phase will give you a way to test objectively if the changes you make to policies, procedures, equipment, protocols, etc., really made a difference--or not. Ideally, you and your organization will begin to approach the decision and execution of such changes using the whole DMAIC method.

STEPS in Scientific Method to Test Improvement Ideas

1. Identify the general problem/opportunity.
2. Identify the improvement intervention to try.
3. Define the specific aspect of the problem or opportunity associated with the idea (if applicable).
4. Select an appropriate dependent variable(s) (the CTQ; the performance indicator for that CTQ)--be as specific as possible.
5. Select the independent variables (performance factors that will be changed in an attempt to positively change the numbers in the performance indicator).
6. Select the type of experimental design to use.
7. Collect and Analyze data.

Example:

- General problem/opportunity: Improve process of care for STEMI patients in a BLS only system.
- Identify idea to try: Put 12-lead ECG capture and transmit technology on BLS first-response units.

- Define the "hypothesis" to be tested: Implementing 12-lead ECG capture/transmit technology on our BLS units system will reduce the EMS to balloon time interval compared to cases treated with our standard equipment and protocols.
- Define the specific aspect of the problem opportunity associated with your idea to try: Reduce the EMS patient contact to balloon time interval.
- Select the dependent variable(s) (e.g., EMS patient contact to balloon interval).
- Select the independent variables (performance factors that will be changed in an attempt to change): e.g., Use versus nonuse of 12-lead ECG capture and transmit technology by BLS crews.

Core of Scientific Method: Compare Experimental Group to Control Group

- Experimental group--the group (or group of instances) that uses the idea being tested.
- Control group--the group (or group of instances) that use the 'normal' way.

Compare the results from the experimental group to the control group. Look for statistically significant differences.

Confounding Variables

Confounding variables are factors that have a correlation to the problem under study, but does not have a cause-effect relationship. Design experiments in a way to reduce the potential for confounders to interfere with the project results.

Confounder (confounding variable) is a factor that is only coincidentally related to the outcome being studied; has no cause- effect relationship to the outcome.

Randomization is a commonly used method for reducing the potential effects of confounders and bias which makes the likelihood for confounding variables to be present in equal proportions in both the experiment and control groups.

Blinding makes it harder to intentionally or unintentionally influence which cases get assigned to the experimental or control groups. Subject and/or the investigator does not know which cases or instances are getting the control group or experimental group intervention.

Commonly Used Randomization and Blinding Methods

- Complete randomization--true random process assigns if particular case is in the control or experimental group (or which type of intervention in the experimental group).
- Even-odd days--control group intervention is used on day one and every other day thereafter.

- Unit assignment--control or experimental group assignments are randomly made based on station number, vehicle number, or similar method.
- Before and after studies--control group consists of cases or incidents occurring for a period of time followed by another period of time afterwards with cases where the experimental group.
- Single Blinding--the investigator knows, but the subject does not know, which subjects are assigned to the control or experimental group.
- Double-Blinding--neither the investigator or subject knows which subjects are assigned to the experimental or control groups.

PILOT STUDIES

Not always practical or appropriate to implement an unproven intervention across an entire organization. Pilot study is a test limited to a small manageable part of an organization. If results are positive, the intervention can be spread to more parts for a larger pilot test--or to the rest of the organization.

SINGLE AND MULTIPLE FACTOR TESTS

OFAT (One Factor at a Time)--one item tested at a time; easier to manage; longer to complete.

MFAT (Multiple Factors at a Time)--simultaneous testing of several factors at a time; more complex to manage; faster to complete.

Example: CTQ--survival; performance indicator = cardiac arrest survival to discharge rate.

Performance factors: epinephrine dose (0.5 mg or 3 mg); ventilation rate (6 or 12 bpm); manual or mechanical chest compressions

Epinephrine--Low Ventilate--Fast Compressions--Manual	Epinephrine--High Ventilate--Fast Compressions--Manual
Epinephrine--Low Ventilate--Fast Compressions--Mechanical	Epinephrine--High Ventilate--Fast Compressions--Mechanical
Epinephrine--Low Ventilate--Slow Compressions--Manual	Epinephrine--High Ventilate--Slow Compressions--Manual
Epinephrine--Low Ventilate--Slow Compressions--Mechanical	Epinephrine--High Ventilate--Slow Compressions--Mechanical

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Activity 10.4

Choose an Experimental Design

Purpose

To identify an appropriate experimental design to test an improvement intervention.

Directions

1. Working in table groups, decide how to approach the design of your process improvement intervention/ experiment based on the following intervention projects:
 - a. Group 1: Support-services-related intervention--reduce supply delivery errors to stations by redesigning the order form to include a checklist column for the person filling the order.
 - b. Group 2: Administrative-related intervention--preventing paper PCRs being misfiled into file cabinets by adding a field for last name in large letters at top of PCR.
 - c. Group 3: Prevention-related intervention--reduce symptom to 9-1-1 activation time interval by including a brochure in chest pain patient's discharge instructions from the Emergency Department advising when to call 9-1-1 if chest pain returns.
 - d. Group 4: MCI/Disaster-preparedness-related intervention--preventing incorrect initial triage category assignments by conducting a refresher training session on use of the triage category process.
2. Choose an experimental design that considers pilot testing; randomization and blinding; OFAT versus MFAT for each.
3. Explain your rationale for your choices
4. Pilot test (Y/N)?
5. Randomize? (Y/N) (if Y, how?)
6. Blinding? (Y/N) (if Y, how?)
7. OFAT or MFAT? Why? (RE: OFAT or MFAT)

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DATA COLLECTION AND ANALYSIS

Data Collection Forms

Your normal EMS patient care report may not have the data needed for the improvement project. You may need to consider

- Special fields added to an ePCR system. Many systems offer the option for adding new fields without software vendor assistance.
- Special data collection form (paper).

Data Analysis

There are many ways to compare control and experiment groups to test a hypothesis with different types of statistical tools. The details of these statistical tests are beyond the scope of this course. One of the tools taught in this course, the statistical process control chart, can be used to do a very basic test of a hypothesis.

Recall that when something unusual happens in a process, it will often generate a special cause "signal" on the SPC chart. When you make a change to a process, you are trying to "provoke" something unusual to happen in the performance of the process. Ideally, the change you provoke through your improvement intervention will make performance better--but it could also make it worse.

If a special cause signal is not provoked and sustained after implementing the intervention, the intervention probably did not have enough, if any, impact. Move on to try something else. If a special cause signal is provoked and sustained but is now worse, stop it and move on to try something else. If a special cause signal is provoked and sustained at a better level of performance, it is very likely that the hypothesis behind your intervention was true. You are ready to move into the 'control' phase.

TOLL GATE REVIEW--IMPROVE PHASE

Needs of the process customer(s) have been documented through one or more Voice of the Customer studies. Baseline on process structure has been documented using one or more analyses that may include SIPOC diagrams, value stream timelines and process flow diagrams. Baseline on process performance has been documented using performance indicators and statistical process control charting. Analyses to determine what factors are influencing process performance and what their relative impacts are has been completed. Interventions were made and test to see if they were effective. Once an effective solution was found, it is time to report back to the senior management team for another toll gate review session.

- What was learned?
- What interventions were attempted and what results did they yield?

- What will be needed to implement this solution across the entire department (if that is applicable)?
- Is there continued support for moving the project into the Control phase? If yes, the team will move ahead into the Control phase.

SUMMARY

- The DMAIC process--what we've covered so far.
- Changing process performance.
- Remedy errors: error proofing.
- Identifying a process for improvement using the five areas of error proofing.
- Process redesign.
- Improving an EMS customer experience.
- Applying the basic principles of the scientific method to test improvement ideas.
- Improving a CTQ using the scientific method.
- Pilot studies.
- Single and multiple factor tests.
- Choosing an experimental design.
- Data collection and analysis.

UNIT 11: THE DMAIC METHOD--"CONTROL" PHASE

TERMINAL OBJECTIVE

The student will be able to implement steps to monitor and maintain performance.

ENABLING OBJECTIVES

The students will:

- 1. Identify mechanisms for ongoing monitoring of performance.*
 - 2. Discuss the need for contingency plans in the event that performance deteriorates.*
 - 3. Define what should be archived for future reference.*
-

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REVIEW

Leading up to this point, you will have

- Clearly defined the process to be improved.
- Clearly defined the customer(s) of that process.
- Clearly defined what their needs are.
- Made an improvement project proposal to senior management that clearly defined what the project intended to provide in terms of a return on investment.
- Documented how the process currently operates.
- Measured the current level of performance.
- Analyzed the process to see what factors may be causing errors or holding back performance.
- Came up with ideas for things to change in an effort to improve process performance measurably.
- Objectively tested those ideas.
- Kept ideas that worked and discarded what did not.
- Now you are ready for the control phase.

OVERVIEW OF CONTROL PHASE

There are three parts to the control phase--establishing mechanisms for ongoing monitoring of performance; developing contingency plans in the event performance deteriorates; and archiving as much about the project as possible for future reference.

Develop and implement a process management plan. This is a way to monitor the process over the long term and preplan steps to take if performance declines. Anticipate likely scenarios for performance declines and preplan corrective actions. Document and archive the entire project for future reference. Share project results and lessons learned.

PROCESS MANAGEMENT PLAN

Considerable time, effort, and expense have been invested in efforts up to this point. This resulted in demonstrable improvements in process performance. Take steps to make sure gains are preserved. A big part of that is designing and implementing a process management plan.

Three Components: Sensor, Alarm, and Response

Sensor

Senor refers to the process performance indicator that is used on a regular basis over time. Build performance measurement infrastructure/capability that can be sustained over time. In the measure phase, a performance indicator was built. This will usually be the right tool to use for measuring the performance of the process over the long term as well as part of the performance management plan. Integrate the measurement of process performance into the normal routine of how the process operates over the long term. Performance measurement for that process is no longer something that is done on an as-needed basis--it is done on a regular basis at intervals that make sense from cost and practicality standpoint.

Frequency of measurement depends on rate of process performance changes, cost of measurement, and consequences of delay in response. For example:

In the hiring process performance may change with each hiring process cycle; monthly or less frequently. It is inexpensive to collect information on performance indicators such as hiring rates and time intervals for steps. Waiting a month to make changes in process with each hiring cycle does not have significant consequences.

For the PCR data collection process performance may change with each PCR completed; hourly or even more frequently. It is expensive to collect data on PCR completion compliance if on a manual system or it can be very inexpensive if automated on an ePCR system that auto synchs to central server. Waiting to correct problems, even for a day, can have billing and regulatory compliance consequences.

Alarms

There are two categories or alarms. Control limits and other special cause variation signals for unfavorable performance from a statistical process chart and specification limit violations. What's the difference? Control limits and special cause variation patterns can sound the alarm when performance is deteriorating, even before the specification limits are crossed.

Example: The mileage at which brake pads are having to be replaced is showing special cause variation signals though an upward trending pattern, but has not yet reached the point where the specification limits for the brake pad guarantee is being violated.

Specification limits sound the alarm only after the lowest acceptable limit of performance has been violated.

Example: The brake pads are being replaced much sooner that the warranty (specification limit) calls for them to be replaced. If this is happening most of the time, this problem may not trigger a special cause signal alarm--because the process is consistently **bad**.

Responses

At this point of a project, team and the managers of the process likely have the highest level of insight into the process that the organization will ever have. List out the many different ways that the process potentially could deteriorate in its performance. For as many items as possible and practical, develop preplans for how to counter each of those deterioration scenarios. It is much cheaper, faster, better, to do this now than wait until the memory of all the lessons learned about the process are forgotten and have to be relearned in order to get back to the point of understanding it well enough to make effective and efficient choices on how to intervene.

Example: PCR data collection process.

- Potential failure modes.
- Failure mode: Crews forget how to complete certain fields.
- Countermeasures: Create a help system on ePCR notebooks, and website has help system that contains video clips from a class that was held on how to complete the PCRs.
- Failure mode: ePCR system is down.
- Countermeasure: Paper PCR as a back-up process.

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DOCUMENT AND ARCHIVE

Throughout the project, be mindful that, in the future, others may benefit from the team's efforts for:

- Developing countermeasures for process performance deterioration.
- Revisiting process design efforts for this process.
- Performance improvement projects on related processes or larger processes that include this process.

With that in mind, try to document and retain as much of the team's notes, emails, work files, spreadsheets, reports, raw data, reports, etc. as possible. To make it searchable electronically, try to store as much of it as possible in searchable electronic formats. Word processing files, spreadsheets, email are already searchable. Consider scanning or making digital pictures of handwritten notes or easel pads or blackboard/dry erase board notes--then scan and OCR into PDF format.

SHARE PROJECT RESULTS AND LESSONS LEARNED

As team progressed from each of the DMAIC phases, the senior management team may have had the team provide progress reports. At conclusion of project, team should make a final presentation to senior management team.

- Establish accountability for final project results.
- Share lessons learned about this process, and the organization overall.
- Helps them learn what works and how to improve the performance project team process.
- Spur ideas for other improvement projects.
- Celebrate!

Regardless of outcome, celebrate the effort, what individual team members learned and experience gained; lessons learned that should be shared with the rest of the organization.

TOLL GATE REVIEW--CONTROL PHASE

Up to this point, we have accomplished the following steps:

- Needs of the process customer(s) have been documented through one or more Voice of the Customer studies.
- Baseline on process structure has been documented using one or more analyses that may include SIPOC diagrams, value stream timelines and process flow diagrams.

- Baseline on process performance has been documented using performance indicators and statistical process control charting.
- Analyses to determine what factors are influencing process performance and what their relative impacts are has been completed.
- Interventions were made and test to see if they were effective. An effective solution was identified and implemented.
- A process control plan was designed and implemented. Process failure modes were identified and contingency plans were developed. Information from the project was documented and archived for future reference. Results and lessons were shared as appropriate.

It is time to report back to the senior management team for the final toll gate review session.

- What was learned?
- What is the process control plan?
- What failure modes were identified?
- What contingency plans were developed?
- What results and lessons learned were shared and with whom?
- Does the team have suggestions for any follow-up projects based on what was learned in this project?
- Is there support for closing out the project? If yes, the project will come to a close.

THE LAST STEP IN A PROCESS IMPROVEMENT PROJECT--CELEBRATION

Once the project is approved for closure, there is another very important step. It is needed to:

- Encourage submission of other project ideas.
- Encourage others to participate on project teams.
- Encourage others to support project team efforts.

This last important step is celebration. The senior management team and team leader should take the lead in finding appropriate ways to recognize the hard work and accomplishments of the team. This is even true if the project did not yield a positive change to the process. Recall that innovation and success comes with many attempts--all of which may not have the desired results. That comes with the territory. Do not create a culture where people become afraid of trying to catalyze improvements for fear of failure.

UNIT 12: IMPLEMENTING THE QUALITY MANAGEMENT PLAN

TERMINAL OBJECTIVES

The students will be able to

1. *Develop a Quality Management (QM) plan.*
2. *Determine strategies for change management.*

ENABLING OBJECTIVES

The students will be able to:

1. *Identify obstacles to implementing processes.*
 2. *Discuss strategies for marketing/selling their QM plans.*
 3. *Describe future directions that have an impact on QM.*
 4. *Cite key principles for catalyzing changes in their QM programs.*
-

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Activity 12.1

Obstacles to Implementation

Purpose

There may be a variety of obstacles to implementing a QM improvement process. This activity provides you with an opportunity to describe to your table group what you consider to be a major obstacle to implementing your QM plan with. The group then provides you with feedback.

Directions

1. Within your assigned group, specifically describe what you consider to be a major obstacle to implementing your QM plan.
2. The table group will give you feedback on how to overcome this obstacle.
3. After everyone in your group has had an opportunity to share his/her obstacle and received feedback, have one member of your group orally tell the entire class one or two of the obstacles described and how the group recommended that they be overcome.

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OBSTACLES

Internal Obstacles

Kurt Lewin

According to Kurt Lewin (1951) change is a three-step process:

1. Unfreezing.
2. Movement to the new end state.
3. Refreezing.

If "unfreezing" is not done, there can be early and crippling resistance.

J.P. Kotter

Approximately 25 years after Lewin, another management theorist, J. P. Kotter (1996) built on Lewin's three steps and identified an eight-step change process:

1. Establish a sense of urgency by creating a compelling reason why change is needed.
2. Form a coalition with enough power to lead the change.
3. Create a new vision with achievement strategies.
4. Communicate the vision throughout the organization.
5. Empower others to act on the vision.
6. Plan for and reward short term "wins".
7. Consolidate improvements, reassess, and make adjustments.
8. Reinforce the changes by demonstrating the relationship between new behaviors and organizational success.

If you failed to carry out any of the steps, the result could be resistance to change. Looked at another way, each of the eight steps--if not completed--becomes another obstacle to QM change.

External Obstacles

There also can be external obstacles, such as:

- Political: lack of support for the change;
- Financial: lack of funds for the change; and
- Cultural: "that's not the way it's done."

Organizational Obstacles

There also can be organizational obstacles, such as:

- Inertia due to lack of experience with change. This may be coupled with fear the change may make the individual look incompetent.
- Limited focus of change. The rest of the organizational structure does not change; soon the limited change is overcome by the larger structure settling back into the status quo.
- A variety of **perceived** threats, such as those:
 - To individual expertise (the change will cause the expert to become obsolete).
 - To existing power structures (the change will cause someone to lose power).
 - To long-established resource allocations, especially budgets (the change will cause an individual or a division to lose resources or assets).

MARKETING/SELLING STRATEGIES

The reference book, *The 22 Immutable Laws of Marketing* (1994), listed in the Bibliography; has become a management "cult classic" and contains much useful information. One of the "22 Immutable Laws" is that "Marketing effects take place over an extended period of time." It is good to remember this "law" and to plan on taking the long view on marketing a QM change.

Practical Marketing Tips

Here are some practical marketing tips:

- Know your product or service, particularly its strengths and weaknesses. An in-depth knowledge will help you to identify obstacles as well as opportunities.
- Know your intended internal and external audiences. If needed, conduct market research (via surveys, focus groups, etc.) to learn more about these groups.

- Know your agency, especially its culture, rules/regulations, and historical usage of marketing. Remember that your agency changes as a result of changes in external and internal conditions, so assess it on an ongoing basis.
- Be ready to invest time **and** effort into marketing. When all else is said and done, there's no replacement for hard work.
- Marketing is continuous, not just at the launch of your project. So, you should plan periodic "milestones" throughout the life of your project.
- Craft your messages similarly, even using a common logo and common verbiage (slogans, sayings, etc.). This builds "brand recognition" with the public. Perhaps use a catchy phrase or acronym to build a "positive buzz".
- Since people use different information sources and may learn differently, use a wide variety of methods to reach them: print media, the Internet, public events, Twitter[®], training opportunities (such as your department's "Citizen's Academy"), etc.
- In setting deadlines begin at the end. Think of your planned output, and then break it into steps that must be completed. Insert your timelines based on your experience. Add in some extra time for the invariable unknowns that arise.

FUTURE DIRECTIONS THAT AFFECT QUALITY MANAGEMENT

Resources on QM future directions abound within and outside of the fire service.

Here are a few examples of other resources:

- World Future Society at: www.wfs.org
- American Management Association at: www.amanet.org
- American Society of Quality at: www.asq.org
- National EMS Information System (NEMSIS) at: www.nemsis.org
- Institute for Healthcare Improvement at: <http://www.ihc.org/ihc>
- Project Public Health Ready at: <http://www.naccho.org/topics/emergency/PPHR/upload/PPHR-Criteria-2010-FINAL.pdf>

Here are a few publications on QM:

- Quality Digest at: <http://www.qualitydigest.com> (free)
- American Journal of Medical Quality at: <http://ajm.sagepub.com>
- Healthcare Benchmarks and Quality Improvement (QI): www.ahcpub.com/products_and_services/?prid=308
- Journal for Healthcare Quality at: www.nahq.org/journal
- Quality Progress at: www.asq.org/qualityprogress/index.html

- Journal for Quality and Participation at: www.asq.org/pub/jqp/index.html
- Quality Management (QM) Journal at: www.asq.org/pub/qmj/index.html
- Six Sigma Forum Magazine at: www.asq.org/pub/sixsigma/index.html

Staple Formula

You can also use the **staple** formula to help you track changing conditions:

- **Social:** what are the changes in the social environment?
- **Technical:** what are the changes in the technical environment?
- **Administrative:** what are the changes in the administrative environment?
- **Political:** what are the changes in the political environment?
- **Legal:** what are the changes in the legal environment?
- **Economic:** what are the changes in the economic environment?

Some even add in a second "E" for Environment and a third "E" for Ethics.

CATALYZING CHANGES IN QM

In order to better understand how to catalyze change let's first recap on Lewin's and Kotter's ideas about the change process with a focus on catalyzing QM changes:

Kurt Lewin's (1951) Three-Step Process

Here's Kurt Lewin's (1951) three-step process:

1. Unfreezing.
2. Movement to the new end state.
3. Refreezing.

You'll remember that if "unfreezing" was not done, there can be early and crippling resistance.

To use Lewin's method to catalyze QM changes:

Be sure to allow plenty of time, communication, and participation in the "unfreezing" step. Be especially aware of the organizational culture. The culture can be an asset or it can be a obstacle.

During the "movement" step be observant of early reactions to changes. Make any incremental improvements as needed. Be flexible about handling any identified problems; some will go away with no action and some need to "jumped on" immediately. Finally, in the "refreezing" step, allow time to absorb the changes. Psychologists call this "integration time", that is, the time need to psychologically process new information and accept it.

J.P. Kotter's (1996) Eight-Step Process

Here, again, is J.P. Kotter's (1996) eight-step process:

1. Establish a sense of urgency by creating a compelling reason why change is needed.
2. Form a coalition with enough power to lead the change.
3. Create a new vision with achievement strategies.
4. Communicate the vision throughout the organization.
5. Empower others to act on the vision.
6. Plan for and reward short term "wins".
7. Consolidate improvements, reassess, and make adjustments.
8. Reinforce the changes by demonstrating the relationship between new behaviors and organizational success.

As noted earlier, failure to carry out any of Kotter's steps can result in resistance to change.

How to Use Kotter's Method

Here are some suggestions on how to use Kotter's method to catalyze QM changes:

1. Ensure that the "compelling reason" for the changes is communicated and understood. Never assume.
2. In "forming a coalition" **consider** including those who oppose the changes: often this cooption of "adversaries" bring fresh ideas and defuses resistance.
3. Your "new vision" must be grounded in reality and explainable in plain English.
4. "Communicate the vision throughout the organization." But, also communicate it to other stakeholders **outside** the organization, as well.

5. In "empowering others to act on the new vision" you accomplish several things: obtain a source of additional manpower/staffing, get buy-in from the empowered, and even have "new eyes" to help fine-tune your changes.
6. In rewarding the participants, do it often and do it without forgetting the "little people," who actually do most of the "grunt work."
7. In "consolidating improvements..." constantly assess and re-adjust as needed. Experience will show that such minor corrections are easier to absorb than are vast sea changes. Massive changes (especially after communicating your vision, goals, roles, procedures, etc.) can be destabilizing and disruptive.
8. "Reinforcing the changes" and their relationship to organizational success requires constant monitoring of the reactions to these changes, communication skills, and practical evaluation techniques.

Kotter built on Lewin's three steps. Kotter's first four steps relate to "unfreezing," the next three steps represent "movement" and the final step addresses "refreezing."

TRAINING NEEDED

Your personal training plan should take into account your background, experiences, skills, attitudes, and motivation levels as they relate to QM.

A Few Further Ideas about Training Needed

- Since QM is built on a solid foundation of management, if you do not have a strong background in that field that would be an ideal first step.
- Another area that lays the foundation for QM is an understanding of organizational culture. We've just scratched the surface of organizational culture in this class. More training and analysis of it would be helpful, perhaps even some anthropology coursework.
- An additional area for training is "people skills". Since QM happens with **and** through people, take further training in that subject.
- More training in the Define, Measure, Analyze, Improve, and Control (DMAIC) process would be an asset: we've spent a few days on it; you could profitably spend weeks or months on it.
- Examine your background for further areas in which you need to "upgrade" your training.

ADAPTING QM TO INTERNAL/EXTERNAL CHANGES

Definition of Environmental Scanning

Environmental scanning is a process of gathering, analyzing, and dispensing information for tactical or strategic purposes. The environmental scanning process entails obtaining both factual and subjective information on the environments in which an organization is operating or considering entering into.

Three Ways to Scan

1. Ad-hoc scanning: Short term, infrequent examinations usually initiated by a crisis.
2. Scheduled scanning: Studies done on a regular schedule (e.g., once a year).
3. Continuous scanning: Continuous structured data collection and processing on a broad range of environmental factors (to include using the STAPLE formula).

These three are **not** mutually exclusive. In fact, you may choose to use all three of them.

Examples of What to Scan

Internal to the Organization

- leadership;
- education levels;
- training levels;
- compensation;
- supportiveness of culture;
- age of staff;
- degree of labor-management harmony;
- upward mobility;
- community support; and
- other.

External to the Organization

The Economy

Items such as:

- economic growth;
- unemployment rate;

- inflation rate;
- financial and political health of business and government; and
- taxing trends.

Hot topic: Reduced or flat budgets due to stagnant economy.

The Government at all Levels

Items such as:

- political stability and risk;
- government debt;
- budget deficit or surplus;
- corporate and personal tax rates;
- leadership changes; and
- infrastructure, including: roads, ports, airports, hospitals, healthcare, communication, etc.

Hot topic: Consolidation/merging of governmental jurisdictions or agencies.

Legal Issues

- medical practice acts;
- environmental protection laws;
- worker safety laws;
- labor/management laws;
- regulation/deregulation of industries; and
- tort laws.

Hot topic: Emergency medical service (EMS) Standards of Care.

Technology Trends

- new EMS products and services;
- new healthcare products and services; and
- any new technology that could affect EMS.

Hot topic: New EMS technologies and increases in initial and continuing education requirements.

Socio-Cultural Issues

Demographic factors, such as:

- population size and distribution;
- age distribution;

- education levels;
- income levels;
- ethnic origins; and
- religious affiliations.

Hot topic: Aging American population and increasing need for ALS.

Attitudes

Attitudes toward:

- materialism;
- capitalism;
- free enterprise;
- individualism;
- role of family;
- role of government;
- consumerism;
- environmentalism; and
- importance of work.

Hot topic: Privatized EMS versus municipal EMS systems.

Cultural Structures

- diet and nutrition;
- housing conditions; and
- changes in the nuclear family.

Hot topic: EMS personnel as care providers to elderly parents.

All of the Above Would be Rated on Two Dimensions

1. Potential impact on the organization.
2. Likelihood of occurrence.

An Environmental Scanning Template (based on the above items) included in the Appendix to this unit for your later use.

When an Issue or Change is Detected During Implementation, There are Six Ways of Responding

1. Opposition strategy: Try to influence the environmental forces so as to negate their impact--this is only successful where you have some control over the environmental variable in question.
2. Adaptation strategy: Adapt your plan to the new environmental conditions.
3. Offensive strategy: Try to turn the new influence into an advantage.
4. Redeployment strategy: Redeploy your assets to meet the change.
5. Contingency strategies: Determine a broad range of possible reactions and, as conditions warrant, select the most useful.
6. Passive strategy: No response. Study the situation further. In some cases the change will have no bearing on your project.

SUMMARY

This unit began with an activity on identifying obstacles to implementing QM. That section was followed by a discussion on marketing techniques, particularly the practical tips on marketing.

The next part of the unit covered the methods to identify future directions, with an emphasis on the STAPLE formula. The future directions section was followed by the catalyzing change portion of the unit. These methods included a look at both Lewin's Three-Step Model and Kotter's Eight-Step Model.

Training needs for competency in QM were discussed. After that, the unit covered adapting QM to internal and external changes with a review of environmental scanning.

Finally, the unit ended with an explanation of the evening assignment (Prepare for Presentations).

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**APPENDIX:
ENVIRONMENTAL SCANNING
TEMPLATE**

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Environmental Scanning Template

Here are some of the items needed to conduct an environmental scan.

Internal	
Environmental Factor	Example of Impact
Leadership	
Education levels	
Training levels	
Compensation	
Supportiveness of culture	
Age of staff	
Degree of labor-management harmony	
Upward mobility	
Community support	
Other	

External	
Environmental Factor	Example of Impact
The Economy	
Economic growth	
Unemployment rate	
Inflation rate	
Financial and political health of business and government	
Taxing trends	
Other	
Government at All Levels	
Political stability and risk	
Government debt	
Budget deficit or surplus	
Corporate and personal tax rates	
Leadership changes	

IMPLEMENTING THE QUALITY MANAGEMENT PLAN

Infrastructure, including: roads, ports, airports, hospitals, healthcare, communication, etc.	
Other	
Legal Issues	
Medical practice acts	
Environmental protection laws	
Worker safety laws	
Labor/management laws	
Regulation/deregulation of industries	
Tort laws	
Other	
Technology Trends	
New EMS products and services	
New healthcare products and services	
Any new technology that could impact on EMS	

IMPLEMENTING THE QUALITY MANAGEMENT PLAN

Other	
Socio-cultural Issues	
Demographic factors	
Population size and distribution	
Age distribution	
Education levels	
Income levels	
Ethnic origins	
Religious affiliations	
Other	
Attitudes	
Materialism	
Capitalism	
Free enterprise	

IMPLEMENTING THE QUALITY MANAGEMENT PLAN

Individualism	
Role of family	
Role of government	
Consumerism	
Environmentalism	
Importance of work	
Other	
Cultural Structures	
Diet and nutrition	
Housing conditions	
Changes in the nuclear family	
Other	

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