



**NATIONAL EMS MANAGEMENT ASSOCIATION**



# EMS CORE MEASURES:

## SUGGESTIONS FOR CONSIDERATION BY THE NATIONAL EMS PERFORMANCE MEASURES PROJECT

PRESENTED AT THE  
**EMS PERFORMANCE MEASURES PROJECT MEETING**  
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## *I. BACKGROUND*

The National EMS Management Association ([www.nemsma.org](http://www.nemsma.org)), working in collaboration with HealthAnalytics ([www.healthanalytics.net](http://www.healthanalytics.net)), has been working on the development of a Performance Improvement & Benchmarking Network (PIBN) for EMS over the past several years (<http://www.healthanalytics.net/ems/services/pibn.htm>). This work has integrated its efforts with the Open Source EMS Initiative (OSEMSI; [www.mhf.net/opensource](http://www.mhf.net/opensource)) and the North Central EMS Institute's (NCEMSI) EMS Benchmarking Program ([www.ncemsi.org](http://www.ncemsi.org)).

The Joint Commission of Accreditation of Healthcare Organizations (JCAHO) and the Centers for Medicare and Medicaid Services (CMS) have been working in close collaboration for the development, promulgation and utilization of healthcare performance measurement systems over the last several years as well. The JCAHO program is called 'Oryx' and the CMS program is called the 'National Voluntary Hospital Reporting Initiative' (NVHRI).

The purposes of the Oryx and CMS programs are straightforward: to catalyze improvements in the quality of care by encouraging and supporting healthcare provider organizations to continuously monitor and improve the performance of key healthcare processes.

As stated on the JCAHO website, "Performance measurement is used internally by health care organizations to support performance improvement and externally, to demonstrate accountability to the public and other interested stakeholders. Performance measurement benefits the health care organization by providing statistically valid, data-driven mechanisms that generate a continuous stream of performance information. This enables a health care organization to understand how well their organization is doing over time and have continuous access to objective data to support claims of quality. The organization can verify the effectiveness of corrective actions; identify areas of excellence within the organization; and compare their performance with that of peer organizations using the same measures. Similarly, performance data can be used by external stakeholders to make value-based decisions on where to seek quality health care."

All JCAHO accredited acute care hospitals are required to participate in the Oryx program order to maintain their eligibility for payments from Medicare. Other selected types of healthcare provider organizations are required to participate in the CMS program in order to be eligible for a 0.4% CMS payment increase. The JCAHO and CMS programs have been working towards a merging of their

performance measurement system specifications over the last few years and this expected to be completed sometime in 2005.

Given the significant clinical and financial implications that the Oryx and NVHRI healthcare performance measurement programs have, JCAHO and CMS have spent significant time and funds with stakeholders and leading performance measurement experts from across the county to create a process for development and operation of their performance measurement and comparative analysis programs. These programs are worthwhile for the National EMS Performance Measures Project to emulate or 'benchmark' for several reasons:

- Their methodology has the benefit of input and refinement from a host of technical experts, complemented by refinements through the collective experience of thousands of hospitals and millions of patient episodes of care.
- Benchmarking their methodology could significantly reduce the R&D costs for developing a system for EMS from scratch.
- Development of like systems and processes for performance measurement in EMS can help facilitate data system interoperability and exchange across the continuum of care and possibly lead towards some alleviation in the difficulties that EMS providers have in linking to clinical outcome data from receiving hospitals.
- Should JCAHO and/or CMS ever require EMS participation in performance measurement efforts like Oryx or NVHRI, our provider organizations and our industry will be better prepared to comply.

## II. *SUGGESTIONS TO CONSIDER FOR EMS CORE MEASURES*

Based on the JCAHO model and experience, we would like to suggest the following for development of national standard EMS performance measures:

- Identify and prioritize 'core measure' areas for EMS, which may correlate to key clinical, and non-clinical processes and issues.
- Develop performance indicators that have the following attributes (Note: The following items are based criteria used for selection of clinical measures for the JCAHO Oryx program. Some of these criteria may also be applicable for operational and administrative indicators. For a more detailed description of these Oryx selection criteria, see Appendix II):
  - *Targets Improvement in the Health of Populations* - refers to the extent to which the measure addresses areas where performance improvement is likely to have a significant impact on the health of specified populations.
  - *Precisely Defined and Specified* - refers to the extent to which the measure is standardized with explicit pre-defined requirements for data collection and for calculation of the measure value or score.

- *Reliable* - refers to the ability of the measure to identify consistently the events it was designed to identify across multiple participating health care organizations over time.
- *Valid* - refers to the extent to which the measure has been shown to capture what it was intended to measure.
- *Can be Interpreted* - refers to the extent to which the measure rationale and results are easily understood by users of the data including accreditors, providers and consumers.
- *Risk-Adjusted or Stratified* - refers to the extent to which the influences of factors that differ among groups being compared can be controlled or taken into account.
- *Data Collection Effort is Assessed* - refers to the availability and accessibility of required data elements, and the effort and cost of abstracting and collecting data.
- *Useful in the Accreditation Process* - refers to the ability of the measure to supplement or enhance the current accreditation process and support health care organization quality improvement efforts.
- *Under Provider Control* - refers to the extent to which the provider has the ability to influence the processes and/or outcomes being measured.
- *Public Availability [Access]* - refers to the availability of the measure construct and calculation algorithm for public use.

### III. SUGGESTED INDEX OF EMS PROCESSES

*The following text is adapted from the April-June 2004 issue of the EMS Management Journal:*

#### A. EMS PROCESS PERFORMANCE INDICATOR INDEX

The Open Source EMS Initiative (OSEMSI; <http://www.mhf.net/opensource>) has developed a draft of the EMS Process Performance Indicator Index. This is intended to be used as the starting point for a more complete hierarchical framework of process and sub-process labels for development of a comprehensive collection of EMS performance indicators. Consistent with the OSEMSI Performance Indicator definition format, a process performance indicator should answer:

- What is the process or sub-process being measured?
- Who is internal or external process customer?
- What is the customer's need?
- What measurement is to be used as an indicator for how well (quality) or how efficiently (cost) the need is being met?
- What data elements are needed to calculate that indicator?
- What are the sources for those data elements?

- What equations are to be used for calculation of the indicator?
- How should the indicator results be displayed (e.g., an 'X bar R' statistical process control chart)?

The names of the top level processes in the PPII were hybridized from the categories of the EMS Agenda for the Future, Malcolm Baldrige Criteria for Healthcare Excellence, and the criteria used by the Commission on the Accreditation of Ambulance Services.

This draft of the PPII includes only the top level process labels. Each of these top level process labels may have any number of levels of associated sub-process labels. For example, the top level 'Clinical' process category might have sub-process labels for Cardiac, Trauma, Respiratory, etc. The Cardiac sub-process label could have an additional level of sub-processes that include Acute Coronary Syndromes, Resuscitation, and Congestive Heart Failure. The sub-process of Acute Coronary Syndromes may then have multiple performance indicators including aspirin, nitroglycerin, and oxygen administration compliance rates; 12 Lead and Rhythm Strip ECG acquisition rates; 9-1-1 Activation to Hospital Arrival Time Interval; and the Patient Contact to Oxygen Administration Time Interval.

### **Process Performance Indicator Index (PPII)**

- Administration / Leadership
- Field Operations
- Clinical Care
- Medical Direction
- Human Resources
- Fleet Management
- Supply Management
- Dispatch & Communications
- Information Services
- Support Services
- Prevention, Community Education & Access
- Special Events & Services
- Financial Services
- Safety & Risk Management
- Research
- System Measures

#### **B. PROCESS PATH NOTATION**

In communication of performance indicator information, OSEMSI has also drafted a notation to convey the process, applicable sub-processes, customer, need, and the corresponding indicator. The top level process and sub-process

labels are separated by a colon(:). Other parts of the notation are separated by the 'greater than' symbol (>). This referred to as process path notation (PPN).

EXAMPLES

Cardiac Arrest Survival Rate:

**Clinical : Cardiac : Resuscitation > Patient > Survival > Survival Rate**

Ambulance Fleet Critical Failure Rate:

**Fleet : Ambulances > Patient > Reliability > Critical Failure Rate**

#### IV. SUGGESTIONS FOR EMS CORE MEASURE AREAS AND INDICATORS

- **Clinical Care**
  - **Acute Coronary Syndromes**
    - Aspirin Administration Rate
    - Rhythm Strip Capture Rate
    - 12 Lead Capture Rate
    - ACS On-Scene Time Interval
    - Field to ED Clinical Impression Correlation Rate
    - ACS Pain Relief
    - ACS Patient Satisfaction Score
  - **Pain Management**
    - ACS Pain Relief\*
    - Trauma Pain Relief\*
  - **Resuscitation**
    - Field ROSC Rate
    - ROSC at ED Transfer Rate
    - Survival to Hospital Admission Rate
    - Survival to Hospital Discharge Rate
    - Patient Contact Time to First Defibrillation Time Interval
    - PAD Application Rate
    - Bystander CPR Rate
    - *Stratification Factors (applied to the resuscitation indicators listed above)*
      - *Witnessed Onset*
      - *Bystander CPR*
      - *PAD Discharge*
      - *Presenting Rhythm*
      - *Presence of Significant Co-Morbidity Factors*
      - *Age Bracket*
      - *Response Time Interval*
  - **Trauma**
    - Major Trauma On-Scene Time Interval
    - Air Medical Transport Rate
      - Over-Triage Rate
      - Under-Triage Rate
    - Trauma Pain Relief
  - **Airway Management**
    - Undetected Esophageal Intubation Rate

- **Operations**
  - **Response Intervals**
    - 9-1-1 PSAP Call Received to Unit Notification Interval (Dispatch)
    - Unit Notification to Unit En Route Interval (Crew)
    - Unit En Route Interval to Unit On Scene Interval (Deployment)
    - Crew At Patient to Patient En Route to Ambulance Interval (Crew)
    - Patient at Ambulance to Unit En Route to Hospital Interval (Crew)
    - Unit at Hospital to Transfer of Care Interval (ED staff)
    - Transfer of Care to Unit Available Interval (Crew)
  - **Fleet Management**
    - Cost per Unit Mile
    - Critical Failure Rate
    - Emergency Vehicle Contact Rate
  - **Stakeholder Satisfaction Scores**
    - Patient
    - Call Taker
    - Field Crew
    - ED Staff
    - EMS Management
    - Regulatory Body
    - Third Party Payor
- **Administration**
  - **Financial**
    - Total EMS Cost per Capita
  - **Billing**
    - **Medicare Acceptance Rate**
      - 1<sup>st</sup> Submission Acceptance Rate
      - Total Acceptance Rate
    - Avg. Age Accounts Receivable
    - Dollars Collected / Billed Ratio
    - Claims Collected / Billed Ratio
  - **Human Resources**
    - **Field Crew Retention Rates**
      - 90 Days
      - 1 Year
      - 5 Years
      - 10 Years
      - 20 Years
      - Retirement Eligibility
    - **Field Crew Absentee Rate**

## ***APPENDIX I: DETAILS ON THE JCAHO ORYX INITIATIVE***

*The following is derived from text on the JCAHO website:*

In 1987, the Joint Commission announced its *Agenda for Change*, which outlined the eventual introduction of standardized core performance measures into the accreditation process. As the vision to integrate performance measurement into accreditation became more focused, the name ORYX® was chosen for the entire initiative. Today, over 100 performance measurement systems who successfully met the criteria continue to be included among the Joint Commission's list of acceptable systems, with approximately 50 systems listed as core measure systems. Recognizing that valid comparisons could only be made between health care organizations using the same measures that were designed and collected based on standard specifications. The availability of over 8,000 disparate ORYX measures also limited the size of some comparison groups and hindered statistically valid data analyses. To address these challenges, standardized sets of valid, reliable, and evidence-based "core" measures have been implemented by the Joint Commission for use within the ORYX initiative. In May 2001, the Joint Commission announced the four initial core measurement areas for hospitals and hospitals began collecting core measure data for patient discharges beginning July 1, 2002:

- Acute myocardial infarction (AMI)
- Heart failure (HF)
- Pneumonia (PN)
- Pregnancy and related conditions (PR) (including newborn and maternal care)

In the fall of 2003 an additional core measurement area for hospitals was added for Surgical Infection Prevention (SIP). Hospitals will begin collecting core measure data for SIP with patient discharges beginning July 1, 2004.

The AMI, HF, PN and SIP sets are common to the Centers for Medicare and Medicaid Services (CMS) and the Joint Commission. CMS and the Joint Commission have worked together to assure that measures in common are in alignment (i.e., will calculate identically) so that data collection efforts by the health care organizations can be minimized.

Related activities for ORYX include:

- National Quality Forum - The National Quality Forum (NQF) has approved a set of national voluntary consensus standards for measuring the quality of hospital care. These measures will permit consumers, providers, purchasers, and quality improvement professionals to evaluate and compare the quality of care in general acute care hospitals across the nation using a standard set of measures. The majority of the Joint Commission's core measures are endorsed by NQF and are denoted on the measure information forms.
- The National Voluntary Hospital Reporting Initiative - The American Hospital Association (AHA), the Federation of American Hospitals (FAH), and the Association of American Medical Colleges (AAMC) have launched a national voluntary initiative to collect and report hospital quality performance information. This effort is intended to make critical information about hospital performance accessible to the public and to inform and invigorate efforts to improve quality. The Joint Commission, the National Quality Forum, the Centers for Medicare and Medicaid Services, and the Agency for Healthcare Research and Quality support this initiative as the beginning of the effort to make hospital performance measure information more accessible. Volunteer hospitals have begun with an initial starter set of 10 Joint Commission/CMS core measures that

are NQF endorsed and are feasible to be publicly reported. Over time it is anticipated that additional measures will be added

- National Quality Measures Clearinghouse - The National Quality Measures Clearinghouse (NQMC™), sponsored by the Agency for Healthcare Research and Quality (AHRQ), U.S. Department of Health and Human Services has included the Joint Commission's core measures in the NQMC™ public database for evidence-based quality measures and measure sets. NQMC is sponsored by AHRQ to promote widespread access to quality measures by the health care community and other interested individuals. The Specifications Manual for National Implementation of Hospital Core Measures is being shared to facilitate an understanding of the clinical and technical aspects of the standardized core measure sets for hospitals.

## *APPENDIX II: ATTRIBUTES AND CRITERIA FOR ORYX PERFORMANCE MEASURES*

ATTRIBUTE A: Targets Improvement in the Health of Populations - refers to the extent to which the measure addresses areas where performance improvement is likely to have a significant impact on the health of specified populations.

- Criterion A1 (Primary) - The measure has an explicit rationale that is consistent with the goal of protecting and improving the health and/or health care of individuals or populations.
- Criterion A2 (Primary) - The measure has justification as to its rationale in addressing important areas of health care (e.g., high-risk, high-volume, problem-prone, inappropriate variation in performance).
- Criterion A3 (Secondary) - The measure addresses factors that are applicable to broad health care issues (e.g., disease prevention, screening, diagnoses and management).
- Criterion A4 (Secondary) - The measure contributes to a measure set that addresses the needs of populations with diverse health care requirements.

ATTRIBUTE B: Precisely Defined and Specified - refers to the extent to which the measure is standardized with explicit pre-defined requirements for data collection and for calculation of the measure value or score.

- Criterion B1 (Primary) - There is documentation for the measure that includes:
  - clear and understandable statements (e.g., numerator, denominator) of what it purports to measure;
  - rules to identify specific targeted populations;
  - defined data elements, corresponding data sources, and allowable values;
  - defined sampling procedures (if applicable);
  - a specified procedure (algorithm) for calculating the measure value or score; and
  - defined risk adjustment specifications (if applicable).

ATTRIBUTE C: Reliable - refers to the ability of the measure to identify consistently the events it was designed to identify across multiple participating health care organizations over time.

- Criterion C1 - (Primary) Evidence is provided demonstrating that the measure has minimal random error and is consistently reproducible when applied across multiple health care organizations and delivery settings. This evidence includes:
  - a description of the data quality evaluation process;
  - documentation of satisfactory results;
  - a description of the reliability evaluation process (e.g., test-retest; inter-rater; internal consistency) including testing history, frequency and settings, and;
  - documentation of satisfactory results.

ATTRIBUTE D: Valid - refers to the extent to which the measure has been shown to capture what it was intended to measure.

- Criterion D1 (Primary) - Evidence is provided demonstrating that the indicator measures what it purports to measure with respect to the targeted health care construct. This evidence includes:
  - a description of the validity evaluation process (e.g., face; content; construct; criterion; convergent/divergent; predictive) including testing history, frequency and settings; and
  - documentation of test results, including evidence that the measure is low in both random and systematic error so that it can detect differences in the targeted construct at a specific point in time and changes over time.

- Criterion D2 (Primary) - Evidence is provided demonstrating that the targeted health care construct is related to improving the health of individuals and populations. This evidence typically includes:
  - documentation that the health care construct underlying the measure is associated with important health care processes and/or outcomes (e.g., published literature presents strong evidence that the use of beta blockers after acute myocardial infarction is an effective agent for reducing mortality).

ATTRIBUTE E: Can be Interpreted - refers to the extent to which the measure rationale and results are easily understood by users of the data including accreditors, providers and consumers.

- Criterion E1 (Primary) - Evidence is provided demonstrating that there is significant variation among organizations in performance on the measure. This evidence includes:
  - reports on the measure demonstrating statistically significant differences that are meaningful to health care processes and/or outcomes between organizations and/or over time; and
  - if it is an outcome measure, data indicating that the variability is correlated with differences in processes of care.
- Criterion E2 (Secondary) - Evidence is provided demonstrating that the measure results are reportable in manner useful to health care organizations and other interested stakeholders. This evidence includes:
  - copies of measure feedback reports provided to stakeholders; and
  - documentation that the reports were found to be understandable and useful for decision making purposes.

ATTRIBUTE F: Risk-Adjusted or Stratified - refers to the extent to which the influences of factors that differ among groups being compared can be controlled or taken into account.

- Criterion F1 (Primary) - Evidence is provided demonstrating that well-validated risk-adjustment or stratification methods exist for the measure, if such adjustment is needed for the intent of the measure. This evidence includes:
  - a description of the approach used to determine if risk adjustment or stratification is appropriate to the intended use of the measure;
  - a description of the clinical rationale and statistical processes employed to build and test the risk-adjustment model(s);
  - a description and definition of the risk-adjustment model(s);
  - documentation of risk-adjustment model validation results; and/or
  - description of the rationale and processes employed to identify and generate strata.

ATTRIBUTE G: Data Collection Effort is Assessed - refers to the availability and accessibility of required data elements, and the effort and cost of abstracting and collecting data.

- Criterion G1 (Primary) - Evidence is provided demonstrating that the measure can be implemented and maintained by health care organizations with reasonable data collection effort. This evidence includes:
  - information on the number of data elements, the number and type of data sources, and the amount of data (e.g., sample data) required to construct the measure;
  - information on the data system(s) required to support the measure; and
  - information on the costs (e.g., financial, personnel, time) required to collect the measure.

ATTRIBUTE H: Useful in the Accreditation Process - refers to the ability of the measure to supplement or enhance the current accreditation process and support health care organization quality improvement efforts.

- Criterion H1 (Secondary) - The measure is likely to contribute to the accreditation decision process. That is, the measure can be used to:
  - monitor accredited organizations between onsite surveys;
  - help identify appropriate interventions for accredited organizations between onsite surveys; and
  - focus onsite surveys.
- Criterion H2 (Secondary) - There is consensus, and/or evidence is provided, that the measure is useful to health care organizations and other stakeholders for benchmarking and identifying best practice.

ATTRIBUTE I: Under Provider Control - refers to the extent to which the provider has the ability to influence the processes and/or outcomes being measured.

- Criterion I1 (Primary) - There is consensus, and/or evidence is provided, that the measure addresses processes or outcomes over which the health care organization has responsibility, substantial control, and the ability to effect change.

ATTRIBUTE J: Public Availability [Access] - refers to the availability of the measure construct and calculation algorithm for public use.

- Criterion J1 (Primary) - the measure construct and calculation algorithm are in the public domain and/or available without payment of royalty

## APPENDIX III: EMS PERFORMANCE INDICATOR FORMAT

The following text is from the Open Source EMS Initiative and published in the EMS Management Journal - <http://www.emsmj.com/o1n1/indicator/default.htm>)

This document contains the format for development of EMS performance indicators, as approved by an open voting process involving the EMS community at large and the Open Source EMS Initiative's editorial board members. This version of the performance indicator format was officially accepted June 1, 2003. It is based on the healthcare performance indicator format developed by the Joint Commission on the Accreditation of Healthcare Organizations.

- **Indicator Name** – Name or title of the performance indicator
- **Key Process Path** – Starting with one of the predefined key process names, this item shows which key process and sub-process that the indicator reflects on
- **Patient or Customer / Need** – Indicators are designed to reflect on how well and/or how efficiently a given patient or customer need is being met. This item shows what patient or customer / need that the indicator reflects on
- **Type of Measure** – Structure, process or outcome
- **Objective** – Describes why an indicator is useful in specifying and assessing the process or outcome of care measured by the indicator
- **Indicator Formula** – The equation for calculation of the indicator. If applicable, separate sections will separately address the numerator and denominator of the indicator equation.
- **Indicator Formula Description** – Explanation of the formula used for the indicator. Where applicable, separate descriptions detailing the numerator and denominator will be provided.
- **Denominator Description** – Description of the population being studied or other denominator characteristics, including any equation or other key aspects that characterize the denominator
  - **Denominator Inclusion Criteria** – Additional information not included in the denominator statement that details the parameters of the denominator population
  - **Denominator Exclusion Criteria** – Information describing criteria for removing cases from the denominator
  - **Denominator Data Sources** – Sources for data used in generating the denominator
- **Numerator Description** – Description of the subset of the population being studied or other numerator characteristics, including any equation or other key aspects that characterize the numerator
  - **Numerator Inclusion Criteria** – Additional information not included in the numerator statement that details the parameters of the numerator population
  - **Numerator Exclusion Criteria** – Information describing criteria for removing cases from the numerator
  - **Numerator Data Sources** – Sources for data used in generating the numerator
- **Sampling Allowed** – Indicates if sampling the study population is or is not allowed in calculation of this indicator.
- **Sampling Description** – If sampling is allowed, this will describe the sampling process to be used for this indicator.
- **Minimum Number of Data Points** – Tells how many data points are needed, at a minimum, for calculation of this indicator.
- **Suggest Reporting Format: Numerical** – The suggested way in which the numerical results should be expressed (i.e. decimal minutes, percentages, ratios)
- **Suggest Reporting Format: Graphical** – The suggested way in which reports should be presented in graphical format (i.e. pie charts, statistical process control charts, etc..)
- **Suggest Reporting Frequency** – Time frame, number of successive cases or other grouping strategies by which cases should be aggregated for calculating and reporting results
- **Testing** – Indicates if a formal structured evaluation has been performed on the various scientific properties of the indicator such as its reliability, validity, and degree of difficulty

- of data collection
- **Stratification** – Indicates if stratification has been applied to the indicator
- **Stratification Options** – Suggested stratification criteria for use with this indicator
- **Current Development Status** – Describes the amount of work completed to date relative to the final implementation of the indicator
- **Additional Information** – Further information regarding an indicator not addressed in other sections
- **References** – Citations of works used for development of the indicator
- **Contributors** – Listing of persons or organizations used in development and refinements to this indicator.

Using this format, the OSEMSI Cardiac Performance Indicator Section is working on a performance indicator specification for cardiac arrest survival rates based on the Utstein Criteria. This draft specification is shown below to illustrate use of the OSEMSI performance indicator format.

- **Indicator Name** – Cardiac Arrest Survival to Hospital Discharge Rate
- **Key Process Path** – Clinical / Cardiac / Resuscitation
- **Customer / Need** – Patient / Survival
- **Type of Measure** – Outcome
- **Objective** – Resuscitation from out-of-hospital sudden cardiac death is a key factor driving the design and clinical capabilities for EMS systems. This indicator includes several stratification criteria that allows for better comparisons between similar patient groups.
- **Indicator Formula** – # of patients that survived to hospital discharge / resuscitation attempts
- **Indicator Formula Description** – The numerator is a subset of the denominator that shows the portion of resuscitation attempts that survived, within the inclusion and exclusion criteria definitions.
- **Numerator Statement** – # of patients that survived to hospital discharge. This is a subset of the denominator.
  - **Numerator Inclusion Criteria** – N/A
  - **Numerator Exclusion Criteria** – N/A
  - **Numerator Data Sources** – Hospital discharge records or cardiac arrest registry
  - **Numerator Data Elements** – Hospital discharge status (alive, expired)
- **Denominator Statement** – Number of cases in which EMS attempted resuscitation
  - **Denominator Inclusion Criteria**
    - Chest compressions or defibrillation provided by EMS
    - Defibrillation or synchronized cardioversion provided a public access defibrillator followed by EMS care
  - **Denominator Exclusion Criteria**
    - No discharge information available
    - Resuscitation efforts discontinued by EMS personnel after resuscitation was initiated by non-EMS personnel for either a lack of evidence of an actual cardiac arrest or in cases where EMS crews immediately deemed that initiation of bystander resuscitation was inappropriate and discontinued it.
  - **Denominator Data Elements**
    - Procedures (chest compression, defibrillation, PAD discharge)
    - ECG rhythm
    - DNR status
    - Patient condition codes (i.e. major trauma, poisoning, overdose)
    - Bystander witnessed arrest event (y/n)
    - EMS witnessed arrest event (y/n)
  - **Denominator Data Source** – EMS medical record
- **Sampling Allowed** – No
- **Sampling Description** – N/A
- **Minimum Number of Data Points** – Series of 50 consecutive resuscitation attempt cases

- **Suggested Reporting Format: Numerical** – Percentage
- **Suggested Reporting Format – Graphical** – Run chart; statistical process control chart (p chart)
- **Suggested Reporting Frequency** – For each consecutive series of 50 cases
- **Testing** – Methodology published in peer-reviewed literature and numerous studies have applied the methodology.
- **Stratification** – Yes
  - **Stratification Options** – The following stratification options are applied to the denominator:
    - By bystander witnessed event status (y, n, aggregate)
    - By EMS witnessed event status (y, n, aggregate)
    - By presumed cardiac etiology (y, n, aggregate)
    - By bystander CPR status (y, n, aggregate)
    - Initial ECG rhythm (VF, VT, asystole, other, aggregate)
    - By public access defibrillator discharge status (y, n, aggregate)
    - By patient age bracket (neonate, newborn, infant, toddler, child, adolescent, teen, 20-39, 40-59, 60-79, >80, aggregate)
    - By EMS BLS response interval bracket (<4, <6, <8, <10, <12, >12 minutes, aggregate)
    - By EMS ALS response interval bracket (<4, <6, <8, <10, <12, >12 minutes, aggregate)
  - **Current Development Status** – Draft only
  - **Additional Information** – This indicator is based on the Utstein Style for reporting out-of-hospital survival data from cardiac arrest. Stratification options allow for compliance to the various reporting categories from the Utstein Style Template. Additional stratification options were added to allow for ALS and BLS response intervals and patient age.
  - **References** – Cummins RO, Chamberlain DA, et. al. (Task Force of the American Heart Association, European Resuscitation Council, Heart and Stroke Foundation of Canada and the Australian Resuscitation Council): Recommended Guidelines for Uniform Reporting of Data From Out-of-Hospital Cardiac Arrest: The Utstein Style. *Circulation* 1991;84(2):960-975
  - **Contributors** – To be named

## APPENDIX IV: JCAHO CORE MEASURE EXAMPLE: ACUTE MYOCARDIAL INFARCTION / ASPIRIN AT ARRIVAL

*The following text, algorithm and data table are taken from JCAHO Oryx materials to illustrate how their core measure specification documents and data element lists are formatted and how their data processing algorithms are designed.*

### A. MEASURE DESCRIPTION

**Core Measure Set:** Acute Myocardial Infarction

**Performance Measure Identifier:** 14229

**Performance Measure Name:** (AMI-1) Aspirin at arrival

**Description:** Acute myocardial infarction (AMI) patients without aspirin contraindications who received aspirin within 24 hours before or after hospital arrival.

**Rationale:** Early treatment with aspirin, whether alone or in conjunction with reperfusion, markedly reduces mortality from AMI. Accordingly, aspirin now plays an important role in the early management of all patients with suspected AMI and should be administered promptly.

**Type of Measure:** Process

**Improvement Noted As:** An increase in the rate.

**Numerator Statement:** AMI patients who received aspirin within 24 hours before or after hospital arrival.

**Included Populations:** Not applicable

**Excluded Populations:** None

**Data Elements:**

- Aspirin Received Within 24 Hours Before or After Hospital Arrival

**Denominator Statement:** AMI patients without aspirin contraindications

**Included Populations:** Discharges with an ICD-9-CM Principal Diagnosis Code for AMI as defined in Appendix A, Table 1.1

**Excluded Populations:**

- Patients less than 18 years of age
- Patients transferred to another acute care hospital on day of arrival
- Patients received in transfer from another hospital, including another emergency department
- Patients discharged on day of arrival
- Patients who expired on day of arrival
- Patients who left against medical advice on day of arrival
- Patients with one or more of the following aspirin contraindications/reasons for not prescribing aspirin documented in the medical record:
  - Active bleeding on arrival or within 24 hours after arrival;
  - Aspirin allergy;
  - Warfarin/Coumadin as pre-arrival medication;or
  - Other reasons documented by physician, nurse practitioner, or physician assistant for not giving aspirin within 24 hours before or after hospital arrival.

**Data Elements:**

- Admission Date
- Admission Source
- Arrival Date
- Birthdate

- Contraindication to Aspirin on Arrival
- Discharge Date
- ICD-9-CM Principal Diagnosis Code
- Transfer From Another ED

**Risk Adjustment:** No

**Data Collection Approach:** Retrospective, data sources for required data elements include administrative data and medical records. Some hospitals may prefer to gather data concurrently by identifying patients at time of hospital arrival. However, complete documentation includes the discharge ICD-9-CM diagnosis and procedure codes, which require retrospective entry.

**Data Accuracy:**

- Variation may exist in the assignment of ICD-9-CM codes; therefore, coding practices may require evaluation to ensure consistency.
- “Other reasons documented by physician, nurse practitioner, or physician assistant” must explicitly link the noted reason with the non-prescription of aspirin.

**Measure Analysis Suggestions:** None

**Terminology:**

- Acute myocardial infarction (AMI): Death of heart muscle resulting from insufficient blood supply to the heart. For purposes of this measure, acute 1.1.
- Aspirin: An analgesic, antipyretic, and antirheumatic agent with antiplatelet activity. Also identified by a range of synonyms including acetylsalicylic acid, buffered aspirin, enteric coated aspirin. Refer to Appendix C, Table 1.1 for a list of aspirin synonyms.
- Contraindication: A factor or condition that renders the administration of a drug or agent or the performance of a procedure or other practice inadvisable, improper, and/or undesirable.

**Sampling:** Yes; for additional information see the Sampling section.

**Age Groups:** Age 18 and older

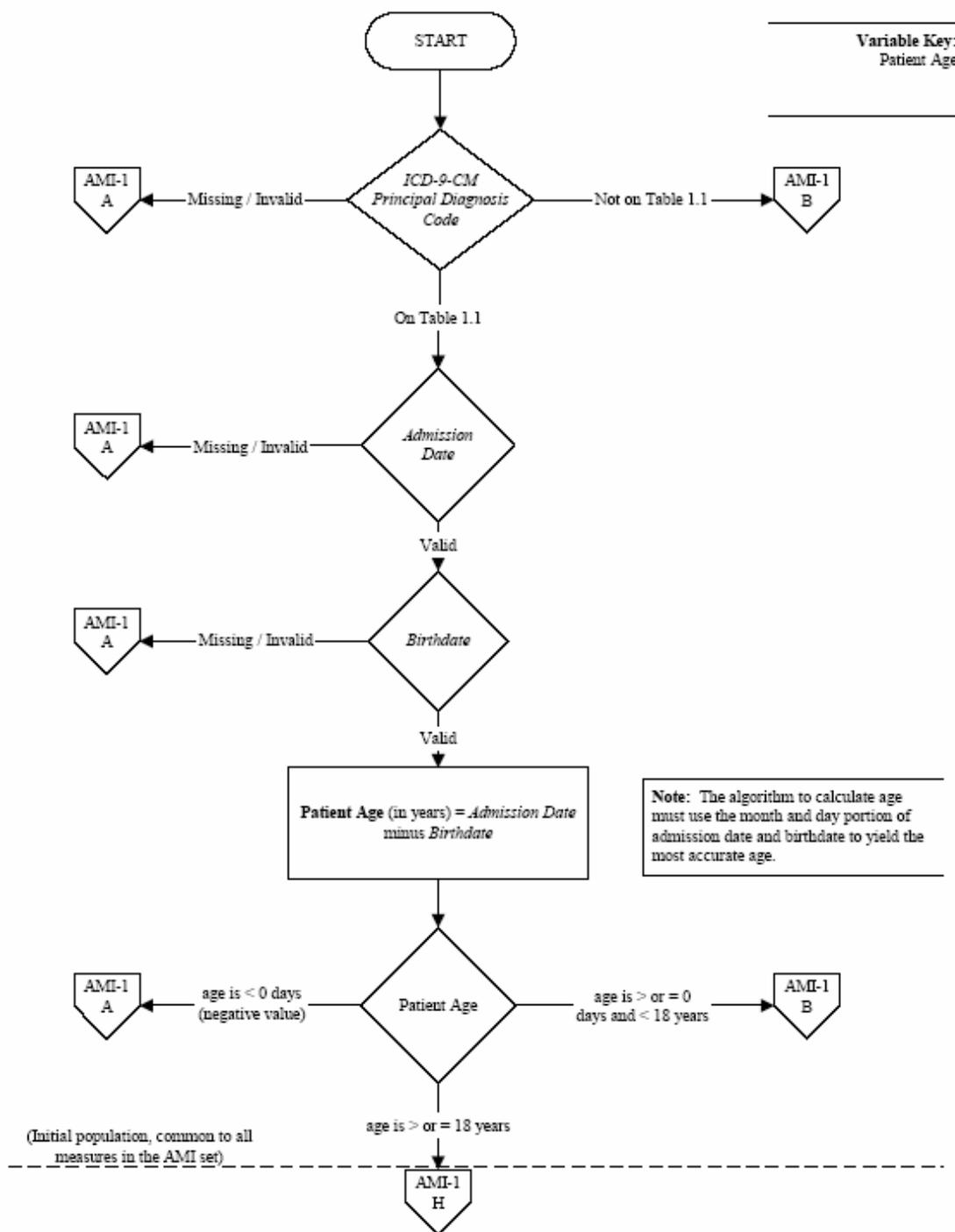
**Data Reported as:** Aggregate rate generated from count data reported as a proportion

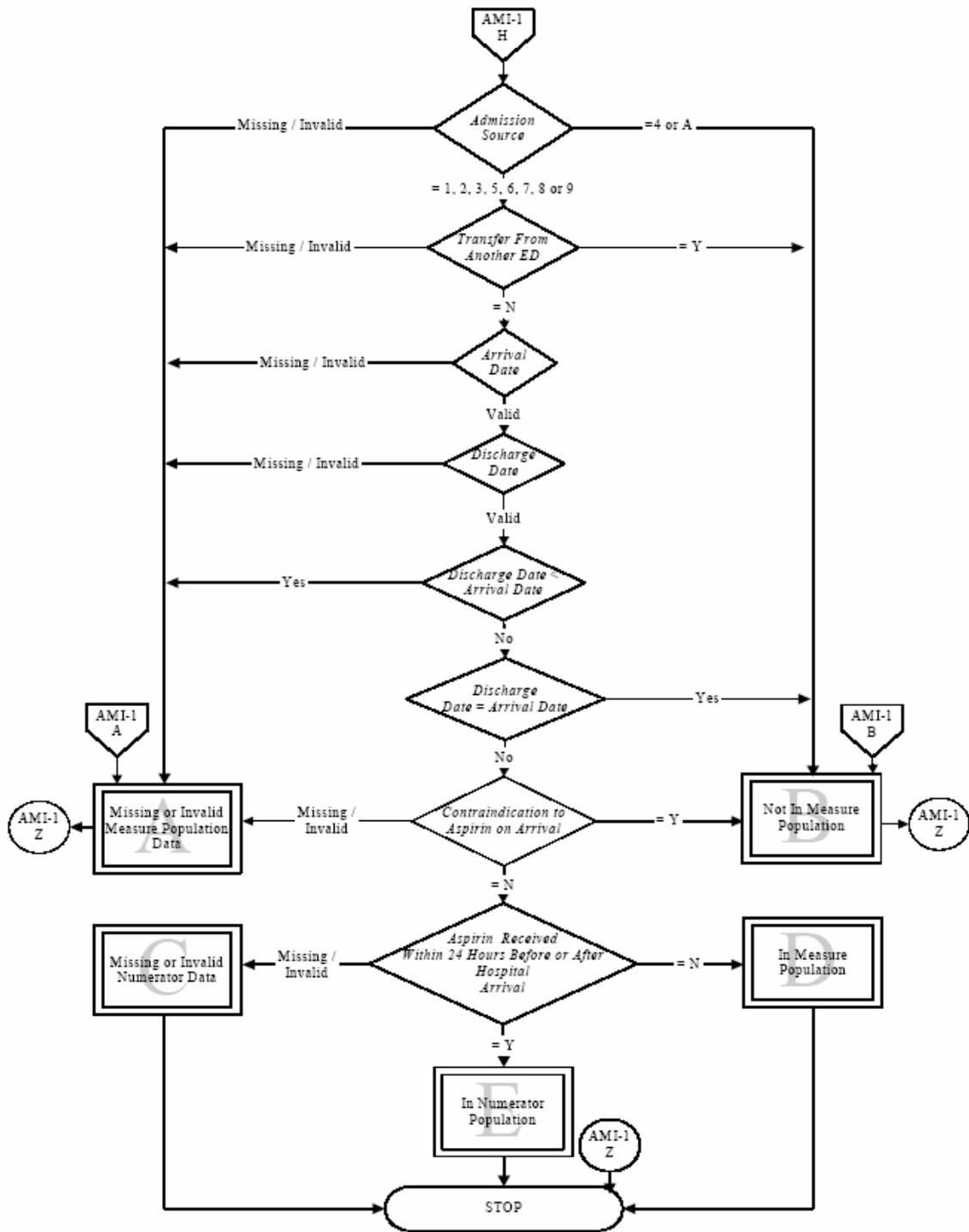
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- Marcinak TA et al: Improving the quality of care for Medicare patients with acute myocardial infarction: Results from the Cooperative Cardiovascular Project. *JAMA*, 279(17):1351-1357, May 1998.
- Ryan TJ, Antman EM, Brooks NH, Califf RM, Hillis LD, Hiratzka LF, Rapaport E, Riegel B, Russell RO, Smith EE III, Weaver WD. ACC/AHA guidelines for the management of patients with acute myocardial infarction:1999 update: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee on Management of Acute Myocardial Infarction). Available at <http://www.acc.org/clinical/guidelines> and <http://www.americanheart.org>. Accessed on March 13, 2000.

## B. AMI ASPIRIN AT ARRIVAL ALGORITHM

Each case submitted by the hospital to the Oryx Performance Measurement System is processed through the algorithm on the flowing two pages:





### C. AMI DATA ELEMENT LIST

General Data Element Name	Collected for:
<i>Admission Date</i>	All Records
<i>Admission Source</i>	All Records (used in algorithm for AMI-1, AMI-6, AMI-7, AMI-7a, AMI-8, AMI-8a, AMI-9)
<i>Admission Type</i>	All Records
<i>Birthdate</i>	All Records
<i>Case Identifier*</i>	All Records
<i>Discharge Date</i>	All Records (used in algorithm for AMI-1 and AMI-6)
<i>Discharge Status</i>	All Records (used in algorithm for AMI-2, AMI-3, AMI-4, AMI-5, AMI-9)
<i>Health Care Organization Identifier</i>	All Records, Used in Data Transmission
<i>ICD-9-CM Other Diagnosis Codes</i>	All Records (used in algorithm for AMI-9)
<i>ICD-9-CM Other Procedure Codes</i>	All Records (used in algorithm for AMI-8, AMI-8a)
<i>ICD-9-CM Other Procedure Dates</i>	All Records (used in algorithm for AMI-8, AMI-8a)
<i>ICD-9-CM Principal Diagnosis Code</i>	All Records
<i>ICD-9-CM Principal Procedure Code</i>	All Records (used in algorithm for AMI-8, AMI-8a)
<i>ICD-9-CM Principal Procedure Date</i>	All Records (used in algorithm for AMI-8, AMI-8a)
<i>Other Patient Case Identifier**</i>	All Records
<i>Patient HIC ***</i>	All Records
<i>Patient Social Security Number**</i>	All Records
<i>Payment Source</i>	All Records
<i>Performance Measure Identifier</i>	All Records, Used in Data Transmission
<i>Postal Code</i>	All Records
<i>Provider ID</i>	All Records
<i>Sex</i>	All Records (used in algorithm for AMI-9)
Algorithm Output Data Element Name	Collected for:
<i>Measure Category Assignment</i>	Used in Verification
<i>Measurement Value</i>	AMI-7, AMI-8
<i>Risk Adjustment Category Assignment</i>	AMI-9
AMI Data Element Name	Collected for:
<i>ACEI Clinical Trial</i>	AMI-3
<i>ACEI Prescribed at Discharge</i>	AMI-3
<i>Adult Smoking Counseling</i>	AMI-4
<i>Adult Smoking History</i>	AMI-4
<i>Arrival Date</i>	AMI-1, AMI-6, AMI-7, AMI-7a, AMI-8, AMI-8a
<i>Arrival Time</i>	AMI-7, AMI-7a, AMI-8, AMI-8a
<i>Aspirin Prescribed at Discharge</i>	AMI-2
<i>Aspirin Received Within 24 Hours Before or After Hospital Arrival</i>	AMI-1
<i>Beta Blocker Prescribed at Discharge</i>	AMI-5
<i>Beta Blocker Received Within 24 Hours After Hospital Arrival</i>	AMI-6
<i>Contraindication to ACEI at Discharge</i>	AMI-3
<i>Contraindication to Aspirin at Discharge</i>	AMI-2
<i>Contraindication to Aspirin on Arrival</i>	AMI-1
<i>Contraindication to Beta Blocker at Discharge</i>	AMI-5
<i>Contraindication to Beta Blocker on Arrival</i>	AMI-6
<i>First PCI Time</i>	AMI-8, AMI-8a
<i>Initial ECG Interpretation</i>	AMI-7, AMI-7a, AMI-8, AMI-8a
<i>LVSD</i>	AMI-3
<i>Thrombolytic Administration</i>	AMI-7, AMI-7a, AMI-8, AMI-8a
<i>Thrombolytic Administration Date</i>	AMI-7, AMI-7a
<i>Thrombolytic Administration Time</i>	AMI-7, AMI-7a
<i>Transfer From Another ED</i>	AMI-1, AMI-6, AMI-7, AMI-7a, AMI-8, AMI-8a

\*Case Identifier is required for all episodes of care collected for the Joint Commission

\*\* These patient identifiers are required to uniquely identify an episode of care for the National Voluntary Hospital Reporting Initiative.