

Frequently Asked Questions (FAQs)
Dry Run of Implementation of CMS Mortality Measure for Pneumonia (PN)

Justification for the CMS 30-day Risk-Adjusted Measure for PN

1. **Why measure outcomes?**
2. **Why measure 30-day mortality?**
3. **Why measure all cause mortality?**
4. **Why measure pneumonia mortality?**
5. **Why measure and report mortality for only Medicare fee-for-service beneficiaries?**
6. **Why do you believe administrative data has scientific rigor in building risk-adjustment models?**
7. **How does this outcome measure relate to the current set of process measures? Do you expect any correlation between the two?**

Public Reporting Process

8. **When is the “dry run” for the 30-day risk adjusted mortality measure for pneumonia (PN)? How will it work?**
9. **What years of data will be used to calculate the PN 30-day mortality measure for the July 2007 dry run? What is the source of the data?**
10. **What do the draft Hospital-Specific Reports contain, and who will receive them?**
11. **My hospital is not yet registered for QualityNet Exchange. How do we get registered?**
12. **Why didn't my hospital receive a draft Hospital-Specific Report (HSR) for the July 2007 dry run of the PN mortality measure?**
13. **Will my hospital be able to suppress its data?**

Risk-Standardized Mortality Rates

14. **Will hospitals be able to duplicate the risk-adjusted mortality rates (RSMRs) calculation, for purposes of validation?**
15. **Where can I find more information about how the mortality rates are calculated?**

Characteristics of the Model

16. **What are the inclusion and exclusion criteria for the PN mortality measure?**
17. **Is the patient population the same as for the PN core process measures?**
18. **Why does the measure include healthcare-associated pneumonia?**
19. **Does the analysis exclude patients admitted for hospice or comfort care?**
20. **How does the model handle patients who have multiple admissions with the same primary discharge diagnosis of PN during the 12 months studied?**
21. **How are transfer patients handled in the model?**
22. **How does the model treat small volume hospitals?**

Justification for the CMS 30-day Risk-Adjusted Measure for PN

1. Why measure outcomes?

The measurement and improvement of core processes for the care of patients with pneumonia is a major advance in medical care, but the current process measures capture only a limited spectrum of the actions in the hospital that could influence outcomes. CMS developed the mortality measures to complement existing process measures. Risk-standardized mortality rates (RSMRs) can provide important additional information about quality of care that is not currently captured by the process measures and is currently unavailable to hospitals. Variation in mortality, after adjusting for case mix, may reflect differences in hospitals' general environments (such as coordination of care, patient safety policies, and staffing) or variation in care processes not measured in the current core measure set. Outcome measures can focus attention on a broader set of healthcare activities that affect patients' well being. Moreover, improving outcomes is the ultimate goal of quality improvement, and so the inclusion of outcomes measures assists in attaining improvement goals. Finally, the Deficit Reduction Act of 2005 calls for expanding the set of publicly reported quality measures to include outcomes of hospital care.

2. Why measure 30-day mortality?

CMS chose 30-day mortality because it is an important outcome assessed in a standardized period that can be strongly influenced by hospital care and the early transition to the outpatient setting. The 30-day standardized period is necessary so that the outcome for each patient is measured consistently. Without a standardized period, variation in length of stay would have an undue influence on mortality rates, and institutions would have an incentive to adopt strategies to shift deaths out of the hospital without improving quality. Although CMS expects that few, if any, institutions would pursue such strategies, it is important that quality measures do not create incentives for actions that may not be in patients' best interests.

The use of the timeframe — 30 days following admission — also places an emphasis on transitions in care and the suitability of the patient for discharge. After discharge the hospital and clinicians have less direct accountability for the outcomes of the patients, but actions taken while a patient is in the hospital and the actions taken by the facility to transition a patient to outpatient status can affect a patient's risk for adverse outcomes. Consistent with this approach, CMS links patients in the analysis to the index admission regardless of whether these patients are transferred to another hospital or readmitted within 30 days of the index admission.

3. Why measure all cause mortality?

The CMS mortality measures consider deaths from all causes, not just directly due to PN. There are two reasons for this choice of outcome. First, from the patient perspective, death from any cause is the key outcome. Attributing mortality to a cause other than PN may provide little solace to patients and their families. Second, it is often hard to exclude quality issues and accountability based on the documented cause of death. For example, a patient with PN who did not receive deep vein thrombosis

prophylaxis may ultimately die of a pulmonary embolism. It would be inappropriate to consider the death as unrelated to the care the patient received for PN. Although this approach will include some patients whose death may be unrelated to their care (e.g. a casualty in a motor vehicle accident), events completely unrelated to the admission are expected to be uncommon and should not be clustered unevenly among hospitals. Finally, in many cases, accurate attribution of the cause of death is challenging.

4. Why measure pneumonia mortality?

This measure focuses on PN because it is a common condition with substantial mortality and morbidity, and because pneumonia process measures are a part of the core measure sets currently reported on Hospital Compare. Pneumonia is the second most common cause of hospitalization of the elderly, and accounts for approximately 770,000 admissions annually among patients 65 years of age or older in the United States. Hospitalization rates for pneumonia increased by 20% from 1988-1990 to 2000-2002 for patients aged 65 to 84 years. The combined reporting category of pneumonia and influenza remains the fifth leading cause of death in this age group. Despite advances in antimicrobial treatment of patients with healthcare-associated and community-acquired pneumonia, mortality rates remain high. This condition imposes a substantial burden on patients and the health care system and there is marked variation in outcomes by institution.

5. Why measure and report mortality for only Medicare fee-for-service beneficiaries?

There are several reasons why it is appropriate to measure and report on mortality rates based only on the experience of Medicare fee-for-service patients. First and foremost, the risk-standardization model requires a set of data related to experience prior to the hospitalization that can best be supplied only by large purchasers. Of the populations represented by various purchasers on Hospital Compare, only Medicare, using its Medicare claims database, which reflects care to the Medicare fee-for-service population, has sufficient national data to meaningfully assess outcomes for PN patients. Also, Medicare patients (over the age of 65) represent the majority of patients admitted to hospitals with this condition. These patients are higher risk and more complex, on average, than the younger patients, so the experience of a facility with such patients can be viewed as a more valuable indicator than a measure reflecting commercial populations.

6. Why do you believe administrative data has scientific rigor in building risk-adjustment models?

CMS has sought to develop mortality measures that: (1) could be calculated from its readily available longitudinal claims database for care provided across all care settings; and (2) could be validated by models built on available medical chart data previously abstracted for the QIOs' quality improvement projects. The CMS measures, based on administrative data, produce estimates of risk-standardized mortality rates (RSMRs) that are very similar to rates estimated by models based on chart data. This high level of agreement in the results based on the two different approaches supports the use of the

claims-based models for public reporting. The models also demonstrated a consistent performance across years of claims data. For further information on model validation, please see the literature referenced on www.qualitynet.org.

CMS's approach to gathering risk factors for patients also mitigates the potential limitations of claims data. Because not every diagnosis is coded at every visit, CMS uses inpatient and outpatient claims data for the year prior to admission, and secondary diagnosis codes during the index admission, for risk adjustment. This time frame provides a more comprehensive view of patients' medical histories than is provided by the secondary diagnostic codes of the index hospitalization alone. If a diagnosis appears in some visits and not others, CMS includes it, minimizing the effect of incomplete coding. CMS was careful, however, to include information about each patient's status at admission and to not adjust for possible complications of the admission. Although some codes, by definition, represent conditions that are present before admission (e.g. cancer), other codes and conditions cannot be differentiated from complications during the hospitalization (e.g. infection or shock). If these are secondary diagnoses of the index admission, then they are not adjusted for in the analysis.

7. How does this outcome measure relate to the current set of process measures? Do you expect any correlation between the two?

CMS would expect some correlation between hospitals' performances on the core measure for PN and on the mortality measure for this condition, but for several reasons that correlation may not be strong, as the populations assessed in the two types of measures are somewhat different. Moreover, due to the improvement hospitals have made in the core measures, hospital performance on core measures shows relatively limited variation. In addition, some of the performance measures -- such as administration of influenza or pneumococcal vaccines -- may not have a measurable effect on 30-day mortality.

Public Reporting Process

8. When is the "dry run" for the 30-day risk adjusted mortality measure for pneumonia (PN)? How will it work?

The dry run for the pneumonia (PN) measure will run from July 2 through July 31, 2007. CMS will send all hospitals a draft Hospital-Specific Report (HSR) for pneumonia mortality based on eligible admissions from July 1, 2005 -June 30, 2006 Medicare fee-for-service data. All hospitals that were open during 2005-2006, had eligible pneumonia cases, and have *QualityNet Exchange* users will receive draft HSRs.

The goal of the pneumonia dry run is to reach out to and educate hospitals about the measure and to test the measure production process. As in the December 2006-January 2007 dry run for AMI & HF mortality measures, the PN dry run results will not be publicly reported. Public reporting of the PN measure on the Hospital Compare Web site is planned for June 2008. The time period to be used for calculating the PN measure results to be posted on Hospital Compare will be communicated at a later date.

The process for the draft HSR distribution will be the same as for the recent AMI and HF HSR distribution; QIOs and hospitals will be notified via an SDPS memo and email “blast”, respectively, of the beginning and end of the upload process. The upload process will be complete by July 2, the start of the 30-day question and comment period. Questions and comments should be sent to Colorado Foundation for Medical Care (CFMC) at: mortalitymeasures@coqio.sdps.org.

9. What years of data will be used to calculate the PN 30-day mortality measure for the July 2007 dry run? What is the source of the data?

The results distributed for the July 2007 dry run of the PN mortality measure are based on administrative claims data that include Part A and Part B Medicare data for claims submitted prior to September 30, 2006. Hospital inpatient claims from July 1, 2005 – June 30, 2006 are used to identify the cohort of patients to include and to provide specific characteristics of the index hospitalization. Hospital inpatient and outpatient claims and physician practice claims data are used to characterize comorbidity as documented during the index admission and in the year before the admission. This time horizon provides a more comprehensive view of patients’ medical histories than would be provided using only the secondary diagnostic codes of the index hospitalization. It also reduces the opportunity for hospitals to influence the model through their coding because most variables in the model are not based solely on what is coded by the admitting hospital. Finally, the Medicare enrollment file is used for beneficiary demographic information. Mortality information is derived from the Medicare enrollment file, which is updated by the Social Security Administration, or from inpatient hospital claims. The Medicare enrollment file is known to be highly accurate in designating the patient’s status and has been used widely by researchers and government; in rare cases, however, the date of death may differ from that in other sources by a small number of days.

10. What do the draft Hospital-Specific Reports contain, and who will receive them?

The Hospital-Specific Report (HSR) describes CMS’ approach to estimating risk-standardized 30-day mortality rates, lists patients covered by the analysis, and presents the results for your individual hospital. It is designed to provide important information to aid you in your quality improvement efforts and help you understand what will be publicly reported in June 2008. A “mock” HSR for the PN measure will be accessible on www.qualitynet.org after the report upload process is completed.

The draft HSRs will be distributed via *QualityNet Exchange*. Each hospital's report will be placed in the *QualityNet Exchange* inbox of that hospital's designated user with the "QIO Clinical Warehouse Feedback Reports" role. All hospitals that were open between July 2005-June 2006, had eligible pneumonia cases, and currently have *QualityNet Exchange* users will receive draft HSRs.

QIOs will receive, in zipped format, the draft HSRs for all hospitals within their respective state(s). In addition, QIOs will receive a list of hospitals within their state that were rated as “Better than...” or “Worse than U.S. national rate”. The reports will

be placed in the *QualityNet Exchange* inbox of the QIO's designated Hospital Public Reporting Point of Contact.

11. My hospital is not yet registered for QualityNet Exchange. How do we get registered?

All hospitals not currently registered for *QualityNet Exchange* are encouraged to consider registration. Instructions for registration can be found at (<http://www.qualitynet.org/dcs/ContentServer?cid=1138115987954&pagename=QnetPublic%2FPage%2FQnetBasic&c=Page>)

12. Why didn't my hospital receive a draft Hospital-Specific Report (HSR) for the July 2007 dry run of the PN mortality measure?

If your hospital didn't receive a draft HSR for the July 2007 PN dry run, it could be due to any of the following reasons:

- Your hospital was not open during July 2005 – June 2006
- Your hospital had no eligible cases in July 2005 – June 2006
- Your hospital is not registered on *QualityNet Exchange*, or doesn't have a user with the appropriate role ("QIO Clinical Warehouse Feedback Reports")

In order to give all hospitals an opportunity to participate in the dry run, hospitals for which there were no eligible 2005-2006 claims data have the opportunity to view a "mock" HSR on www.qualitynet.org during the dry run. The "mock" HSR is identical to the distributed HSRs, with one exception: it displays simulated hospital and state level data. Use of simulated data ensures that hospitals gain experience looking at the rates but do not see confidential data reflective of any hospital's actual experience.

If you have questions about your registration status or assigned roles on *QualityNet Exchange*, please contact your facility's *QualityNet Exchange* administrator, or your QIO. If you have questions about whether an HSR was sent to your hospital, please contact CFMC at mortalitymeasures@coqio.sdps.org.

13. Will my hospital be able to suppress its data?

The results of the July 2007 dry run for the 30-day mortality measure for PN will not be publicly reported, so the question of suppression is not relevant for these results.

As information regarding suppression for the June 2008 publicly reported PN measure results is available, CMS will update the information posted here and communicate the information to hospitals and QIOs.

Risk-Standardized Mortality Rates

14. Will hospitals be able to duplicate the risk-adjusted mortality rates (RSMRs) calculation, for purposes of validation?

Hospitals will not be able to independently calculate the RSMRs. The risk adjustment coefficients used as well as the individual patients' data included in the analyses are in the HSRs. But the model requires input of patient longitudinal data across care settings and also data from the entire national sample to estimate risk factor coefficients and the hospital-specific effects used in the equations. Since these data are unavailable to hospitals, hospitals will not be able to independently estimate these equations. But to be transparent in how the RSMRs are calculated, CMS will make the methodology (including the HCC algorithm) available on www.qualitynet.org and the CMS Web site.

15. Where can I find more information about how the mortality rates are calculated?

The best source of information on the risk-adjustment model is the methodology report, [Risk-Adjustment Methodology for Hospital Monitoring/Surveillance and Public Reporting, Supplement #1: 30-day Mortality Model for Pneumonia](#), posted on the Methodology page of the Mortality Measures section of www.qualitynet.org.

Additional references on the measure and on the statistical model used (the hierarchical generalized linear model) can also be found on www.qualitynet.org, including: Krumholz HM, et al. Standards for statistical models used for public reporting of health outcomes. *Circulation* 2006;113:456-62. (<http://circ.ahajournals.org/cgi/reprint/113/3/456>)

Characteristics of the Model

16. What are the inclusion and exclusion criteria for the PN mortality measure?

The PN mortality measure includes fee-for-service Medicare enrollees with a principal discharge diagnosis of PN at least 65 years of age at the time of their admission who were enrolled in Medicare for at least one year prior to their admission.

The specific ICD-9-M codes meeting the inclusion criteria for PN is as follows: 480.3, 480.8, 480.9, 481, 482.0, 482.1, 482.2, 482.30, 482.31, 482.32, 482.39, 482.40, 482.41, 482.49, 482.81, 482.82, 482.83, 482.84, 482.89, 482.9, 483.0, 483.1, 483.8, 485, 486, or 487.0

The following patients are excluded from each hospital's report and risk standardized mortality rate (RSMR) calculation for PN:

- 1) Patients less than 65 years old;
- 2) Patients with incomplete administrative data for the period 12 months prior to the index admission date (e.g. not enrolled in Medicare Part A and Part B or enrolled in a managed care plan);

- 3) Cases with a length of stay of ≤ 1 day discharged alive (and not discharged against medical advice or transferred to another hospital within their first day of admission), because these patients are unlikely to have a true diagnosis of PN or;
- 4) Cases with a total length of stay exceeding one year;
- 5) Patients who are transferred to another hospital who do not have a principal discharge diagnosis of PN at the receiving hospital (i.e. an unconfirmed diagnosis);
- 6) Patients with unknown mortality information (date of death before date of index admission or date of death before discharge date for patients discharged alive);
- 7) PN cases excluded from your hospital's measures because of multiple admissions (if there were multiple PN admissions for a patient in the 12 months studied, one hospitalization per patient was randomly selected for inclusion after applying the other exclusion criteria); and,
- 8) Patients admitted to your hospital who were received in transfer from another hospital (these patients are included in the first hospital's report).

17. Is the patient population the same as for the PN core process measures?

The patient population in the mortality measures is likely to differ from that included in your hospital's core measures for several reasons. For example, in the mortality measures:

- Only Medicare fee-for-service patients were included (due to data availability);
- Patients transferred to a second hospital after admission were linked to the first (index) hospital admission;
- If there were multiple PN admissions for a patient in the 12 months studied, one hospitalization per patient was randomly selected for inclusion after applying the other exclusion criteria;
- The PN mortality measure includes several additional viral codes (480.3 – SARS associated coronavirus; 480.8 – viral pneumonia not specified elsewhere; and 480.9 – viral pneumonia unspecified); and
- The PN process measures include patients with a primary diagnosis of septicemia or respiratory failure and a secondary diagnosis of PN (who had a working diagnosis of PN on admission by chart review). The mortality measure requires a primary diagnosis of PN so that patients who develop PN as a complication of an admission for another cause will not be included.

18. Why does the measure include healthcare-associated pneumonia?

The measure is designed to include all patients with pneumonia on admission, but to exclude patients who develop PN as a complication of an admission for another condition. Accordingly, it includes both community acquired pneumonia (CAP) and healthcare-associated pneumonia (HCAP). HCAP is defined by professional societies to include “any patient who was hospitalized in an acute care hospital for two or more days within 90 days of the infection; resided in a nursing home or long-term care facility; received recent intravenous antibiotic therapy, chemotherapy, or wound care within the past 30 days of the current infection; or attended a hospital or hemodialysis clinic.” (American Thoracic Society and Infectious Diseases Society of America). Both types of PN contribute substantially to Medicare pneumonia mortality. The measure does not include hospital-acquired or ventilator-associated pneumonias, because these are complications of a hospital admission for another condition. The decision to include both CAP and HCAP in our model is consistent with the National Pneumonia Project, the Pneumonia Patient Outcomes Research Team, and a number of studies linking processes of care to patient mortality which all include patients with both CAP and HCAP.

19. Does the analysis exclude patients admitted for hospice or comfort care?

Patients who are admitted to the hospital for signs and symptoms of pneumonia, but whose goal is comfort rather than survival, are not excluded by the model. CMS recognizes that death is not always an unexpected event. Death from pneumonia may represent the inevitable end to a long, chronic illness and not in any sense a failure of the system. Some patients or patients’ families elect comfort-only or hospice care on admission or during their hospital stay.

CMS addressed this concern by taking each patient’s health status on admission into consideration. Using inpatient and outpatient claims data for the year prior to admission, the model adjusts for a number of factors associated with the likelihood that patients are at the end of their lives, including protein-calorie malnutrition, metastatic cancer, dementia, and age. Hospitals with very sick patients, therefore, will be expected to have more deaths, and the model will adjust their risk-standardized mortality rate (RSMR) accordingly.

In addition, CMS was careful in their approach to include information about each patient’s status at admission and to not adjust for possible complications of the admission. Although some codes, by definition, represent conditions that are present before admission (e.g. cancer), other codes and conditions cannot be differentiated from complications during the hospitalization (e.g. infection, shock, and transition to comfort care-only or hospice status). Excluding patients from the analysis who transition to comfort care or hospice may inadvertently reward hospitals that poorly manage their patients.

For the vast majority of patients with pneumonia, the goal is survival. CMS knows that differences in RSMRs to some degree reflect differences in the quality of pneumonia care and differences in hospitals’ general environments (such as coordination of care,

patient safety policies, and staffing). The mortality measure information and patient-level data CMS provides to hospitals should help them identify and address areas of concern.

The goal of this initiative is to promote quality improvement. Hospitals that admit a disproportionate number of patients for hospice or comfort measures may have good reasons for doing so (e.g. a lack of alternative end of life care providers in the community). If, as a result, a hospital's RSMR is higher than expected, the hospital may choose to share the reason publicly and engage its community in a discussion of the hospital's role in end of life care.

20. How does the model handle patients who have multiple admissions with the same primary discharge diagnosis of PN during the 12 months studied?

Because PN patients commonly have multiple admissions in a year, the CMS 30-day risk adjusted mortality measure for PN model randomly selects one admission to use as the "index admission" for that patient. If the patient dies within 30 days of the index admission date, that patient's death is assigned to the index hospitalization, regardless of whether the patient is readmitted to another hospital.

21. How are transfer patients handled in the model?

Patients who are admitted to a hospital with a diagnosis of PN and then transferred are included in the measures. The model considers an episode of care starting at admission to the first hospital, and assigns the patient's outcome to the hospital to which the patient was initially admitted. These patients are not counted for the hospitals that receive them. Those seen in the emergency department only and transferred to another hospital are counted at the receiving hospital.

Assigning outcomes to the admitting hospital has two advantages. First, it allows CMS to assess systems of care and how well they are serving Medicare patients. Actions taken at the admitting hospital, during the transfer, and at the receiving hospital all can affect outcomes. CMS hopes this approach will encourage coordination between hospitals and their referral network. Second, this approach avoids creating an incentive for hospitals to refer patients who are critically ill and at high risk of dying to other institutions. Although it is unlikely that hospitals would act on such an incentive, it is important that measures do not create incentives for actions that may not be in the best interest of the patient.

22. How does the model treat small volume hospitals?

CMS has taken a careful approach to assessing small volume hospitals. A key factor in accurately classifying a hospital's quality of care is the number of patient cases that are available for observation. Some hospitals have small numbers of cases; this is a constraint that one cannot circumvent. In developing the model for the 30-day mortality measures, CMS had a choice of excluding "small" hospitals entirely from the report or including as many hospitals as possible while honestly reflecting the amount of certainty we had in the estimates. CMS adopted the latter strategy.

CMS has addressed this challenge in two major ways. First, it chose a statistical model that allows inclusion of hospitals with relatively few observations but takes into account the uncertainty associated with sample size in estimating their risk-standardized mortality rates (RSMRs). As described in the PN Dry Run HSR and in the supporting reports available on the Methodology page in the Mortality Measures section of www.qualitynet.org, CMS uses a hierarchical generalized linear model to adjust for patient risk factors and to estimate a hospital-specific quality effect. This “hospital-specific effect” is an estimate of the average impact of being treated in a particular hospital on the likelihood of dying within 30 days of admission.

A key characteristic of the model is its ability to avoid producing unreliable estimates for hospitals having few patients. Conceptually, the estimated hospital-specific effect for a small volume hospital gets pulled toward the average because the limited number of cases in the hospital tells us little about that hospital’s true RSMR. Therefore, the best estimate is close to the national average. This approach, in turn, makes the estimated RSMRs for smaller hospitals more likely to be closer to the national mortality rate. In the extreme case where a hospital had only one case CMS would not want to report that the mortality rate was 0% (if there were no deaths) or 100% (if that single patient died). The model would estimate this hospital’s true mortality rate at close to the national average (slightly below or above depending on the patient’s outcome). Each estimate has an associated 95% interval estimate (similar to a confidence interval) so that the precision of the estimate can be understood.

Second, CMS is proposing an approach to categorizing hospitals for public reporting that reflects the greater uncertainty associated with small volume hospitals’ RSMRs. As explained in the HSR, each hospital’s RSMR is only interpreted in the context of its 95% interval estimate, and whether that estimate contains the raw national mortality rate. The interval estimate generally will be wider for small hospitals given the greater uncertainty in their RSMR estimate, and therefore will be more likely to encompass the national mortality rate.

In summary, given the statistical model and CMS’ approach to reporting the model’s results, CMS will characterize the performance of nearly all small volume hospitals on the Hospital Compare Web site as “no different than U.S. national rate... or the difference is uncertain”.