

## **Data Quality**

### **(Joint Commission Performance Measurement Systems Only)**

#### **Introduction**

The term “data quality” can be broadly defined as the accuracy and completeness of a data set. As the national quality measure data are used for more and varied purposes, it is essential that key stakeholders have confidence that the data populating the ORYX<sup>®</sup> national comparative database accurately represent the care provided. Information derived from this database will have a direct impact on how all hospitals in the nation are perceived by these stakeholders. Poor quality data bias performance measurement and can mislead important health care decision-making. To be useful, measurement must be based on data that accurately represent the processes and outcomes of patient care.

Under the basic tenets of the ORYX initiative, listed performance measurement systems assume primary responsibility for monitoring and assuring the accuracy and completeness of the patient-level data they receive from health care organizations, and the aggregated data they transmit to the Joint Commission (refer to the Performance Measurement System Requirements, Attribute 3, Criterion 3C). This section is intended to establish the Joint Commission’s *minimum expectations* regarding performance measurement systems’ responsibilities for monitoring and ensuring the quality of national quality measure data.

#### **Data Reliability**

Listed measurement systems must ensure that the data accurately represent what they purport to measure in a consistent manner regardless of the data collection methods employed, or the data sources utilized, within and across their client health care organizations. For that reason, measurement systems are expected to routinely engage in data quality assessments that include medical record reabstraction. *Reabstraction* refers to the re-collection of national quality measure data for the purpose of comparing data element values to data that have been previously collected from the same medical record.

Ensuring the accuracy of performance measure data should be a shared responsibility between measurement systems and their client health care organizations. For this reason, health care organizations also are expected to take an active role in monitoring the quality of national quality measure data, and measurement systems should encourage their client organizations to perform similar reviews of their data to ensure consistent and accurate data collection.

## **CMS Data Validation**

The Centers for Medicare & Medicaid Services (CMS) recently established an independent data reabstraction activity in order to ensure that the data submitted to the national clinical data repository via the QualityNet Exchange website are abstracted in a manner that is consistent and reproducible. This activity is implemented by local Quality Improvement Organizations (QIOs) and Clinical Data Abstraction Centers (CDACs) in cooperation with participating hospitals – at no cost to the hospital. Each quarter, for each participating hospital, CMS randomly selects five medical records from the universe of patient-level records submitted to the clinical data warehouse. Each hospital photocopies the requested records and submits them to their local CDAC for reabstraction. Results are returned to the hospital and the local QIO for discussion and follow-up, if necessary (see the Results of Reliability Testing section later in this chapter). The Joint Commission supports the CMS approach, and measurement systems will NOT need to perform medical record reabstraction for any client hospital that has submitted data to the clinical data warehouse during the previous reporting period. Measurement systems will, however, be expected to monitor the results of the CDAC reabstraction for their client hospitals and follow-up, if necessary. Results of the CDAC reabstraction may be obtained directly from the participating hospital.

### **Required Performance Measurement System Activities**

Listed measurement systems must ensure that an independent reabstraction of national quality measure data is performed and monitored on a quarterly basis. Independent reabstraction refers to the reabstraction of hospital records by personnel that are not affiliated with the hospital. This may include trained measurement system staff or qualified subcontractors of the measurement system. The intent of this requirement is to evaluate the accuracy and completeness of data collection across *all* measurement system client hospitals that are collecting national quality measure data.

### **Alternative Approaches to Meeting the Requirement**

Two basic alternatives are available. Measurement systems may elect to cluster sample client hospitals (Option A), or pursue a simple random sample of all client hospitals (Option B) using an approach that is similar to the one developed by CMS.

#### **Option A**

##### **Health Care Organization (HCO) Sampling:**

Reabstraction must be conducted quarterly and include records from a random sample of the listed measurement system's client organizations that do NOT submit data to the national clinical data repository (refer to Table 1, below). A new sample of hospitals must be drawn each quarter and should meet the following conditions:

**Table 1: Sample Size Based on Number of Client Hospitals  
NOT Reporting to CMS**

<i>Minimum Sample Size Requirements</i>	
<b>Number of Client Organizations (Not reporting to CMS) “N”</b>	<b>Minimum Required Sample Size per Quarter “n”</b>
≥ 150	15 hospitals
50 – 149	10% of population size (up to 15 hospitals)
< 50	5 hospitals (or 100% if less than 5 client HCOs)

Once the measurement system has identified a sample of hospitals, the individual records to be reabstracted must be selected. A minimum random sample of medical records, per measure set should be identified (See Table 2 for sample size requirements). Client hospitals should make these records available to measurement system staff for reabstraction, either through on-site visits or through photocopying and delivery of requested records.

**Record Sampling:**

For each selected national quality measure set, the measurement system should identify a random sample of cases to be reabstracted. The sample size should meet the following conditions:

**Table 2: Sample Size Based on ICD Population Size**

<i>Recommended Hospital Reabstraction Sample</i>	
<b>ICD Population Size for the Measure Set per Quarter “N”</b>	<b>Minimum Required Sample Size per Quarter “n”</b>
≥ 250	25 records
50 – 249	10% of population size
5 - 50	5 records
< 5	All cases

**A larger sample size than is required may be used. (Refer to the data dictionary for additional details on ICD Population Size).**

*Note: Measurement systems should confirm that their existing business associate contracts with client health care organizations cover these additional patient health information requirements.*

## **Option B**

Each quarter measurement systems should draw a simple random sample of 5 medical records, for each client hospital that DOES NOT submit data to the national clinical data repository, from the universe of records abstracted by each hospital during the previous quarter. Client hospitals should make these records available to measurement system staff for reabstraction, either through on-site visits or through photocopying and delivery of requested records. Results should be compared to the data that were originally abstracted and transmitted to the measurement system.

Individual health care organization results must be shared with the individual organization and aggregate results of the measurement system reabstraction efforts should be shared with all of the system's client health care organizations.

**Note:** The requirement to submit results of the measurement system reabstraction to the Joint Commission is pending until such time that the process and the file formats are finalized between CMS and the Joint Commission.

**Note:** *If a measurement system has developed an alternative approach to evaluating the accuracy and completeness of national quality measure data, and would like to implement that approach in place of the options provided above, a request should be submitted to the Joint Commission via the [oryxcore@jcaho.org](mailto:oryxcore@jcaho.org) mailbox. All requests should include a detailed description of the approach and a rationale to explain how the approach would meet or exceed the Joint Commission's data quality expectations.*

## **Additional Recommended Activities**

Performance measurement systems should encourage client health care organizations to self-reabstract a sample of medical records on a quarterly basis, in order to evaluate the accuracy of their data abstraction and collection processes (refer to the Performance Measurement System Requirements, Attribute 3, Criterion 3D). The intent of this practice is to evaluate the accuracy and completeness of data collection within the health care organization.

Sampling of medical records should meet or exceed the minimum requirements outlined in Table 2 (above). Once the reabstraction has been completed, the hospital should share their reabstracted data with their measurement system for comparison against the originally abstracted data. Measurement systems that have a reabstraction function designed into their data collection tool should ensure that the tool meets or exceeds the Joint Commission's sampling targets (random selection of records, minimum sample size). Aggregate results of the analysis should be shared with all client hospitals. When appropriate, results should be returned directly to the submitting organization in order to address specific issues.

**Note:** *During self-reabstraction it is recommended that, whenever possible, reabstraction be performed by a qualified data collector who did NOT take part in the original data collection. If such a person is not available, the original abstractor should perform the reabstraction. This information should be captured and included in any report of reliability results.*

## Data Analysis

Analysis of reliability data should incorporate two basic components:

- Data Element Agreement Rate (DEAR). This is a one-to-one comparison of agreement between the original abstractor and the reabstractor's data element values. An agreement rate should be calculated for each national quality measure data element, including general data elements. To calculate a DEAR, follow these steps:
  - o Count the total number of paired records for the data element. A paired record is defined as the data collected at two points in time for a data element that has been derived from a single medical record (original abstraction and the reabstraction) allowing for a comparison of results. Paired records, therefore, should NOT include records with one or more null fields for that data element (i.e., no value was originally abstracted; no value was abstracted by the reabstractor; data element was not abstracted by the original abstractor or reabstractor), since it would not be possible to compare the results.
  - o From the pool of paired records, count the total number of successful matches for the data element (number of times the original abstractor and reabstractor agreed on the data element value)
  - o Divide the count of successful matches by the total number of paired records.

Example: Data Element Agreement Rate (DEAR)

Type	HCO ID	Case ID	Admission Date	Admission Source	Admission Type	Birth Date	Discharge Date	Discharge Status
Original	1234	1000	06/30/2003	7	1	08/12/1927	06/31/2003	02
Reabstract	1234	1000	06/30/2003	7	1	08/12/1927	06/31/2003	02
Original	1234	1001	06/23/2003	7		05/17/1913	06/30/2003	06
Reabstract	1234	1001	06/24/2003	7		05/17/1913	06/30/2003	06
Original	1234	1002	06/28/2003		2	12/18/1925	06/29/2003	02
Reabstract	1234	1002	06/28/2003	7	1	12/18/1925	06/29/2003	02

In the example, three cases (1000, 1001 and 1002) have been reabstracted and compared to the original abstraction.

*Admission Date:*

Paired records = 3  
 Matches = 2 (case 1001 dates did not match)  
 DEAR = 2/3 = 0.666667

*Admission Source:*

Paired Records = 2 (case 1002 had no value for the original record)  
 Matches = 2  
 DEAR = 2/2 = 1.0

*Admission Type:*

Paired Records = 2 (case 1001 had no value for the original or reabstracted record)  
 Matches = 1 (case 1002 values did not match)  
 DEAR = 1/2 = 0.500000

- **Category Assignment Agreement Rate (CAAR).** This is a one-to-one comparison of agreement between the original abstractor and the reabstractor’s record-level results. After processing each record (original and reabstracted) through a national quality measure algorithm, the result should be a measure category assignment (A, B, C, D, or E). For continuous variable measures, a measurement value should also be available. Just as allowable values were compared in the DEAR analysis, category assignment values should also be compared. The CAAR value represents the impact of data element reliability on the measure outcome. To calculate a CAAR, follow these steps:
  - o Process the original and reabstracted records through the national quality measure algorithms and record the measure category assignment for each record.
  - o Count the total number of paired records for the data element (no records will be excluded, since all records will have a measure category assignment).
  - o From the pool of paired records, count the total number of successful matches for each measure in the measure set (number of times the original abstractor and reabstractor had the same measure category assignment).
  - o Divide the count of successful matches by the total number of paired records.

**Example: Category Assignment Agreement Rate (CAAR)**

Type	HCO ID	Case ID	AMI -1	AMI -2	AMI-3	AMI -4	AMI-5	AMI-6	AMI-7	AMI-7a	AMI-8	AMI-8a	AMI-9
Original	1234	1000	E	B	B	B	B	E	B	B	B	B	B
Reabstract	1234	1000	E	B	B	B	B	E	B	B	B	B	B
Original	1234	1001	E	D	B	D	D	E	B	B	B	B	D
Reabstract	1234	1001	E	E	B	D	D	E	B	B	B	B	D
Original	1234	1002	E	B	B	B	B	E	D	E	B	B	B
Reabstract	1234	1002	B	B	B	B	B	E	D	E	B	B	B

In the example, three cases (1000, 1001 and 1002) have been reabstracted and compared to the original abstraction. The records have been processed through the AMI national quality measure algorithms and the category assignments are displayed.

*AMI-1:*

Paired records = 3  
Matches = 2 (case 1002 category assignments did not match)  
CAAR =  $2/3 = 0.666667$

*AMI-2:*

Paired Records = 3  
Matches = 2 (case 1001 category assignments did not match)  
CAAR =  $2/3 = 0.666667$

*AMI-3:*

Paired Records = 3  
Matches = 3  
CAAR =  $3/3 = 1.0$

*Note: Depending upon the number of cases available, it may also be useful to calculate and compare measure rates (original versus reabstracted). For additional details, see the Steps to Calculate Rates and Measurements section of this manual. Results for measure rate comparisons may offer insight into the impact and influence of data collection discrepancies.*

## **Results of Reliability Testing**

A perfect agreement rate between originally abstracted data and reabstracted data equals 1.0. During 2004, measurement systems and hospitals will be expected to aggressively pursue and correct agreement rates (DEAR and CAAR) that fall below 0.90, regardless of the source -- performance measurement system reabstraction or CMS/QIO/CDAC reabstraction. Remediation of agreement rates that fall below the expected threshold may include, but is not limited to, discussion with hospital data abstractors, modifications to data collection tools, system-wide educational efforts and/or targeted intervention (where isolated problems have been identified). Improvement should be tracked over time. While it is anticipated that agreement rates for many hospitals may fall below 0.90 during 2004, the goal of remediation efforts will be to achieve agreement rates that meet or exceed the 0.90 threshold by 2005. It is important to note that the Joint Commission's data quality threshold has been set at a higher level than the initial threshold set by CMS (0.80). There is a difference in Joint Commission and CMS data quality thresholds and CMS and the Joint Commission are working together to resolve. Ongoing efforts to improve data quality should continue until agreement rates of 1.0 become routine.

Note: The requirement to submit results of the measurement system reabstraction to the Joint Commission is pending until such time that the process and the file formats are finalized between CMS and the Joint Commission.

## **Completeness of Data**

In order to assess completeness of data, performance measurement systems must, on a quarterly basis, confirm that all eligible cases from individual organizations are used in compiling national quality measure data. This is accomplished by comparing the number of records that were

initially identified during a hospital's national quality measure data abstraction process with a subsequent identification of records for the same time period.

Each quarter measurement systems should perform (or request that client health care organizations perform) an analysis on the data submitted to the Joint Commission during the previous quarter. This analysis is an administrative count of eligible cases for a measure set during a specified time period (using the same criteria used to calculate the original population to be abstracted – the *ICD Population Size*). That new count of eligible cases should be compared to the *ICD Population Size* count that was originally transmitted to the Joint Commission for the same measure set, during the specified time period.

### **Example**

Using an administrative data pull, a hospital identified 100 AMI cases (based upon ICD-9-CM Principal Discharge Diagnosis Code) during the 3<sup>rd</sup> quarter of 2002. National quality measure data reabstraction was based upon this pull of 100 medical records. One quarter later, the hospital's measurement system requires them to perform the same administrative data pull for the same time period (3<sup>rd</sup> quarter 2002). This time, 105 records are identified – a difference of 5% – using the formula provided below:

$$\frac{\text{Recount of } ICD \text{ Population Size} - \text{Original } ICD \text{ Population Size}}{\text{Original } ICD \text{ Population Size}}$$

Initial expectations are that variation in *ICD Population Size* should not exceed 10%. Values that exceed 10% should be considered discrepant and warrant further investigation (See the Data Dictionary for a complete definition of the *ICD Population Size* data element as it applies to each national quality measure set). When discrepancies are identified, the measurement system and health care organization should work together to resolve those discrepancies and, if necessary, improve the processes by which the measure set populations are identified.

Note: The requirement to submit results of the measurement system reabstraction to the Joint Commission is pending until such time that the process and the file formats are finalized between CMS and the Joint Commission.

### **Outlier Analysis**

Performance measurement systems are required to perform outlier analyses on a quarterly basis in order to determine if that extreme outlier status (statistically unusual data on any measure, for any organization, during any quarter), is the result of a data quality problem. Outlier analysis should make use of the measurement system's knowledge of their client hospitals' past performance, their system-wide comparative database, and historical Joint Commission National Comparison Group Data. The existing three standard deviation comparison chart methodology may be used to identify outliers (Refer to the *Mining ORYX® Data 2000* publication for additional details on comparative analysis). Where extreme outliers are identified, measurement systems should use their knowledge of client hospital past performance and their clinical judgment to evaluate the need to follow-up with particular organizations to either validate or correct such data prior to the data being submitted to the Joint Commission. The measurement

system may only delete the inaccurate case(s), if coding or transmission errors have been positively confirmed as the source of the statistical outlier. In this situation, the system must maintain a record of the data excluded and make it available to the Joint Commission upon request. Where coding, data entry or transmission errors cannot be confirmed as the source of statistical outliers, the data should **NOT** be altered or removed.

### **Example 1**

For the 3<sup>rd</sup> Quarter 2003 reporting period, the measurement system calculates a mean time to PCI (AMI-8) = 75148.571 minutes for a client health care organization with 18 PCI cases. The Joint Commission National Comparison Group Data from the previous quarter provided a mean time to PCI at 350 minutes (SD = 50). The measurement systems own database indicates a mean time to PCI value of 320 minutes (SD = 40). Based on these data, the health care organization value for the 3<sup>rd</sup> Quarter would be considered to be an extreme statistical outlier well beyond three standard deviations. The measurement system contacts the health care organization to confirm this value prior to transmission to the Joint Commission. During the discussion, it becomes clear that an arrival date was mistakenly entered for the previous year, giving one record a measurement value of 525,690 minutes to PCI. In this case, the system may require the health care organization to correct the data, or delete the case (keeping a log of such action).

### **Example 2**

For the 3<sup>rd</sup> Quarter 2003 reporting period, the measurement system calculates a rate of 1.0 for the adult smoking cessation advice/counseling measure (PN-4) for a client health care organization with 35 denominator cases during the reporting period. The national rate for 2nd Quarter 2003 was 0.476, the measurement system's database rate for the measure was 0.495, and the health care organization's previous rates ranged from 0.356 to 0.445. The new rate of 1.0 is determined to be a statistical outlier. Based upon the statistical outlier status, the extreme rate of 1.0 and the organization's previous performance, the measurement system contacts the health care organization to confirm this value prior to transmission to the Joint Commission. The organization confirms that it successfully implemented a system wide program to improve documentation and ensure that all smokers receive cessation counseling prior to discharge, and, therefore, the data are correct.

## **Missing and Invalid Data**

While there is an expectation that all defined data elements will be collected, the Joint Commission recognizes that in certain situations information may not be available (dates, times, codes, etc.). After due diligence, if the health care organization determines that a value is not documented, the organization should leave the data element blank. This should not be an issue for most data elements, since the value "No" often incorporates the absence of documentation into the definition (only a handful of data elements include a specific "Not Documented" allowable value, such as Adult Smoking History and Pneumococcal Vaccination Status

Documented). Data elements that are left blank could affect the organization's observed measure rate for that national quality measure.

Measurement systems are required to provide their clients with a "Missing Data Report" to track missing data rates over time. It is recommended that this report offer the user the ability to identify data elements that are left blank and to denote data as 'investigated, but missing' with another internal value. To assist the health care organizations in using the 'Missing Data Report', a mechanism could be built into the organization's data collection software to identify whether a missing data element has been researched previously and found to be "Not Documented". This feature will eliminate the need to re-examine data elements previously found to be unavailable. (See the Missing and Invalid Data Section for details).