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Quality Monitoring for Medicare Global Payment Demonstrations: Nursing Home Quality-Based Purchasing Demonstration

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Contract # 500-00-0032, T.O. # 1

Final Design Report

June 2006

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Executive Summary

The Nursing Home Quality-Based Purchasing (NHQBP) demonstration is a 3-year demonstration project that is being designed as part of the Centers for Medicare and Medicaid Services (CMS) Long-Term Care Task Force initiative to improve the quality of care furnished to Medicare beneficiaries in nursing homes. The demonstration will offer financial incentives to participating nursing homes that demonstrate the ability to provide high quality care and/or improve the level of care that they provide. The demonstration offers the opportunity to test whether a performance-based reimbursement system can improve the quality of nursing home care while not increasing certain Medicare expenditures.

This report presents Abt Associates' recommendations for the NHQBP demonstration and is organized around several basic steps that are required to design the demonstration:

- Selecting performance measures and specifying scoring rules and weights for each measure.
- Determining how to link nursing home performance to the performance payment amount.
- Calculating the size of the performance payment pool.

Selection of Performance Measures

Selection of performance measures and how they are used to determine performance payments has major implications on the incentives that the demonstration furnishes. Assuming that providers respond to the financial incentives introduced by the demonstration, improvement is most likely for those measures that are most highly rewarded relative to the cost of improving performance. We recommend that, in the first year of the demonstration, that the system includes four basic types of performance measures:

- Nursing home staffing (staffing level and nursing staff turnover)
- Rate of potentially avoidable hospitalizations
- MDS-based resident outcome measures
- Outcomes from state survey inspections

We recommend the use of a continuous scoring system that awards points over a large range of values. We believe that this approach is the fairest one, since it avoids having large changes in scores depend on small changes in performance (i.e., around threshold levels) and that it will motivate improvement for homes with all types of performance at baseline. Note that the fact that homes may receive points for relatively low performance levels does not necessarily mean that these homes will receive a performance payment. The issue of how performance scores link to performance payment amount is separate from the rules used to assign points for the performance measures.

Nursing Home Staffing

There is strong evidence that low nurse staffing levels seriously compromise quality of care. We recommend that the system include three staffing-related performance measures:

- RN hours per resident day
- Total nursing hours per resident day
- Turnover percentage for nursing staff

Because differences in resident acuity affect the staffing levels needed to care for residents, we recommend that the total nursing hours performance measure be casemix adjusted based on nursing home's average RUG-III nursing index. There are very large differences in RN staffing levels for hospital-based and freestanding homes[1], differences that remain even after adjusting for casemix. As a result, it seems appropriate to specify separate scoring rules for the two types of homes.

We recommend that the staffing domain have a relatively high weight in the quality-based purchasing system, and that it account for 30 percent of the nursing home performance score. Given limitations in the existing sources of staffing data, we recommend that staffing data be collected directly from participating homes, who would provide information on staffing levels and turnover that is based on payroll records.

Potentially Avoidable Hospitalizations

As described below, the demonstration is to be financed based on the reduction in certain Medicare expenditures achieved across participating homes in each state. The most direct method by which nursing homes can control Medicare expenditures is by reducing hospitalizations. Performance measures based on the rate of potentially avoidable hospitalizations give a direct incentive to homes to reduce hospitalizations. Our recommendation is that the hospitalization performance measure counts for 30 percent of nursing home performance score.

Potentially avoidable hospitalizations may be identified based on a list of ambulatory-care sensitive conditions developed by the Agency for Healthcare Research and Quality (AHRQ). These include hospitalizations for medical conditions such as congestive heart failure, chronic obstructive pulmonary disease (COPD), and urinary tract infection thought to be largely avoidable with appropriate outpatient care. We recommend having separate performance measures for the hospitalization rates of short- and long-stay residents, with the relative weight of each measure depending on the proportion of short- and long-stay residents served by the nursing home.[2] We recommend that a risk adjustment model be developed and used to minimize the risk of unintended

[1] Note that the definition of hospital-based homes used in this report is based on the CMS 671 Form and includes homes that report that they are hospital-based and also homes that report that they provide care only for residents with Medicare-covered SNF stays.

[2] Throughout this report, short-stay residents are defined as those experiencing a Medicare-covered skilled nursing home (SNF) stay. Long-stay residents are defined as Medicare beneficiaries whose nursing home stay is not paid for by Medicare.

consequences such as homes refusing to admit sicker patients who are at higher risk of hospitalization.

MDS-Based Outcome Measures

We recommend using as performance measures a subset of already-developed MDS-based quality measures (QMs), focusing on measures that have been validated, that are under the nursing home's control, that have good statistical performance, and that reflect important societal values. Separate MDS-measures are appropriate for short- and long-stay residents.

For long-stay residents, we recommend using five of the QMs posted on Nursing Home Compare:

- Percentage of residents whose need for help with daily activities has increased
- Percentage of residents whose ability to move in and around their room got worse
- Percent of high-risk residents with pressure sores
- Percentage of residents who had a catheter inserted and left in their bladder
- Percentage of residents who were physically restrained

For each of these measures, the exclusion criteria, minimum required sample, and risk adjustment methodology would be the same as used in the publicly reported measures.

For short-stay residents, we recommend three of the post-acute care (PAC) quality measures that Abt Associates validated in 2004:

- Percentage of residents with improved level of ADL functioning
- Percentage of residents who improve status on mid-loss ADL functioning
- Percentage of residents with failure to improve bladder incontinence

We did not include pain with the other recommended MDS-based performance measures because of concerns about differences across nursing homes in how they assess pain, but, given the relationship between pain and quality of life, we recommend that CMS consider pain-related performance measures for both short- and long-stay residents.

We recommend that the MDS-based outcome measures would count for 20 percent of nursing home performance scores, with each measure that can be calculated counting for an equal number of points.

Survey Deficiencies

All nursing homes that participate in Medicare or Medicaid must have a certification survey on a regular basis (on average once every 12 months) to ensure that they meet certain federal requirements. The survey provides a broad perspective of the quality of care furnished by the nursing

home, including assessment of nursing home administration, environment, kitchen/food services, and resident rights and quality of life. We recommend that survey deficiencies be used in two ways:

- As a screening measure that would disqualify any nursing home that, in the demonstration year, received a citation for substandard quality of care or that had one or more citations for actual harm or higher in certain regulatory groups such as quality of life, quality of care, resident rights, resident behavior and nursing home practices and life safety from receiving a performance payment. This screening criteria would help to ensure that homes with otherwise good performance would not receive any performance payment as a result of the serious quality of care issues identified by surveyors.

- As part of homes' performance scores. We recommend that a survey performance score be created that is based on the deficiencies that homes receive on their survey. Individual citations, both health and life safety, are assigned weights based on a scoring matrix according to their scope and severity. Within each demonstration state, homes would be ranked based on the survey weights. We recommend that survey performance would count for 20 percent of nursing home performance scores.

Note that CMS intends to require States to conduct at least one survey for each nursing home in the demonstration during each year of the demonstration, ensuring that a survey performance score could be calculated each year.

Other Potential Performance Measures

There are a number of other potential performance measures, including measures related to end-of-life care, resident perspectives on their nursing home care, and staff immunizations that are conceptually appealing as performance measures for the demonstration, but that cannot be used in the first year of the demonstration because of a need for additional developmental work. The additional developmental work includes drafting and testing suitable data collection instruments and a need for further research to understand how the measures relate to resident outcomes.

We recommend that, as part of the nursing home application process, that information on these potential measures be collected from nursing homes, and that this information be used to evaluate whether it is appropriate to add one or more of these measures to the demonstration after its first year.

There are some other potential performance measures, including medication errors and nursing home use of electronic medical records, that will likely not be feasible to include in the demonstration but may eventually be able to be included in a national quality-based purchasing system.

Linking Nursing Home Performance to Performance Payments

The demonstration is intended both to reward high performing homes and to encourage improvement for homes that may not have good quality initially. As a result, the performance payment will be determined based both on the level of performance and improvement in performance over time. Under the demonstration, no homes will face payment reductions as a result of poor performance.

We recommend that nursing home performance be linked to performance payments based on the following:

- Performance payments should be based on overall performance rather than performance on individual performance measures or categories of measures. This is because the intent of the demonstration is to reward homes that provide overall high quality care rather than those that excel in individual areas.

- Improvement should be measured based on the change in overall performance score relative to the base year, the prior year, or some combination of the two.

- Homes with an overall performance score that is in the top 20 percent in terms of performance level should qualify for a performance payment. Homes in the top 10 percent would receive a larger performance payment than those in the next ten percent.

- Homes in the top 20 percent in terms of improvement should qualify for a performance payment in recognition of their improved performance, as long as their performance level was at least as high as the 40th percentile in the performance year. This is to ensure that homes do not receive performance payments for improvement if their overall level of performance is low.

- Payments should be weighted based on the number of resident days for residents who are Medicare beneficiaries, including beneficiaries whose nursing home stay is not covered by Medicare (i.e., those receiving only Part B services).

- Homes that qualify for a performance payment based on both performance level and improvement would receive payment for either performance or improvement but not both. They would receive the higher of the two performance payments for which they qualified.

- The performance payment pool would be spilt evenly among top performers and improvers.

- Baseline performance measures information should be collected as part of the application process for the NHQBP demonstration, allowing improvement relative to baseline to be calculated in the first year of the demonstration.

Determining the Size of the Performance Payment Pool

Similar to the Physician Group Practice Demonstration[3] the size of the performance payment pool for participating homes in a given state will be determined based on the reduction in Medicare expenditures (across certain types of services) for residents at participating homes. Medicare program savings will be estimated by comparing the rate of change in certain Medicare expenditures for Medicare beneficiaries in demonstration homes to the rate of change in certain Medicare expenditures for a comparison group.

In the NHQBP model, savings are calculated across all participating homes in a state rather than at the level of the individual nursing home. If the demonstration does not result in any savings for

[3] See Appendix D for more details on the methodology used in the Physician Group Practice demonstration for measuring Medicare savings),

homes in a state, then no performance payments will be made to any nursing home regardless of the nursing home's performance. If the demonstration does result in savings, then these savings would be used to fund performance payments. The performance payments are allocated to homes based on their level of performance and their improvement over time. While the size of the performance payment pool is determined based on the estimated reduction in certain Medicare costs, the distribution of the performance payment pool across homes is based on a set of nursing home-specific performance measures.

The underlying strategy of this approach is to compare the change in Medicare expenditures for demonstration homes in a state from the period before to the period after the demonstration was implemented with the difference in expenditures for a comparison group. If the demonstration does not result in any savings for homes in a state, then no performance payments will be made to any homes regardless of their performance. If the demonstration does result in savings, then these savings would be used to fund performance payments, which would be allocated to homes based on the methods described above.

While the size of the performance payment pool is determined based on the estimated reduction in certain Medicare costs, the distribution of the performance payment pool across homes is based on a set of nursing home-specific performance measures.

Demonstration Design

The demonstration is expected to include an average of 50 nursing homes per state in 4 or 5 states. Participation will be voluntary. We are assuming that many homes will be interested in the demonstration, permitting a randomized design in which some homes that apply to be in the demonstration are assigned to a comparison group. The comparison group will likely include the same number of nursing homes as the demonstration (i.e., 200 to 250). Nursing homes that volunteer to participate could be stratified based on criteria including nursing home type, urban/rural status, ownership type, or bed size and then assigned to either the demonstration or to a comparison group.

To ensure that the demonstration reaches the entire Medicare population (including those for whom Medicare is not the payment source for their nursing home care), the demonstration will be open to all hospital-based and freestanding nursing homes providing care to Medicare beneficiaries. The demonstration is intended to include homes with a range of quality so that the impact of the demonstration on poor performing homes can be measured. The demonstration will include all nursing home residents, regardless of payer, although it will not be possible to calculate hospitalization rates for residents who are not Medicare beneficiaries.

1. Background

In its report "Crossing the Quality Chasm," the Institute of Medicine (IOM, 2001) argued that payment incentives should be aligned with quality improvement, with providers given the opportunity to share in the benefits of quality improvement and incentives aligned with the achievement of better outcomes and the use of good processes of care or other desired actions. The report recommended that all purchasers reexamine payment policies to remove barriers that impede quality and build in stronger incentives for quality enhancement, calling for government agencies such as CMS to "identify, pilot test, and evaluate various options for better aligning current payment methods with quality improvement goals."

Quality-based purchasing (or pay-for-performance) involves the use of incentives to encourage providers to improve the quality of services that they provide. This is in contrast to the current system, for which quantity is the basis for reimbursement (Carter, 2006). The NHQBP demonstration is one response to the IOM's challenge and is part of CMS' broader long-term care quality initiative. Like other quality- based purchasing (or pay-for-performance) programs, the demonstration will offer incentives to providers who meet certain quality objectives. These incentives are expected to promote the quality of care provided by nursing homes and help to offset investments needed to support quality improvement, for example related to increasing staffing levels.

1.1. Other CMS Pay-for-Performance Initiatives

With the goals of supporting quality improvement while improving cost efficiency, CMS is conducting pay-for-performance initiatives in a variety of healthcare settings. Below is a description of these initiatives[4].

Hospital Quality Initiative: The Hospital Quality Initiative, part of the National Quality Initiative, links the reporting of ten quality measures to the payment that hospitals receive for each discharge. Hospitals that submit the required data receive the full payment update to their Medicare DRG payment. Almost all of the hospitals eligible to participate in this program are complying with the reporting requirements and receiving the higher payment.

Premier Hospital Quality Incentive Demonstration: This demonstration is testing whether giving financial incentives to hospitals for providing high quality can improve the quality of inpatient care. Almost 300 hospitals are participating in the demonstration. The performance measures used for this demonstration include 34 quality measures that relate to five clinical conditions: heart attack, heart failure, pneumonia, coronary artery bypass graft, and hip and knee replacements. Hospitals that rank in the two 10 percent for a given set of quality measures receive a 2 percent performance payment relative to the standard DRG payment for the relevant discharges. The next highest ten percent receive a 1 percent performance payment. In the third year of the demonstration, hospitals that fail to meet a pre-determined threshold are subject to payment reductions.

[4] The source of much of the information in this section is "Medicare Pay-for-Performance Initiatives," available on the CMS web site: http://www.cms.hhs.gov/apps/media/press/release.asp?Counter=1343.

Physician Group Practice Demonstration: The physician group practice demonstration seeks to encourage coordination of Part A and Part B services, promote efficiency through investment in administrative structure and process, and reward physicians for improving health outcomes. It superimposes new incentives on traditional fee-for-service reimbursement that are more in line with capitation incentives. The ten large group practices that are participating in the demonstration have an incentive to reduce utilization for their Medicare fee-for-service beneficiaries, as the size of their incentive pool is based on the Medicare savings that the practice achieves. Medicare savings are calculated by comparing the change in Medicare costs for demonstration beneficiaries to the change in costs for a comparison group. The demonstration includes performance measures based on process and outcome quality indicators. Performance payments are determined based on performance on these measures and cost savings.

Medicare Care Management Performance Demonstration: Modeled on the "Bridges to Excellence" program. This is a three-year demonstration with physicians that is being developed to promote the adoption and use of health information technology and evidence-based medicine to improve patient quality of care for chronically ill Medicare beneficiaries. The demonstration will test whether use of information technology can help to promote continuity of care, reduce adverse health outcomes, and help to stabilize chronic conditions. Performance measures are based on clinical delivery systems and patient outcomes, and physicians who meet or exceed performance standards receive an performance payment for managing the care of eligible Medicare beneficiaries. The demonstration is required to be budget neutral and will focus on small and medium-sized physician practices. It is being implemented in four states: Arkansas, California, Massachusetts, and Utah.

Medicare Health Care Quality Demonstration: CMS recently issued a solicitation package for interested organizations to apply to participate in this demonstration. The demonstration projects funded by the demonstration are intended to examine health delivery factors that encourage the delivery of improved quality in patient care, including program that improve patient safety, the appropriate use of best practice guidelines, reducing variations in utilization by appropriate use of evidence-based care and best practice guidelines, shared decision making between providers and patients, and using culturally and ethnically appropriate care. Organizations will receive performance payments for improving health outcomes. Eligible organizations include physician groups and integrated health systems. This demonstration must be budget neutral and is expected to include 8-12 health care organizations such as physician group practices, integrated delivery systems, and regional coalitions of physician group practices and integrated delivery systems

Chronic Care Improvement Program: This demonstration will test a population-based model of disease management. There are nine organizations participating in the demonstration, including disease management vendors and larger organizations such as insurance companies. They receive a monthly capitated payment rate for management of patients with specific conditions such as advanced congestive heart failure and/or complex diabetes. The program emphasizes geriatric assessment and care coordination, and they are intended to increase adherence to evidence-based care, reduce unnecessary hospital stays and emergency room visits, and help participants avoid costly and debilitating complications. Participating organizations must guarantee CMS savings of at least 5 percent plus the cost of the monthly fees relative to a similar beneficiary population. Payment of fees is contingent upon performance on quality measures and satisfaction of both beneficiaries and providers.

Disease Management Demonstration for Severely Chronically Ill Medicare Beneficiaries: This Demonstration is testing whether applying disease management and prescription drug coverage in a fee-for-service environment. It focuses on Medicare beneficiaries with one of three chronic conditions that are related to high costs to the Medicare program: congestive heart failure, diabetes, and coronary heart disease. There are three disease management organizations participating in the demonstration. They must guarantee that there will be a net reduction in Medicare expenditures.

Disease Management Demonstration for Chronically Ill Dual Eligible Beneficiaries: Under this demonstration, disease management services are being provided to a group of dually eligible beneficiaries who have advanced-stage congestive heart failure, diabetes, or coronary heart disease. The demonstration allows the opportunity to combine Medicare and Medicaid resources. LifeMasters, the demonstration organization, is being paid a fixed monthly amount per beneficiary. It assumes the financial risk if performance targets are not met. Savings above the targeted amount will be shared equally between CMS and LifeMasters.

1.2. Principles of a Quality-Based Purchasing System

In recent years, several organizations have endorsed a set of guiding principles for quality-based purchasing (or pay-for-performance) systems. While these organizations focused on pay-for-performance programs for hospitals and physician practices, many of these principles are applicable for the NHQBP demonstration.

1.2.1. Medicare Payment Advisory Commission (MedPAC)

In their 2005 Report to Congress, MedPAC recommended that Medicare also base a portion of provider payment on quality performance in hospitals, home health agencies and physicians. MedPAC recommended that pay-for-performance systems should have the following design features (MedPAC, 2003, 2005):

- Performance measures should be evidence-based, accepted by independent quality experts, and familiar to providers. Performance measures should identify real differences in provider quality.

- The performance measures should apply to a broad range of care and providers and should encompass a broad range of types of care.

- The system should reward both improvement and attaining or exceeding certain benchmarks. This will encourage providers with different levels of performance to participate.

- Data collection should not by unduly burdensome. Where possible, performance measures should be based on data that is already collected.

- Appropriate risk adjustment of performance measures is important for outcome measures. An alternative is to use process, structure, or patient care experience measures that are less affected by casemix.

- Pay-for-Performance programs should be budget neutral, with the performance payments funded by setting aside a small portion (1 to 2 percent) of budgeted payments

- A formal process of private and public sector participants should be established to streamline, update and improve measure sets.

1.2.2. Joint Commission on Accreditation of Healthcare Organizations (JCAHO)

JCAHO published "Principles for the Construct of Pay-for-Performance Programs."[5] While these principles focused on pay-for-performance for physicians, these principals apply to the NHQBP demonstration as well:

- The goal of pay-for-performance programs should be to align reimbursement with the practice of high quality, safe health care for all consumers.
    - Payment systems should recognize the cost of providing care in accordance with accepted standards of practice and should guard against any incentives that could undermine the provision of safe, high quality care.
    - Reward programs should encourage qualified clinical staff to accept patients where complexity, risk, or severity of illness may be considerations.
    - Performance incentives should be aligned with professional responsibility and control.

- Programs should include a mix of financial and non-financial incentives (such as differential intensity of oversight; reduction of administrative and regulatory burdens; public acknowledgment of performance) that are designed to achieve program goals.
    - The type and magnitude of incentives should be tailored to the desired behavior changes.
    - Rewards should be great enough to drive desired behaviors and support consistently high quality care.
    - A sliding scale of rewards should be established to allow for recognition of gradations in quality of care, including service delivery.

- When selecting the areas of clinical focus, programs should strongly consider consistency with national and regional efforts in order to leverage change and reduce conflicting or competing measurement. It is also important to attend to clinical areas that show significant promise for achieving improvements because they represent areas where unwarranted differences in performance have been documented.

- Programs should be designed to ensure that metrics upon which performance payments are based are credible, valid and reliable.
    - Quality-related program goals should be transparent, explicit and measurable.
    - Metrics should be evidence-based or, in the absence of strong science, be based on expert consensus.
    - Metrics should also be standardized, be risk-adjusted where appropriate, and have broad acceptance in the provider and professional communities.

[5] See http://www.jointcommission.org/PublicPolicy/pay.htm

- Credible and affordable mechanisms to audit data and verify performance must be developed and implemented.
- The measurement set should be constructed to fulfill program objectives with the minimum amount of measurement burden needed.

- Programs must be designed to acknowledge the united approach necessary to effect significant change, and the reality that the provision of safe, high quality care is a shared responsibility between provider organizations and health care professionals.
  - Performance payments should recognize systemic drivers of quality in units broader than individual provider organizations and practitioner groups and encourage improvement at these aggregate levels.
  - Incentive programs should support team approaches to the provision of health care, as well as integration of services, overall management of disease, and continuity of care.
  - Incentive programs should encourage strong alignment between practitioner and provider organization goals, while also recognizing and rewarding the respective contributions of each to overall performance.

- The measurement and reward framework should be strategically designed to permit and facilitate broad-scale behavior change and achievement of performance goals within targeted time periods. To accomplish this, providers and practitioners should receive timely feedback about their performance and be provided the opportunity for dialogue when appropriate. Rewards should follow closely upon the achievement of performance.

- Programs should reward accreditation, or have an equivalent mechanism that recognizes health care organizations' continuous attention to all clinical and support systems and processes that relate to patient safety and health care quality.

- Incentive programs should support an interconnected health care system and the implementation of "interoperable" standards for collecting, transmitting and reporting information.

- Programs should incorporate periodic, objective assessment into their structure. The evaluations should include the system of payment and incentives built into the program design, in order to evaluate its effects on achieving improvements in quality, including any unintended consequences. The program and, where appropriate, its performance thresholds should be re-adjusted as necessary.

- Provisions should be made to invest in sub-threshold performers who are committed to improvement and are willing to work themselves or with assistance to develop and carry out improvement plans. Such investments should be made after considering both the potential for realistic gains in improvement relative to the amount of resources necessary to achieve that promise, and what is a reasonable timeframe for achieving program performance goals.

1.2.3. American Medical Association

In 2005, the American Medical Association (American Medical Association, 2005), noting that pay-for-performance programs can serve as a positive force for the healthcare system, listed the following

set of principles for "fair and ethical" programs that link evidence-based performance measures to financial incentives:

- Ensure quality of care. The most important mission of pay-for-performance programs is to improve patient care. The performance measures should be evidence-based quality of care measures.

- Foster the patient/physician relationship. Fair and ethical programs should support the patient/physician relationship and overcome obstacles to physicians treating patients.

- Participation should be voluntary and the program should not impact the economic viability of non-participating practices. Participation can be supported by minimizing financial and technological barriers.

- Use of accurate data and fair reporting. Providers should be allowed to review and appeal results prior to determination of performance payments or any type of reporting.

- Provide fair and equitable program incentives provide new funds for positive incentives to physicians for their participation, progressive quality improvement, or attainment of goals within the program.

1.2.4. Medical Group Management Association

The Medical Group Management Association issued a position paper in 2005 that asserted that a pay-for-performance program that conformed to these nine principles had the potential to improve the effectiveness and the efficiency of health care payment programs (Medical Group Management Association, 2005).

- The primary goal of pay-for-performance programs should be improving the health quality and safety. Goals related to cost effectiveness and efficiency should be subordinated to quality and safety.

- Participation in pay-for-performance programs should be voluntary, with complete openness and transparency about the specifics of the program given to providers so they have sufficient time to decide whether or not to participate. There should be no financial consequences to providers that choose not to participate. Participation should not be tied to any health information technology requirement.

- Practicing physicians and their professional organizations should be involved in the design of the program.

- Performance measures must be evidence-based, broadly accepted, clinically relevant, continually updated and developed by practicing physicians. Evidence-based performance measures are the cornerstone of a pay-for-performance system, and the measures that are used should meet generally accepted standards of scientific validity, relevance and currency.

- Performance measures should be adjusted for sample size and use risk-adjustment methods to account for variables that affect health outcomes.

- Pay-for-performance programs must reward participation, including use of electronic health records and decision-support tools. Achieving performance objectives should produce tangible financial rewards to participating providers, and frequent feedback on the level of performance should be given.

- Medicare pay-for-performance programs should not be budget neutral.

- Pay-for-performance programs should reimburse providers for the administrative burden associated with collecting and reporting data for the system.

- Providers should be able to review and correct performance data.

1.3. Payment Considerations

1.3.1. Payment Approach

Although the majority of programs focus on providing rewards as an incentive, there are multiple variations on how the reward is structured which are believed to potentially influence motivation among providers. At this point, there are no studies that compare the effectiveness of one approach over another.

Competitive and non-competitive models: Rosenthal et al. (2004) distinguished between competitive vs. noncompetitive models and programs that reward for reaching a target vs. improvement as two significant features. Programs that force providers to compete for bonuses, i.e., creating distinct winners and losers are the most common are believed to provide a stronger incentive because even those with high baseline performance risk not receiving the bonus if others improve and they do not. The total dollars available are divided among all providers qualifying for the payment. The percentile threshold may remain consistent over time, however providers relative standing will change, leaving providers at risk of losing payments when others succeed.

Noncompetitive programs where all participants have the opportunity to reach a fixed target or implement a structural measure in order to share in a reward pool are said to provide less of an incentive and less risk to providers. If a provider achieves the target, they receive the performance payment regardless of the performance of others; it is possible that all providers may receive the performance payment.

Performance level vs. improvement: Rewards based on improvement toward rather than achievement of an absolute quality target may provide greater incentives for those with low baseline quality (Rosenthal et al., 2004) while rewarding those who have achieved targets favors those already delivering quality results (Keenan and Kline (2004). Rosenthal et al., (2004) notes that if there are diminishing returns to quality improvement activities, it may be less costly for providers at low baseline levels of performance than for those at a higher level to improve quality. In a review of 31 separate sponsors of pay-for-performance programs covering more than 20 million enrollees,

Rosenthal et al., (2004) found that the majority of programs reward good performance rather than improvement. Among the noncompetitive programs, bonuses were rarely prorated or tiered to reward partial achievement of the goal. The authors noted that this system seems to put providers who are already achieving good results at an advantage potentially leading to failure and loss of the low quality providers.

Penalizing poor performers: Most existing quality-based purchasing programs provide rewards for providing high-quality care and do not withhold payment for poor performance.[6] A concern about reducing payments to poor performers is that these providers may have few reserve resources and the reduced payment may force them to reduce their quality of care (Moyers and Feuerberg, 1997) or force them out of business.

1.3.2. Payment Structure

Bailit suggested several types of payment approaches in his 1999 report to the State of Minnesota on options for a Medicaid pay-for-performance system. Lump sum payments in which a nursing home receives a fixed financial reward for achieving a specific performance level are reportedly easy to administer and budget. If gradations to measures are introduced as well as payment for a variety of different measures, complexity increases. Another approach is to base payment on patient days. The size of the payment is dependent on the total number of patient days over a particular period of time. Larger nursing homes would potentially receive larger payments. Bailit pointed out that this would be more difficult to budget and administer. A variation on this approach is to base payment on a fixed percentage of the nursing home's total Medicaid service payments, which would be easier to administer. A further variation would be to base payment on the number of residents for whom certain measurable outcomes could be set and achieved (Moyers and Feuerberg, 1997).

In the context of physician practices, Epstein et al., (2004) noted that payments that are based on too many measures may overwhelm practitioners, while if based on too few measures, would encourage providers to focus on only a few areas, neglecting other aspects of care.

1.3.3. Performance Payment Amount

Bailit (1999) noted the risk in setting the performance payment too low as nursing homes would not be motivated to earn it. Setting it too high risks diverting a disproportionate amount of attention to those measures under review. Strunk and Hurley (2004) noted that in current programs, the size of the performance payment is typically modest compared with a provider's total revenue from a given plan – usually about one to five percent of total payments. Epstein et al., 2004 point out that for physician practices, for the payment to have any impact, a substantial proportion of the provider's practice must be involved. Larger practices can be motivated by smaller payments because expenses can be spread out over all a larger number of physicians, but that physicians are unlikely to respond to an incentive program that applies to less than 15 – 20 percent of their practice. According to Strunk and Hurley (2004) current programs do not yet know how large incentives need to be to achieve the desired change.

[6] One except is the Premier Hospital Quality Incentive Demonstration, which will include a penalty for poor care in the third year of the demonstration

Many quality improvement activities are costly, requiring more funds and effort tha performance payments will potentially cover. Bailit and Kokenyesi note that for health plans and providers, investing in quality improvement activities generally does not result in more enrollees or higher reimbursement for the health plan or provider. They point out that there is no strong business case for investing in quality improvement beyond what is required for accreditation purposes or for the small group that is interested in quality.

Moyers and Feuerberg (1997) point out that if the incentive is used to supplement an inadequate reimbursement system, it may prevent the degradation of care, but not promote optimum care. Larger incentives alone will not necessarily alter provider behavior to yield quality (Strunk and Hurley, 2004). Additionally, if the quality incentive is not in line with base payment objectives, the net effect could be rewarding opposing behaviors, yielding no effect regardless of the size of the payment. (Strunk and Hurley, 2004). Larger payments may also be inflationary if not used within a fee-based or capitated reimbursement system. Payments offered in addition to base payments cannot be cost neutral for the system. Payments withheld, reduced or not required (because no service was performed) from one set of providers and awarded to another group could achieve a budget neutral effect.

1.4. Nursing Home Performance Measures

This section contains background information on potential nursing home performance measures.

1.4.1. Staffing Levels

There is strong evidence that low nurse staffing levels seriously compromise quality of care. Based on previous studies, higher staffing levels in nursing homes has been found to be associated with fewer hospitalizations (Kramer, 2000 and 2001; Dorr et al., 2004), fewer infections (Dorr et al., 2004; Zimmerman et al., 2002), fewer pressure ulcers (Kramer, 2000 and 2001, Dorr et al, 2004; Bostick, 2004), less skin trauma (Kramer, 2000 and 2001), less weight loss (Kramer, 2000 and 2001) decreased resistance to care (Kramer, 2000 and 2001), higher levels of assistance (Schnelle et al., 2004) and improved functional status (Kramer, 2000 and 2001).

The strongest evidence that relates nurse staffing to resident outcomes is presented in the Phase I and later Phase II CMS Reports to Congress on *Appropriateness of Minimum Nurse Staffing Ratios in Nursing Homes* (CMS 2000, 2002). These studies found that staffing levels below certain identified levels had an adverse effect on hospital transfers related to congestive heart failure, electrolyte imbalance, respiratory infection, urinary tract infection, and sepsis as well as pressure ulcers, functional ability, weight loss, skin trauma and resistance to care. For each of these measures, there was a pattern of incremental benefits of increased staffing until a threshold was reached at which point there were no further significant benefits with respect to quality associated with higher staffing levels.

In related studies, Schnelle et al., (2004) reported that higher staffed homes performed significantly better on 13 of 16 care processes performed by nurse aides as compared to lower staffed homes. Using a combination of observation, resident and nurse aide interview, medical record review and wireless monitor to detect resident physical movement, Schnelle was able to show that at better staffed homes residents spent more time out of bed, were engaged more frequently, received better feeding and toileting assistance, were repositioned more frequently and show more physical

movement patterns during the day. Dorr et al (2005)'s study on potential cost savings from decreased adverse resident outcomes showed that minutes of RN staffing time per day demonstrated a net reduction in three classes of adverse outcomes: rehospitalizations, pressure ulcers and urinary tract infections. Their analysis showed an annual net societal benefit of $3,191 per resident per year in a high-risk long stay nursing home unit that employs sufficient nurses to achiever 30 – 40 minutes of RN direct care time per resident per day vs. nursing homes that have nursing time of less than 10 minutes. Bostick (2004), using MDS-based quality indicators and OSCAR data for 413 nursing homes, found a significant association between RN hours and prevalence of pressure ulcers, and an unfavorable association between LPN hours and prevalence of late loss ADL decline and pressure ulcers.

Staff turnover: There is turnover in all segments of the labor force, but turnover among nurse aides is among the highest of any service sector occupation, and turnover for RNs and LPNs working in nursing homes is also high. A recent survey conducted by the American Health Care Association (AHCA) (AHCA 2003) reported that, nationwide, annual turnover was 71 percent for nurse aides and around 50 percent for RNs and LPNs.

Intuitively, it seems reasonable that nursing home staff turnover would have important implications for the amount and quality of care that nursing home residents receive, although research has not definitely demonstrated such a relationship. Most previous research on nursing home turnover has been based on data from a small number of nursing homes. There is no current census or nationally representative sample survey of turnover and retention among nursing homes. Nursing staff turnover data are not routinely collected by the Center for Medicare and Medicaid Studies (CMS), nor are they typically part of state Medicaid Cost Reports.

The IOM (1996) maintains that "high turnover compromises the continuity of care and supervision of staff . . . high turnover rates adversely affect residents who do not cope well with frequent changes in staff." Turnover also requires orientation of new employees, time for new workers to get "up to speed," and time from existing staff to train new employees, thus reducing the amount of time available for providing care. Several previous studies have established a relationship between RN and LPN turnover and quality of care-- both of these studies are cited in IOM (1996) and are quite dated.

Evidence from several recent limited studies has shown an association between RN turnover and nurse aide turnover and retention with several resident outcomes. Zimmerman et al., (2002) found a higher rate of incident infections associated with RN turnover. Using data from 59 nursing homes, Zimmerman et al., (2002) found that for each proportionate loss of an RN (per FTE/100 beds) the risk of infection increased almost 30 percent and the risk of hospitalization increased more than 80 percent.

1.4.2. Performance Measures Based on Potentially Avoidable Hospitalizations

Nursing home residents are most commonly hospitalized for infections (Specht-Leible, 2003; Zimmerman et al., 2002, Bowman et al., 2001) falls and fractures (Specht-Leible, 2003), and cardiocascular events (Specht-Leible, 2003; Bowman et al., 2001). Pneumonia, a common nursing home acquired infection, is the leading cause of morbidity, death and hospitalization in nursing home residents (Zimmerman et al., 2002). Studies suggest that careful management of ambulatory care-sensitive conditions (e.g., congestive heart failure, chronic obstructive pulmonary disease, diabetes mellitus, urinary tract infections and pneumonia) may reduce hospitalizations and that as many as 36

percent of emergency department transfers and 40 percent of hospital admissions were inappropriate (Saliba et al., 2000). Studies also suggest that for some conditions there is no significant difference in outcomes between residents treated in nursing homes and those hospitalized (Naughton and Mylotte, 2000; Thompson et al., 1997; Fried et al., 1995). Furthermore, outcomes for nursing home residents transferred to the hospital may be worse than those who remained in the nursing home (Boockvar et al., 2005).

Previous studies have identified a relationship between nursing home staffing patterns and the rate of potentially avoidable hospitalizations. This may be because low-staffed nursing homes are less able to identify residents with declining health status or because they may not have sufficient staff to provide the types of special services (e.g., intravenous care) that would allow residents to be treated at the nursing home. Nursing homes with more staff in general (Mor, 1998), more physicians (above the median 0.08 FTE physicians on staff or contract) (Intrator et al., 1999), physician extenders (nurse practitioners or physician assistants) (Intrator et al., 1999; Intrator et al., 2003), nurse aide training programs (Intrator et al., 2003), and less RN turnover (Zimmerman et al., 2002) were less likely to hospitalize residents. Residents in nursing homes with more LPN FTEs (Carter and Porell, 2003) appear to have a greater risk of hospitalization. Kramer (2000) was able to identify nurse aide, and licensed staffing hours per resident day thresholds below which residents were at higher risk of hospitalization for four conditions (electrolyte imbalance, respiratory infection, urinary tract infection and sepsis).

Studies suggest that certain resident conditions are more strongly associated with risk for hospitalization than others. There is more evidence that pressure ulcers (Carter and Porell, 2003; Fried and Mor, 1997; Specht-Leible et al., 2003) and functional dependence (Specht-Leible et al., 2003; Fried and More, 1997) are associated with hospitalization, than for conditions such as weight change (Carter and Porell, 2003), accidents (Carter and Porell, 2003), feeding tubes (Fried and Mor, 1997), incontinence (Specht-Leible et al., 2003), and psychotropic drug use (Carter and Porell, 2003).

In its March 2005 report, the Medicare Payment Advisory Commission stated that the experts that they had interviewed unanimously suggested that re-hospitalization be used as an indicator of short-stay quality of care."[7] The National Quality Forum has also recommended re-hospitalizations as a quality measure for short-stay nursing home residents.[8]

1.4.3. Performance Measures Based on Resident Outcomes (MDS-Based Quality Measures)

Researchers have developed a set of quality measures (QMs) from the Minimum Data Set (MDS) to depict the care provided in nursing homes.[9] The QMs are prevalence or change measures aggregated at the nursing home level, capturing the use/lack of a care procedure or the presence/absence of a clinical condition in a nursing home. It is assumed that the variation of the QMs across nursing homes is due to the varying quality of care in nursing homes, and that the QMs are modifiable by changing

[7] Source: http://www.medpac.gov/publications/congressional_reports/Mar05_Ch02c.pdf

[8] Source: http://www.qualityforum.org/nursinghomememopg.pdf

[9] The Minimum Data Set (MDS) is collected by all Medicare or Medicaid certified nursing homes to fulfill federal government requirements. Following a uniform assessment protocol, nursing home staff record residents' clinical and functional information in MDS, including residents' physical and mental function, psychological well-being, clinical signs and symptoms, diagnoses and medications.

the care practice in a nursing home. CMS currently posts a subset of these QMs on its Nursing Home Compare web site.

The nursing home quality measures are posted on Nursing Home Compare provide information to consumers about the care provided by nursing homes and to nursing homes to help them improve their quality of care. Because each QM addresses one aspect of care, multiple QMs are needed to fully describe the care in nursing homes given the multidimensional nature of nursing home care. The QMs posted on Nursing Home Compare address various care areas and include measures for both the short and long-stay population.

The quality measures are calculated using the Minimum Data Set (MDS), using the resident assessment data that nursing homes routinely collect on their residents. Assessments for residents at a given nursing home are aggregated to create nursing home-level quality measures.

- "Chronic" care (CC) measures are calculated for long-stay residents, a population that typically consists of those who enter a nursing home because they are no longer able to care for themselves at home. These are long-stay residents who tend to remain at the nursing home anywhere from several months to several years.

- The post-acute care (PAC) measures are calculated for short-stay residents, those residents who are admitted to a nursing home and typically stay less than 30 days. These admissions typically follow an acute care hospitalization and involve high-intensity rehabilitation or clinically complex care.

Nursing Home Compare includes eight chronic care and three post-acute quality measures. The chronic care measures are:

- Percent of residents whose need for help with daily activities has increased
- Percent of residents who have moderate to severe pain
- Percent of residents who were physically restrained
- Percent of high-risk residents who have pressure sores
- Percent of low-risk residents who have pressure sores
- Percent of residents who spent most of their time in bed or in a chair
- Percent of residents whose ability to move about in and around their room got worse
- Percent of residents with a urinary tract infection
- Percent of residents who had a catheter inserted and left in their bladder
- Percent of residents who lose too much weight
- Percent of low-risk residents who lose control of their bowels or bladder
- Percent of residents who have become more depressed or anxious

There are three "post-acute" care quality measures endorsed by the NQF to be used in national public reporting. These include the following:

- Percent of short-stay residents with delirium
- Percent of short-stay residents who had moderate to severe pain
- Percent of short-stay residents with pressure sores

These QMs are calculated and reported for every nursing home in the United States for which sufficient MDS data are available.

Reliability and Validity of MDS-Based Quality Measures: Studies reveal contradictory findings with regard to the validity of currently available MDS QMs. We attribute these discrepancies primarily to the use of differences in nursing home and resident sample sizes and study methods utilized. The QMs that are posted on Nursing Home Compare were tested for both reliability and validity in more than 200 nursing homes in six states (see Morris et al, 2002).

In 2005, Abt Associates, Inc examined the validity of 29 of post-acute care (PAC) quality measures (Abt Associates, 2005). Twenty of these measures were found to be valid. The measures address a broad range of functioning and health status in multiple care areas and clinical domains, including clinical complexity (delirium; pain; bladder functioning; and respiratory functioning), functional status (including improvement measures that may encourage positive practices among providers and other functional status domains that are relevant to the post-acute care population, for example those that capture improvements in "early-loss" and "mid-loss"ADLs).

1.4.4. Performance Measures Based on Certification Surveys

All nursing homes that participate in the Medicare or Medicaid programs must undergo a standard survey at least once every fifteen months. Surveys are unannounced and are conducted by a team of health care professionals. State survey teams spend several days in the nursing home to assess whether the nursing home is in compliance with federal requirements. Certification surveys provide a comprehensive assessment of the nursing home, including assessment of nursing home administration, environment, kitchen/food services, and resident rights and quality of life. As part of the standard survey process, surveyors assess the quality of care provided to a sample of residents, using a series of specific investigative protocols. When a nursing home fails to meet a specific requirement that may have a negative impact on resident health and safety, surveyors cite the nursing home for a deficiency.

Deficiencies are classified into one of twelve categories based on scope (number of residents potentially or actually affected) and severity. Nursing homes must submit a plan of correction that includes information on how and when the nursing home corrected the deficiency and how it will be prevented in the future. Survey deficiency data is recorded in the CMS Online Survey Certification and Reporting (OSCAR) system. OSCAR is continually updated when new survey data are received from states.

A determination of substandard quality of care indicates that the nursing home as one or more deficiencies related to resident behavior and nursing home practices, quality of life, or quality of care that constitutes either immediate jeopardy to resident health or safety; a pattern of widespread actual

harm that is not immediate jeopardy or a widespread potential for more than minimal harm, but less than immediate jeopardy with no actual harm have not been met.

1.4.5. Other Potential Performance Measures

These are examples of performance measures that may be considered for the demonstration, potentially beginning in year 2. Other measures may also be considered.

Immunizations

Pneumonia and influenza together constitute the fifth major cause of death in people aged 65 and over (NVSR, 2005). Among those over age 65, nursing home residents are particularly vulnerable to developing severe complications of influenza and pneumonia as compared to their non-nursing home peers (Kingston and Wright, 2002). Nursing home residents have higher risks of exposure due to increased susceptibility related to age, comorbid conditions and frequent exposure to staff, visitors and volunteers from the community. Influenza and respiratory syncytial virus increased hospitalization rates, antibiotic use and deaths in elderly nursing home residents (Ellis et al., 2003).

The Centers for Disease Control (CDC) and Association for Practitioners in Infection Control and Epidemiology, Inc. (APIC) recommend the immunization of all nursing home residents and staff with patient contact (Sneller et al., 2000) against influenza. Vaccination can be 50 – 60 percent effective in preventing hospitalization or pneumonia and 80 percent effective in preventing death (CDC, 2004) A resident vaccination rate of 80 percent or higher can reduce the risk of an institutional outbreak (Patriarca, 1986), however, the average nursing home coverage for influenza immunizations, based on a sample of 22,182 residents during 1999-2002, was 56 percent (Bardenheier et al., 2004). Even with a high vaccination rates, the effectiveness of preventing influenza illness in this population often ranges from 30 – 40 percent (CDC, 2004, Monto, et al., 2001).

Because of inadequate antibody response evident in the elderly population, many nursing home residents continue to be at risk despite influenza vaccination (Potter et al., 1999). Immunization of at least 60 percent of staff in long term care nursing homes has been documented as associated with reducing influenza –like illness and deaths among residents even though vaccination of residents was not associated with significant effects on mortality (Potter et al., 1997; Carman et al., 2000). The Association for Practitioners in Infection Control and Epidemiology, Inc. (APIC) recommends that all healthcare workers in long term care nursing homes should be vaccinated in the fall of each year (Sneller et al., 2000).

Resident and Family Satisfaction

Nursing home satisfaction represents a multidimensional collection of issues related to various aspects and experiences of the particular group responding (i.e., resident or family). Based on our review of the published literature and examination of the currently available instruments in use and their processes for development, the following set of eight core domain areas were identified as key to resident and family satisfaction (Crystal et al., 2003, Edwards et al., 2000, Kane et al., 2003, Mostyn et al., 2000, RTI et al., 2003, Ryden et al., 2000, Tellis-Nyak, 2001):

- ***Overall Assessment:*** This domain represents the resident or family member's general level of overall satisfaction with care and services provided by the nursing home.

- ***Activities:*** This domain addresses questions about type of activities and their participation in those activities.
- ***Environment (e.g., Nursing home Appearance, Room, Maintenance, Housekeeping, etc.):*** Questions typically address resident's physical environment, surroundings, room, nursing units, odor, noise, and home-like environment.
- ***Food (e.g., Meals, Dining, Food):*** Questions usually address menu selection, taste and temperature of food and the eating experience including the dining room area.
- ***Autonomy/Privacy:*** This domain typically covers issues surrounding courteous and respectful treatment, respect for dignity, level of control, involvement in decision-making and maintenance of independence as much as health allows.
- ***Clinical Care and Treatment (Physician and Nursing Care):*** Given the health problems faced by most long-term care residents, the residents' evaluation of medical care and treatment figures prominently as an element of satisfaction. This domain covers issues associated with medical services, nursing services, delivery systems, and staff skills.
- ***Personal Care (e.g., Direct care, Nurse Assistants, Personal Care, etc.):*** In addition, to clinical services, many nursing home residents require assistance with personal care (e.g., dressing, bathing, toileting), often provided by certified nursing assistants.
- ***Staff Interaction – Clinical and Non-clinical Staff:*** Includes questions on the ease and effectiveness of communication with all staff including physicians, nurses, nurse aides and general nursing home staff and their responsiveness to questions and requests.

There are a number of resident and family surveys in use (or under development) having been constructed for a variety of purposes – for nursing home selection, for quality improvement initiatives, for public reporting and as a component to adjust reimbursement rates (e.g., provide care-related payment incentives). A number of these instruments have undergone extensive development and testing. In a study for the Maryland Health Care Commission, Abt Associates reviewed resident and family satisfaction surveys to assist Maryland with implementing state legislation requiring public reporting of nursing home quality of care and resident satisfaction (Moore et al., 2004).

The Nursing Home CAHPS instrument is one nursing home resident survey that is being developed. It builds on the work of the Consumer Assessment of Health Plans Survey (CAHPS), as an extension of the family of CAHPS instruments. Each CAHPS instrument covers aspects of care residents can report on and aspects of care that residents consider important. Domains relevant to nursing home care from the residents' perspective were developed from a review of the literature, interviews with experts, focus groups with residents and cognitive interviewing with residents. Domains include global ratings on staff care and nursing home as well as getting needed care, getting care quickly, staff helpfulness/courtesy, and staff communication. (Kosiak et al., No Date).

2. Performance Measures

The NHQBP demonstration is consistent with the Institute of Medicine (IOM) recommendation, contained in their report *Crossing the Quality Chasm* (IOM, 2001), that CMS develop a research agenda "to identify, pilot test, and evaluate various options for better aligning current payment methods with quality improvement goals." Under the demonstration, CMS will recognize and reward

quality by giving performance payments to homes depending on their performance on an array of performance measures.

Decisions made about which performance measures to use in the system and how they are used to determine performance payments is likely to have major implications on the expected outcomes of the demonstration, since improvement is most likely for those measures that are most highly rewarded in the system. Given the voluntary nature of the demonstration, selection of performance measures and the process for determining performance payments may also affect nursing home interest in participating in the demonstration.

Recommendation: In the initial year of the demonstration, the system should include four main types of performance measures: staffing, hospitalization, resident outcomes, and survey deficiencies.

We have identified a set of core measures to be used in the first year of the demonstration, and a set of measures that are not included in the system initially but that may be added during the second year of the demonstration or later pending the results of ongoing research and development efforts. We recommend that the initial quality-based purchasing system include these core performance measure categories:

- Nursing home staffing (nurse staffing levels and staff turnover and/or retention
- Rate of potentially avoidable hospitalizations
- Resident outcomes (MDS-based quality measures)
- Outcomes from state survey inspections

There are several other types of performance measures, including measures based on end-of-life care, residents' experiences, and staff immunization that may be appropriate to add as performance measures after the first year of the demonstration, pending further development.

Note that performance measure information for the base year will be determined either through existing data sources (e.g., for performance measures related to hospitalization, MDS-based, and survey deficiencies) or obtained directly from participating nursing homes as part of the process for applying for the demonstration (e.g., for staffing measures). (See Appendix C for an example of types of data that participating nursing homes would be required to supply.)

Options for establishing scoring rules

There are two basic options for establishing scoring rules for determining the number of points to award homes for their performance on each of the measures.

- The points associated with given performance levels could be determined based on performance in the demonstration year compared to the baseline distribution, using the baseline distribution as a scale for determining the number of points associated with a given performance level. The primary advantage of this approach is that it allows nursing homes to know in advance the points that are associated with performance on each measure. This may

be helpful to homes as they plan their quality improvement activities and facilitate their ability to monitor their performance during the year.

- Scoring could be based on relative ranking during each demonstration year, using the distribution during each demonstration year as the scale for determining the number of points associated with a given performance level. Under this option, nursing homes do not know ahead of time how many points are associated with performance on each measure, but this approach allows for more uniform distribution of points associated with each measure.

2.1. Performance Measures Based on Nursing Home Staffing

2.1.1. Staffing Performance Measures

Recommendation: Include three staffing performance measures: RN hours per resident day, total nursing hours per resident day, and turnover percentage for nursing staff.
Our recommendation is that the staffing-related performance measures include measures of both staffing level and turnover.

- Total nursing hours per resident day (RN, LPN, nurse aide)
- RN hours per resident day
- Turnover percentage for nursing staff (RN, LPN, nurse aide)[10]

Recommendation: Agency staff should be included in the total nursing and RN measures but given less weight than regular nursing home employees.
Our recommendation is that agency staff be counted in the total nursing hours and RN hours performance measures, but that agency staff be counted less than regular nursing home employees. This is because, while the use of agency staff is preferable to being understaffed, the use of agency staff may impact the continuity of care that residents receive and make it more difficult for residents to form relationships with the staff who provide their care.[11] As a result, we recommend a multiplier of 0.8 for agency staff, recognizing that there is no research currently available to guide selection of this multiplier.

Recommendation: Include a fraction of Director of nursing hours in the total nursing and RN measures.
It was also unclear as to whether Director of Nurse's (DON) time should be included in the RN and total nursing hours per resident day measures. The amount of direct hands-on care provided by DONs is limited, but they do provide some direct care, particularly at smaller homes. It is not feasible for homes to report the portion of DON time that is spent on direct patient care. Our recommendation is that CMS count 50 percent of DON hours in the RN and total nursing hours per resident day performance measures.

[10] Both turnover and staff retention were considered as performance measures. The two measures are highly correlated, but we believe that turnover is the better measure.

[11] For a description of these concerns, see the Congressional testimony of Steven Guillard, the CEO of a nursing home corporation (http://www.house.gov/ed_workforce/hearings/106th/oi/wrkrsht21700/guillard.htm).

Recommendation: The total nursing and RN measures should be based on hours worked as opposed to hours paid.

Nursing home payroll systems can generally distinguish between hours worked and hours paid. Hours worked captures the time that staff actually spent working at the nursing home. Hours paid includes hours that are paid to employees as components in a benefits package, including holidays, sick hours, and vacation hours. We recommend that staffing levels be defined based on hours worked, as this presents a more accurate picture of the amount of direct care provided for nursing home residents.

Table 2.1 shows the definitions for the performance measures in the staffing domain.

Table 2.1
Staffing Performance Measures: Definition

Measure	Definition
Nurse staffing hours per resident day	Defined as sum of RN, LPN, nurse aide, 50 percent of DON hours worked by nursing home employees and 80 percent of RN, LPN, and nurse aide hours worked by agency staff by total resident days for the reporting period.
RN hours per resident day	Defined as sum of RN, 50 percent of DON hours worked by nursing home employees, and 80 percent of RN hours worked by agency staff by total resident days for the reporting period.
Nursing staff turnover	100*(Number of nurse staff employees at the nursing home during the period / (average number of nursing staff employees) – 100.

Notes: Measure nurse staffing and RN hours per resident day based on hours worked as recorded in nursing home payroll records. Measure staffing agency hours as recorded in invoices to the nursing home.

Source: Abt Associates, 2006

2.1.2. Relative Weight of Staffing Performance Measures

Recommendation: Staffing performance measures should count for 30 percent (30 points) of a nursing home's performance score, with each measure counting for 10 percent (10 points).

Our recommendation is that the staffing performance measures count for a total of 30 points in the quality-based purchasing system, with the three staffing measures each counting for 10 points as shown in Table 2.2. The relative importance of the staffing domain reflects findings from the CMS Staffing Studies that showed a relationship between staffing levels, staffing stability and resident outcomes. Also, staffing data are derived from nursing home payroll records and are less subject to gaming and better able to be independently verified than some of the other performance measures.

Table 2.2
Staffing Performance Measures: Points

Measure	Points
RN hours per resident day	10
Nurse staffing hours per resident day	10
Nursing staff turnover	10

Source: Abt Associates, 2006

2.1.3. Casemix Adjustment of Staffing Performance Measures

Recommendation: Adjust the total hours per resident day measure based on the nursing home's RUG-III nursing index.

Differences across nursing homes in the average acuity (or casemix) of their residents affect the amount of nursing time that is required to adequately care for residents. For example, based on the casemix weights used in the Medicare prospective payment system, the residents in the highest casemix group require more than three times the amount of direct nursing care than residents in the lowest casemix group. Given differences in resident care needs, nursing homes with the same staffing level but differences in resident casemix could differ substantially in how well their staffing levels meet resident needs. Failure to adjust for resident casemix raises concerns about whether reported differences in staffing levels reflect differences due to the care needs of a nursing home's residents (i.e., differences in patient acuity or frailty) or actual, casemix adjusted differences in the amount of care provided to residents. It seems appropriate to adjust the staffing level performance measures to account for differences in nursing home casemix.

We recommend that the total nursing hours per resident day measure be adjusted based on the nursing home's RUG-III nursing index, which can be calculated from MDS assessments.[12] Medicare nursing home payments are set prospectively using the Resource Utilization Group (RUG-III casemix system), a system that is also used for Medicaid reimbursement in about 20 states. An advantage of RUG-III is that is familiar to the nursing home industry, so providers will understand the casemix adjustment model and many will have software that they can use to track their casemix adjusted staffing levels. If one or more demonstration states do not currently use the RUG-III quarterly assessment, then CMS may wish to require demonstration homes to complete the quarterly assessment so that the RUG-III nursing index can be calculated.[13]

While hospital-based homes tend to have substantially higher total nursing hours than freestanding homes, our analysis indicated that much of this difference is attributable to differences in the casemix of residents cared for at these types of homes. This suggests that, for the total nursing hours per resident day measure, there is no need to have separate scoring rules for hospital-based and freestanding homes.

- In 2003, based on staffing data from the CMS On-Line Survey, Certification, and Reporting System (OSCAR), the average staffing level for hospital-based homes was 5.26 hours, compared to 3.51 hours for freestanding homes.

- There are significant differences in the RUG-III nursing index for hospital-based and freestanding homes.

    - Hospital-based homes have a much higher proportion of Medicare residents than freestanding homes. Based on data from OSCAR, 44 percent of residents at

[12] For each RUG-III group, there is an associated nursing component of the payment rate that is intended to cover the costs of both nursing and social services and non-therapy ancillary costs (i.e., prescription drugs, respiratory therapy, equipment and supplies). If RUG-III were used to adjust staffing levels for casemix, it would make sense to focus only on the nursing index.

[13] The RUG-III quarterly assessment includes items that are required to assign residents to a RUG-III group, items that are not included in the standard MDS quarterly assessment.

hospital-based homes have their care paid for by Medicare, compared to only 11 percent of residents at freestanding homes.

- Short-stay residents have a higher average RUG-III nursing index than long-stay residents. We compared the distribution of residents by RUG-III group for those with Medicare and Medicaid-covered stays in Iowa.[14] There are significant differences in the casemix index for these residents. In 2002, 55 percent of Iowa residents with Medicare-covered SNF stays were in one of the RUG-III rehabilitation groups and 26.5 percent were in Extensive Care (Table 2.3).[15] Medicaid residents were much more likely to be in the Clinically Complex or Reduced Physical Functioning RUG-III categories, which have a lower casemix index. More than half of Medicaid residents were in Reduced Physical Functioning, the lowest category in the RUG-III system. In Iowa, the average nursing index was 0.71 for long-stay (Medicaid) residents and 1.33 for short-stay residents.

- Liu and Black (2003) found that, among short-stay residents, the average RUG-III nursing index was higher for residents at hospital-based homes (1.12) than for residents at freestanding homes (1.08).

- We can combine information on the differences in payer mix and casemix to estimate the average RUG-III nursing index for hospital-based and freestanding homes (Table 2.4). Based on this analysis, we estimate that the average RUG-III nursing index is 31 percent higher for hospital-based homes than for freestanding non-SNF homes.

Adjusting for differences in casemix considerably reduces the difference in total nursing hours for the two types of homes. Adjusting for casemix, the average staffing level for hospital-based homes is 4.08 hours compared to 3.51 hours at freestanding homes. Based on these analyses, we estimate that differences in casemix account for more than two-thirds of the observed difference in nursing hours per resident day between the two types of homes.

[14] Note that the Iowa data did not separately report RUG-III information for all long-stay residents, only those whose with a Medicaid-covered nursing home stay.

[15] Nationwide, 67.5 percent of residents with a Medicare covered stay were in a RUG-III Rehabilitation group and 13 percent were in the Extensive Care category.

Table 2.3
RUG-III Distribution for Residents in Iowa Nursing Homes Based on Primary Payer

RUG-III Group	Medicaid	Medicare
Rehabilitation	1.1%	55%
Extensive Service	1.2%	26.5%
Special Care	7.6%	1.2%
Clinically Complex	18.2%	5.0%
Impaired Cognition	19.2%	0.6%
Behavioral Problems	1.1%	N/A
Reduced Physical Functioning	51.6%	N/A
Not otherwise classified		11.8%
Average RUG-III nursing index	0.71	1.33

N/A: Not available.

Sources: Payer mix and staffing level information is from OSCAR. Casemix information is from CMS and the Iowa Department of Human Services Division of Medical Services.

Table 2.4
Comparison of Hospital-Based and Freestanding Nursing Homes in Iowa

Item	Hospital-Based	Freestanding
Percent short-stay	44%	11%
Percent long-stay	56%	89%
Average RUG-III nursing index	1.004	0.778
Average total nursing hours per resident day	5.26	3.51
Casemix adjusted staffing levels	4.08	3.51[†]

Note: Based on average RUG-III index from Table 2.3 weighted by the payer mix of hospital-based and freestanding homes and assuming that, within payer groups, casemix is higher for hospital-based homes based on the results of Liu and Black (2003).

[†]: Casemix adjusted staffing level for hospital-based homes adjusts for the relative RUG-III nursing index for the two types of homes (i.e., the casemix adjusted level is equal to 0.778/1.004 * 5.26, reflecting the higher casemix at hospital-based nursing homes).

Sources: Abt Associates analysis of staffing data from OSCAR and casemix information from CMS and the Iowa Department of Human Services Division of Medical Services.

Recommendation: Do not use RUG-III for the RN hours per resident day measure; instead determine points for hospital-based and other nursing homes separately.

We recommend separate scoring rules for hospital-based and freestanding homes. Hospital-based homes provide a fundamentally different type of care than freestanding homes, treating sicker patients who tend to require more extensive services. The question of whether to have separate targets for the two types of homes is largely one of fairness. Using separate scoring rules is appropriate if the higher RN staffing levels observed in hospital-based nursing homes reflects the higher acuity and greater care needs of the residents cared for in those homes.

There are very large differences in RN staffing levels for the two nursing home types, differences that are much larger than can be adjusted for in our casemix models. Using OSCAR staffing data for 2003:

- Median RN hours per resident day were 0.75 for hospital-based and 0.25 for freestanding homes.

- The 75th percentile of RN hours per resident day was 1.76 for hospital-based and 0.39 for freestanding homes.

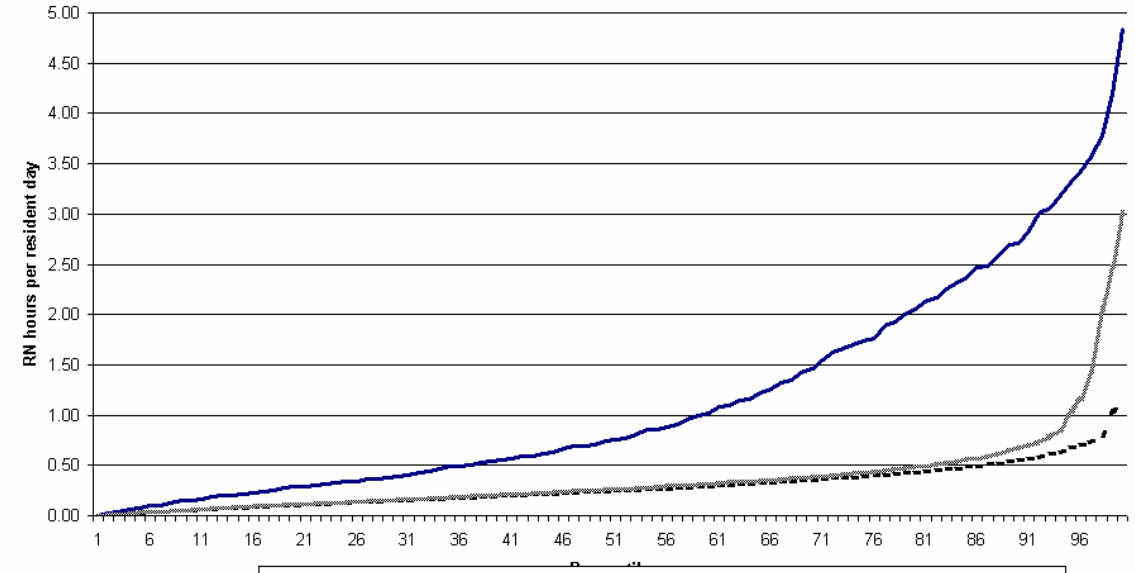
- 10 percent of hospital-based had 2.77 or more RN hours per resident day, while only 10 percent of freestanding homes had 0.56 or more RN hours per resident day.

Figure 2.1 shows the difference in RN staffing levels between the two types of homes, showing the RN staffing levels corresponding to different percentile ranks. It is clear that if the two types of homes have the same RN staffing scoring rules that a disproportionate share of hospital-based homes will achieve the maximum score. For example, the overall 90th percentile of RN staffing is 0.69 hours per resident day. More than 50 percent of hospital-based homes have RN staffing at this level, but only 5 percent of freestanding homes.

The RUG-III index was developed to account for variance in the total nursing time required to care for nursing home residents, not RN time *per se*. Much of the variance in the RUG-III nursing index is due to the splits of RUG-III categories into different groups based on the level of resident functioning on activities of daily living. Nurse aides rather than RNs provide most of the assistance to nursing home residents with activities of daily living. As a result, we do not believe that it is appropriate to use RUG-III for casemix adjustment of RN staffing levels.

It is clear from the analyses described above (Tables 2.3 and 2.4) that differences in the RUG-III nursing index account for relatively little of the difference in RN staffing levels for the two types of homes. Our recommendation is that separate scoring rules be established for freestanding and hospital-based homes for the RN hours per resident day performance measures. The use of separate scoring rules ensures that the distribution of points for the RN hours per resident day measure is the same for hospital-based and freestanding homes (i.e., a freestanding nursing home at the 50th percentile in terms or RN hours relative to other freestanding homes would receive the same number of points as a hospital-based home at the 50th percentile relative to other hospital-based homes). Note that, while we recommend using a separate scoring scale for hospital-based and freestanding homes, both types of nursing homes would be scored using the same scale for the total nursing hours and turnover performance measures.

Figure 2.1: RN Hours Per Resident Day for Hospital-Based/SNF and Freestanding Facilities



Source: Abt Associates, 2005

Recommendation: For the nursing staff turnover measure, have a combined measure across hospital-based and freestanding homes.

We recommend that the turnover performance measure be based on the turnover rate across all nursing home nursing staff (RN, LPN, nurse aide). This measure will be more straightforward for homes to report, as it avoids issues related to calculating turnover rates for employees who are promoted during the reporting period.

2.1.4. Scoring Rules

Recommendation: Points for the staffing performance measures should be based on the statistical distribution of the measures.

We recommend that a continuous scoring system be used that avoids thresholds and awards points over a wide range of values. Note that the fact that homes may receive points for relatively low performance levels does not necessarily mean that these homes will receive a performance payment for these levels of performance. The issue of how performance scores are used to determine performance payments is separate from the issue of scoring rules for performance measures.

As with all of the performance measures, one could use either the baseline distribution of staffing levels within each state to assign scores or use relative rankings during each demonstration year.[16] If the baseline distribution is used to set scoring rules, these targets should be established based on the staffing data furnished by homes that apply to be in the demonstration rather than OSCAR, which covers only a two-week period during the year.

[16] CMS plans to collect baseline staffing information on staffing from all nursing homes that apply to participate in the demonstration. See Appendix C for the draft data collection form.

There are a number of methods that could be used to assign points for each of the staffing measures. We recommend that CMS select from one of these three options:

- Option 1: One option is to give zero points to homes below the 5th percentile of the baseline distribution, the maximum number of points to homes at the 95th percentile, and to award points proportionately to homes between the 5th and 95th percentiles using the formula given in Table 2.5.

- Option 2: Another option is to award points to homes based on their percentile (or rank) in terms of the performance measure during each demonstration year, using the entire range of the distribution.

The first option determines points based on how a nursing home's performance compares to homes at the 95th percentile. If the distribution on the staffing measures is skewed, so that nursing homes at the 95th percentile have much higher staffing or much lower turnover levels than nursing homes at a slightly lower percentile, then most nursing homes would receive fewer points using Option 1 than they would using Option 2, under which points are assigned strictly based on nursing home's percentile ranking.

Note that, for each of these options, points could be determined based either on the distribution in the baseline period or the distribution during the demonstration year. Table 2.5 describes the scoring rule options for the staffing performance measures.

Table 2.5
Staffing Measures: Scoring Rules

Measure	Points	Scoring Rules
Total hours per resident day	10	Option 1: Allocate points between 5th and 95th percentiles based on level. Zero points at 5th percentile, maximum points at 95th percentile. Within 5th and 95th percentiles, allocate points within the range based on how close the nursing home is to the 95th percentile: Points= 10* (Measure$_{\text{Nursing home}}$ - Measure $_{\text{5th percentile}}$)/(Measure $_{\text{95th percentile}}$ - Measure$_{\text{5th percentile}}$). Option 2: Percentile (relative) rank Number of points= percentile rank * 0.10 (with an extra 0.1 to homes at the 99th percentile) For all three options, use RUG-III nursing index for casemix adjustment.
RN nursing hours per resident day	10	Same methodology as for total hours per resident day, except do not use RUG-III for casemix adjustment; instead create scores separately for freestanding and hospital-based homes.
Total nursing staff turnover percentage	10	Same methodology as for the total nursing hours per resident day, except that there is no casemix adjustment.

Source: Abt Associates, 2006

Example:

To give an example of how staffing performance measures would be calculated using the two options presented in Table 2.5, we use staffing data for California nursing homes. We used the California data because it included information on nursing home turnover levels that is not available for most states. It also includes annual measures of total nursing and RN hours per resident day that may correspond to the time period used in calculating performance scores in the demonstration. Because the source of the data used in this example is state Medicaid Cost Reports, the analysis under-represents hospital-based homes, which are less likely to provide care to Medicaid residents and be Medicaid-certified. As a result, we do not consider the separate performance measure for the RN hours per resident day measure that is discussed above. Also, note that it is not possible to apply the RUG-III casemix adjustment to these data, so unadjusted staffing levels are used. It is important to note that the distribution of staffing levels associated with given point assignments under Option 1 would likely be more uniform if it were possible to apply the RUG-III casemix adjustment.

Based on these data, the number of points that a nursing home would earn for given staffing and turnover levels varies considerably across the three options. Reflecting the skewed distribution of staffing levels for the high-staffed homes at the 95th percentile, most homes would earn fewer points for Option 1, which is based on nursing home staffing levels relative to these benchmarks than for Option 2, which awards points based on homes relative ranking (i.e., percentile). For example,

- A nursing home with median total nursing hours (3.332 hours per resident day) would receive 2.95 points using Option 1 and 5 points using Option 2 (Table 2.6). A nursing home with total nursing hours per resident day at the 75th percentile (3.582 hours per resident day) would receive 4.54 points using Option 1 and 7.5 points using Option 2.

- A nursing home with median RN staffing (0.299 hours per resident day) would receive 3.09 points using Option 1 and 5 points using Option 2 (Table 2.7). A nursing home at the 90th percentile in terms of RN hours (0.600 hours) would receive 7.58 points using Option 1 and 9 points based on Option 2.

- A nursing home with a median turnover percentage (48.57 percent) would receive 3.49 points using Option 1, and 5 points using Option 2 (Table 2.8). A nursing home at the 90th percentile of turnover (22.96 percent) would receive 8.06 points using Option 1 and 9 points using Option 2. Note that, for the turnover measure, a higher percentile corresponds to a lower turnover percentage.

Table 2.6
Distribution of Total Nursing Hours per Resident Day for California Nursing Homes, 2004

Percentile	Total Nursing Hours per Resident Day	Points	
		Option 1: 5^{th}-95^{th} percentiles	Option 2: Percentiles
1	1.314	0.00	0
2	2.132	0.00	0.2
3	2.433	0.00	0.3
4	2.644	0.00	0.4
5	2.866	0.00	0.5
10	3.039	1.10	1
15	3.106	1.52	1.5
20	3.154	1.83	2
25	3.186	2.03	2.5
30	3.216	2.22	3
35	3.247	2.41	3.5
40	3.276	2.60	4
45	3.302	2.76	4.5
50	3.332	2.95	5
55	3.365	3.16	5.5
60	3.404	3.41	6
65	3.447	3.68	6.5
70	3.521	4.14	7
75	3.582	4.54	7.5
80	3.681	5.16	8
85	3.811	5.98	8.5
90	4.018	7.29	9
95	4.446	10.00	9.5
96	4.667	10.00	9.6
97	5.036	10.00	9.7
98	5.818	10.00	9.8
99	8.879	10.00	10

Notes:

Option 1: Points= 10* ($Measure_{Nursing\ home}$ - $Measure_{5th\ percentile}$)/($Measure_{95th\ percentile}$ - $Measure_{5th\ percentile}$).
Option 2: Points equal percentile value * 0.1 (with an extra 0.1 to homes at the 99^{th} percentile and no points for nursing homes at the 1^{st} percentile).

Total nursing hours includes RN, LPN/LVN, nurse aide, and 50 percent of management (e.g., DON) hours. Per the performance measure specification described above, agency staff are counted at a ratio of 0.8 that of regular nursing home employees.

Source: Staffing and turnover data are from California Long-Term Care Annual Nursing home Data, 2004

Table 2.7
Distribution of RN Hours per Resident Day for California Nursing Homes, 2004

Percentile	RN Hours per Resident Day	Points	
		Option 1: 5th-95th percentiles	Option 2: Percentiles
1	0.029	0.00	0
2	0.055	0.00	0.2
3	0.064	0.00	0.3
4	0.072	0.00	0.4
5	0.092	0.00	0.5
10	0.127	0.53	1
15	0.149	0.86	1.5
20	0.173	1.21	2
25	0.195	1.54	2.5
30	0.219	1.89	3
35	0.239	2.19	3.5
40	0.258	2.48	4
45	0.282	2.83	4.5
50	0.299	3.09	5
55	0.320	3.40	5.5
60	0.346	3.78	6
65	0.373	4.19	6.5
70	0.400	4.59	7
75	0.427	5.00	7.5
80	0.464	5.55	8
85	0.521	6.40	8.5
90	0.600	7.58	9
95	0.763	10.00	9.5
96	0.825	10.00	9.6
97	0.918	10.00	9.7
98	1.152	10.00	9.8
99	2.242	10.00	10

Notes:

Option 1: Points= 10* (Measure$_{\text{Nursing home}}$ - Measure$_{\text{5th percentile}}$)/(Measure$_{\text{95th percentile}}$ - Measure$_{\text{5th percentile}}$).
Option 2: Points equal percentile value * 0.1 (with an extra 0.1 to homes at the 99th percentile and no points for nursing homes at the 1st percentile

Total nursing hours includes RN, LPN/LVN, nurse aide, and 50 percent of management (e.g., DON) hours. Per the performance measure specification described above, agency staff are counted at a ratio of 0.8 that of regular nursing home employees.

Source: Staffing and turnover data are from California Long-Term Care Annual Nursing home Data, 2004

Table 2.8
Distribution of Turnover Percentage for California Nursing Homes, 2004

Percentile	Turnover Percentage	Points	
		Option 1: 5th-95th percentiles	Option 2: Percentiles
1	195.52	0.00	0
2	133.35	0.00	0.2
3	121.73	0.00	0.3
4	118.53	0.00	0.4
5	111.37	0.00	0.5
10	92.7	0.84	1
15	82.74	1.29	1.5
20	74.14	1.60	2
25	68.68	1.93	2.5
30	63.15	2.25	3
35	59.71	2.53	3.5
40	56.35	2.85	4
45	53.19	3.16	4.5
50	48.57	3.49	5
55	45.33	3.97	5.5
60	42.41	4.30	6
65	39.3	4.65	6.5
70	36.59	5.00	7
75	33.46	5.58	7.5
80	30.34	6.14	8
85	27.29	7.03	8.5
90	22.96	8.06	9
95	14.86	10.00	9.5
96	8.25	10.00	9.6
97	5.72	10.00	9.7
98	3.36	10.00	9.8
99	0	10.00	10

Notes:

Option 1: Points= 10* (Measure$_{\text{Nursing home}}$ - Measure$_{\text{5th percentile}}$)/(Measure$_{\text{95th percentile}}$ - Measure$_{\text{5th percentile}}$).
Option 2: Points equal percentile value * 0.1 (with an extra 0.1 to homes at the 99th percentile and no points for nursing homes at the 1st percentile

Total nursing hours includes RN, LPN/LVN, nurse aide, and 50 percent of management (e.g., DON) hours. Per the performance measure specification described above, agency staff are counted at a ratio of 0.8 that of regular nursing home employees.

Source: Staffing and turnover data are from California Long-Term Care Annual Nursing home Data, 2004

2.1.5. Data Source for Staffing Data

Recommendation: Staffing data should be collected directly from participating homes and based on payroll records.

We recommend that nursing home payroll data be used to collect the staffing information necessary for the NHQBP demonstration. Homes would complete a form that includes information that can be verified using payroll records. The primary advantages of collecting staffing data directly from homes are that this would provide more accurate, reliable, and timely data than staffing measures from other potential data sources and would allow us staff turnover and retention, measures which are not available from any national data source.

All nursing homes must generate information on hours worked for each non-exempt employee to generate their payroll. Because payroll data originate from employees and are used to pay their salaries, there is an incentive for both the employers and employees to ensure accurate data. Most homes collect data on non-exempt employees' hours via some type of time recording device – using either paper time cards or an electronic system. Electronic systems collect time punches and store them for later transfer, with the more advanced models allowing management to transfer collected information to a computer for calculation and eventual payroll processing. Electronic systems utilize swipe badges, or in some cases, biometrics recognition systems (e.g., hand recognition) and may be integrated with schedules as well as with payroll software.

There are several studies that have examined the feasibility of using nursing home payroll records as a potential data source for a quality-based purchasing system. The Phase I and II "Appropriateness of Minimum Nurse Staffing Ratios in Nursing Homes" studies examined nursing home payroll records as a source of accurate, verifiable staffing information. These analyses indicated that there is variability in the types of payroll reporting systems used by nursing homes and in the staffing information captured in those systems. For this report, researchers conducted a survey of nursing homes to examine and describe nursing home payroll processes including the types of records available and procedures involved in maintaining and modifying those records. Survey findings supported the ability to provide payroll data among nursing homes that were not affiliated with major nursing home chains. Homes reported that they would be able to report resident census, nursing hours by licensure type, distinguishing hours worked and hours paid, and provide the information necessary to calculate turnover and retention.

We believe that it would be feasible under the demonstration to require participating homes to use payroll records and staffing agency invoices as the source for their staffing information and to document their submitted information. Requiring nursing homes to report their staffing information using payroll records is an important part of ensuring that accurate staffing data is used for the quality-based purchasing system.

Our recommendation is that homes report staffing levels, turnover, and resident census information using the data collection form that is included in Appendix C. The form, which could be collected for any specified time period, collects the following information:

- Staff hours worked by job category (DON, RN, LPN, nurse aide)
- Agency hours worked by job category

- Resident days (to calculate measures of hours per resident day)

- Number of nurse employees, by payroll period (to calculate average number of employees for the turnover calculation)

- Total number of nurses employed during the period

Given the specification for the measures described above, the form asks homes to report hours separately by job type and also to report hours separately for employees and staffing agencies.[17] Homes will be instructed that nursing home payroll records and invoices from staffing agencies should be the source documents used for the staffing information that is reported, thus permitting potential verification of the information that homes report (i.e., through electronic or paper submission of documentation of the reported information). CMS could select a sample of records for off-site audit and data verification, focusing on homes that report aberrant staffing information.

At least during the first year of the demonstration, it may be appropriate to collect this data quarterly so that the quality of the reported data can be monitored and any problems detected sooner than if the information were reported annually.

Our previous research into nursing home payroll systems suggests that homes can report staffing levels and turnover from their payroll records. As part of follow-up work to the CMS Staffing Study, Abt Associates researchers investigated the types of staffing data that homes have available in payroll records. Results from the survey indicated that most homes already have nursing hours worked by licensure type (RN, LPN, Nurse Aide) as well as information on staff turnover available in their payroll records. As a result, we believe that the reporting burden to homes will be minimal.

2.2. Performance Measure Based on Rate of Potentially Avoidable Hospitalizations

The intent of performance measures based on hospitalization rates is to give homes a direct incentive to reduce the rate of potentially avoidable hospitalizations. It is important that the system include this type of direct incentive since determination of the size of the performance payment pool in each state depends on the overall savings achieved by homes in the demonstration, not the savings generated by individual homes.

2.2.1. Identifying Potentially Avoidable Hospitalizations

Recommendation: Identify potentially avoidable hospitalizations using the list of ambulatory-care sensitive conditions developed by the Agency for Healthcare Quality and Research.
While the size of the performance payment pool depends on the certain Medicare savings achieved by demonstration homes in a state, there is concern that a performance measure based on overall hospitalizations is not fair because some types of hospitalizations are not potentially avoidable and are presumably not related to nursing home quality of care. For example, hospitalizations for

[17] While they would not actually need to separately report LPN hours given our staffing performance measures, homes typically track RN, LPN, and nurse aide hours separately.

conditions such as stroke, acute myocardial infarction, gastro-intestinal bleeding are not under the control of the nursing home, and we would not expect them to be related to nursing home quality-of-care or influenced by the NHQBP demonstration.

We recommend using the list of ambulatory-care sensitive conditions that was developed by the Agency for Healthcare Quality and Research (AHRQ) (Table 2.9). These are hospitalizations that stem from medical conditions thought to be largely avoidable and/or manageable (e.g., dehydration, diabetes, congestive heart failure, COPD, urinary tract infection) if they are treated in a timely fashion with access to outpatient physician and other medical support services. They would include hospitalizations that ended in death if the hospitalization were for one of the conditions defined as potentially avoidable.

The AHRQ list of ambulatory-care sensitive conditions was initially developed for community residents and not developed specifically for the nursing home population. It may be appropriate to review it to identify hospitalizations that likely result from conditions that developed in the nursing home. Carter (2003) found that nursing home-level factors and nursing home quality of care indicators significantly contributed to the risk of hospitalizations for ambulatory care sensitive diagnoses.

While the AHRQ list of ambulatory-care sensitive conditions is largely based on primary diagnoses, following Carter (2003) and the CMS Staffing Studies (2000, 2002), we recommend defining ambulatory-care sensitive hospitalizations using both primary and secondary diagnoses, using the diagnoses that are recorded on Medicare claims.

Table 2.9
Ambulatory Care Sensitive Diagnoses

Condition	ICD9 code/DRG	Further Selection Information
Congenital syphilis	090	Secondary diagnosis for newborns only
Immunization-related and preventable conditions	033, 037, 045, 320.0, 390, 391	Hemophilus meningitis [320.2] for age 1-5 only
Grand mal status and other epileptic convulsions	345	
Convulsions "A"	780.3	Age 0-5
Convulsions "B"	780.3	Age >5
Severe ear, nose, and throat infections	382, 462, 463, 465, 472.1	Exclude otitis media cases [382] with myringotomy with insertion of tube [20.01]
Pulmonary tuberculosis	011	
Other tuberculosis	012-018	
Chronic obstructive pulmonary disease	491, 492, 494, 496, 466.0	Acute bronchitis [466.0] only with secondary diagnosis of 491, 492, 494, 496
Bacterial pneumonia	481, 482.2, 482.3, 482.9, 483, 485, 486	Exclude case with secondary diagnosis of sickle cell [282.6] and patients <2 months
Asthma	493	
Congestive heart failure	428, 402.01, 402.11, 402.91, 518.4	Exclude cases with the following surgical procedures: 36.01, 36.02, 36.05, 36.1, 37.5, or 37.7
Hypertension	401.0, 401.9, 402.00, 402.10, 402.90	Exclude cases with the following procedures: 36.01, 36.02, 36.05, 36.1, 37.5, or 37.7

Table 2.9
Ambulatory Care Sensitive Diagnoses

Condition	ICD9 code/DRG	Further Selection Information
Angina	411.1, 411.8, 413	Exclude cases with a surgical procedure [01-86.99]
Cellulitis	681, 682, 683, 686	Exclude cases with a surgical procedure [01-86.99], except incision of skin and subcutaneous tissue [86.0] where it is the only listed surgical procedure
Skin grafts with cellulitis	DRG 263, DRG 264	Exclude admissions from skilled nursing home/intermediate care nursing home
Diabetes "A"	250.1, 250.2, 250.3	
Diabetes "B"	250.8, 250.9	
Diabetes "C"	250.0	
Hypoglycemia	251.2	
Gastroenteritis	558.9	
Kidney/urinary infection	590, 599.0, 599.9]	
Dehydration - volume depletion	276.5	Examine principal and secondary diagnoses separately
Iron deficiency anemia	280.1, 280.8, 280.9	Age 0-5 only, and examine principal and secondary diagnoses separately
Failure to thrive [783.4]	783.4	Age <1 only
Pelvic inflammatory disease	614	Women only denominator - exclude cases with a surgical procedure of hysterectomy [68.3-68.8]
Dental Conditions	521, 522, 523, 525, 528	

Note: All diagnoses refer to principal diagnosis, unless otherwise specified.

Source: Agency for Healthcare Research and Quality (http://www.ahrq.gov/data/safetynet/billappb.htm)

2.2.2. Rate of Potentially Avoidable Hospitalizations

Short-Stay Residents: Note that short-stay residents include anyone whose nursing home stay is paid for by Medicare. We used a file of linked Medicare hospital claims/MDS assessments for residents with Medicare-covered nursing home stays (i.e., short-stay residents) to analyze the rate of potentially avoidable hospitalizations. For this analysis, we analyzed all records with a nursing home admission date in 2003 (2,371,874 stays) and focused on hospitalizations that were either directly from the nursing home or that occurred within 7 days of the end of the Medicare-covered stay. Note that this file only includes information on the *first* hospitalization that occurs following SNF admission, not subsequent hospitalizations and that it does not include information on nursing home discharge date, only the end date for the Medicare-covered portion of the stay.

- 19.8 percent of SNF stays had a hospital admission within 7 days of the end of the Medicare-covered part of their stay[18] in which the primary or a secondary diagnosis was for an ambulatory-care sensitive condition (Table 2.10). This includes hospitalizations that occurred after the SNF stay ended (but within 7 days of discharge).

[18] Note that this file does not allow us to identify the date that the nursing home stay itself ends, only the last day that Medicare paid for their nursing home care.

- Five percent of SNF stays had a hospital admission within 7 days of discharge for which the primary diagnosis was for an ambulatory-care sensitive condition.

- Overall 24 percent of residents had a hospitalization (for any diagnosis) within 7 days of the end of the Medicare SNF stay. Thus, more than 80 percent of the hospitalizations that occurred had a diagnosis (primary or secondary) that indicated that the hospitalization was potentially avoidable.

- Many of these hospitalizations occurred very soon after the start of the SNF stay (see Figure 2.2). Overall, of the hospitalizations for ambulatory-care sensitive conditions, 32 percent occurred on or before the end of the Medicare-covered SNF stay, 12 percent occurred within 7 days of the end of the SNF stay, 5 percent occurred 8-14 days after the end of the SNF stay, 8 percent occurred 15-30 days after the SNF stay ended, and 43 percent occurred more than 30 days after the end of the SNF stay (Table 2.11).

Table 2.10
Hospitalizations of Residents with Medicare-Covered SNF Stays, 2003

Measure	Percentage
Any hospitalization within 7 days of end of SNF stay: Any diagnosis	24.4%
Any hospitalization within 7 days of end of SNF stay: Ambulatory Care Sensitive Condition	19.8%
Any hospitalization within 7 days of end of SNF stay: Ambulatory Care Sensitive Condition as primary diagnosis	5.0%

Source: DataPRO SNF Stay File, 2003

Table 2.11
Days Between End of Medicare-Covered SNF Stay and Hospitalization for Ambulatory-Care Sensitive Condition, 2003

Days From End of SNF Stay and Hospitalization	Percentage
0	31.5%
1	5.7%
2	1.3%
3	1.0%
4	0.9%
5	0.9%
6	0.9%
7	0.9%
8-14	5.0%
15-30	8.4%
31-60	10.5%
61-90	7.7%
91-120	6.0%
121-150	4.7%
151-180	3.7%
181-270	7.3%
271-365	3.7%

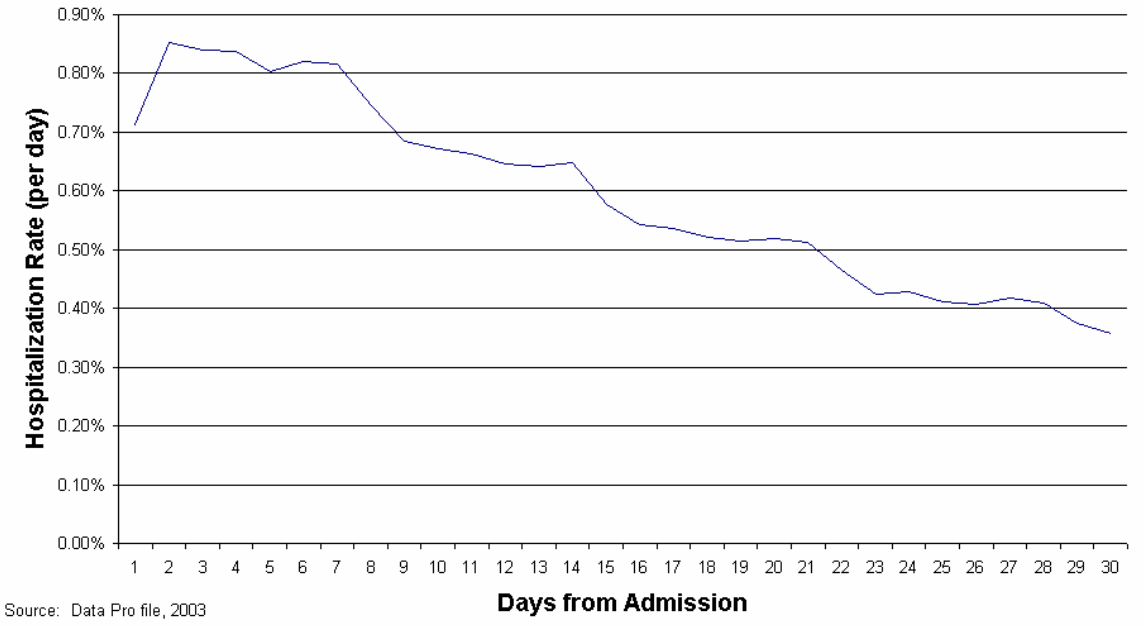
Source: DataPRO SNF Stay File, 2003

Long-Stay Residents: There is no existing data source for information on potentially avoidable hospitalizations for long-stay residents. However, based on analysis of the hospitalization rates of short-stay residents, we can infer that the hospitalization rate of long-stay residents is considerably lower than that of short-stay residents. To illustrate, Figure 2.2 shows the proportion of potentially avoidable hospitalizations that occurred on each day between 1 and 60 following admission. The rate decreases consistently the further from date of admission. Of the first hospitalization following SNF admission:

- 16.7 percent occurred within 10 days of admission
- 12.5 percent occurred within 11-20 days of admission
- 9 percent occurred within 21-30 days of admission
- 6.8 percent occurred within 31-40 days of admission
- 5.6 percent occurred within 41-50 days of admission
- 4.6 percent occurred within 51-60 days of admission
- 3.9 percent occurred within 61-70 days of admission
- 3.4 percent occurred within 71-80 days of admission
- 3.1 percent occurred within 81-90 days of admission

Given that the DataPRO data report only information on the initial hospitalization following SNF admission, but not subsequent hospitalizations, so the figures above likely overstate the difference in hospitalization rates between short and long-stay residents, assuming that some individuals have multiple hospital stays following SNF admission.

Figure 2.2: Rate of Hospitalizations for Ambulatory Care Sensitive Conditions By Days From Admission



Source: Data Pro file, 2003

2.2.3. Hospitalization Performance Measures

Recommendation: Use separate hospitalization performance measures for short- and long-stay residents based on the rate of hospitalization for an ambulatory-care sensitive condition divided by number of resident days.

Given that a nursing home's hospitalization rate is related to the proportion of short-stay residents at the nursing home, it seems appropriate to use separate performance measures for potentially avoidable hospitalizations of short and long-stay residents.

- *Rate of hospitalizations for short-stay residents:* Short-stay residents are defined as those with a Medicare-covered SNF stay. The rate of hospitalizations for short-stay residents equals the number of ambulatory-care sensitive condition hospitalizations for short-stay residents divided by the total number of short-stay days for the nursing home.

- *Rate of hospitalizations for long-stay residents:* Long-stay residents are defined as those whose stay is not covered by Medicare. Note that short-stay residents become long-stay residents after the end of their Medicare-covered SNF stay. The long-stay hospitalization rate equals the number of ambulatory-care sensitive condition hospitalizations for long-stay residents divided by the total number of long-stay days for the nursing home.

Note that the short-stay measure captures the re-hospitalization of residents admitted to the nursing home from the hospital. These performance measures are described in Table 2.12.

Table 2.12
Hospitalization Performance Measures: Definitions

Measure	Definition
Potentially avoidable hospitalization rate for long-stay residents	The rate of hospitalizations for long-stay residents equals the number of ambulatory-care sensitive condition hospitalizations for long-stay residents divided by the total number of long-stay days for the nursing home. Define potentially avoidable hospitalizations based on the list of diagnoses included in Table 2.9. Include hospitalizations that occurred during the nursing home stay or that began within seven days of discharge.
Potentially avoidable hospitalization rate for short-stay residents	The rate of hospitalizations for short-stay residents equals the number of ambulatory-care sensitive condition hospitalizations for short-stay residents divided by the total number of short-stay days for the nursing home. Define potentially avoidable hospitalizations based on the list of diagnoses included in Table 2.9. Include hospitalizations that occurred during the nursing home stay or that began within seven days of discharge.

Source: Abt Associates, 2006

2.2.4. Relative Weight of Hospitalization Performance Measures

Hospitalization performance measures are given a higher weight than measures based on MDS quality measures or survey deficiencies and count the same as the staffing performance measures.

Recommendation: We recommend that the hospitalization performance measures should count for 30 percent (30 points) of a nursing home's performance score.

Recommendation: We recommend that the relative weight of the short- and long-stay hospitalization measures should depend on the types of residents served by the nursing home, weighted by the relative hospitalization rates of short- and long-stay residents.
We recommend that the hospitalization domain count for 30 points (30 percent of the overall performance score) with the relative weight of the short and long-stay hospitalization measures depending on how much each contributes to a nursing home's expected hospitalization rate. To determine the relative weight of the short and long-stay hospitalization measures, we recommend using the relative rate of hospitalization (per resident day) for short-stay residents compared to long-stayers. For example, assume that the hospitalization rate of long-stay residents is four times as high as that of short-stay residents. Then, for a nursing home that has 80 percent long-stay residents and 20 percent short-stay, both the short and long-term measures would count equally, since there are four times as many long-stay residents but their risk of hospitalization is only 25 percent as high as that of short-stay residents. This approach avoids issues related to missing performance measures for homes that do not have sufficient short or long-stay residents. The formula for determining the relative weight of the short- and long-stay hospitalization rates is given in Table 2.13.

Table 2.13
Hospitalization Performance Measures: Points

Measure	Definition
Potentially avoidable hospitalization rate for long-stay residents	Each measure counts towards a total of 30 points depending on the distribution of residents at the nursing home and the relative hospitalization rate for short- and long-stay residents: Points $_{\text{long-stay}}$= 30*(number of long-stay resident days)/(number of long-stay resident days + (Relative hospitalization rate $_{\text{short stay}}$ * Number of short-stay resident days))
Potentially avoidable hospitalization rate for short-stay residents	Points $_{\text{short stay}}$= 30* (number of short-stay resident days)/(number of long-stay resident days + (Relative hospitalization rate $_{\text{short stay}}$ * Number of short-stay resident days)) Examples: Assume that the short-stay hospitalization rate is 4 times as high as the long-stay hospitalization rate. 1) For a nursing home with 500 short-stay resident days and 500 long-stay days, the nursing home would have 24 points for the short-stay hospitalization rate and 6 points for the long-stay hospitalization rate. 2) For a nursing home with 25 short-stay resident days and 100 long-stay resident days, both the short- and long-stay hospitalization measures would count for 15 points.

Source: Abt Associates, 2006

2.2.5. Scoring Rules

Recommendation: Use relative scoring rules for the hospitalization performance measures, using the baseline distribution of hospitalization rates or the relative ranking of homes in each demonstration year.

Given the lack of guidance in the literature about what constitutes good hospital performance in terms of hospitalization rate, we recommend using one of two approaches to set scoring rules:

- Use the national baseline distribution
- Use the relative ranking of nursing homes (either overall or within individual demonstration states) during each demonstration year

For each measure that can be calculated, points would be distributed proportionately for hospitalization rates between the 1st (i.e., highest rate of potentially avoidable hospitalizations) and 75th percentiles. No points would be awarded above the top quartile (i.e., lowest hospitalization rates) to minimize the incentive for homes to avoid appropriate hospitalizations. It is important that the demonstration not cause homes to be so aggressive in avoiding hospitalizations that they are providing poor care, and the truncation of hospitalization performance measure is intended to recognize that some hospitalizations, even for ambulatory-care sensitive conditions, are not avoidable.

Table 2.14
Hospitalization Performance Measures: Scoring Rules

Measure	Scoring Rules
Potentially avoidable hospitalization rate for long-stay residents	0 points for the nursing home with the highest rate of risk adjusted potentially avoidable hospitalizations among demonstration participants in the state. The maximum number of points if the potentially avoidable hospitalization rate is in the bottom 25 percent of all homes in the state Allocate points proportionately to nursing homes that are between the lowest quartile and the nursing home with the highest rate of potentially avoidable hospitalizations, with points distributed proportionately within this range. Do not award additional points above the lowest quartile (i.e., corresponding to the lowest hospitalization rates) to minimize the incentive for homes to avoid appropriate hospitalizations. Relative weight of long and short-stay measure is based on methods described in Table 2.7. Risk adjustment is recommended and could be based on MDS and claims data, building on the risk adjustment models used in the CMS Staffing Study.
Potentially avoidable hospitalization rate for short-stay residents	

Source: Abt Associates, 2006

2.2.6. Risk Adjustment

Recommendation: Risk adjustment models should be used for both the short- and long-stay hospitalization measures.
We recommend that risk-adjusted hospitalization rates be used, given the potential for the demonstration to have unintended effects on nursing home willingness to admit sicker patients who are at higher risk of hospitalizations if hospitalization rates are used to determine nursing home performance payments. We do not have sufficient hospitalization data to propose a specific risk-adjustment model, but can offer some general recommendations.

In the Phase II CMS Staffing Study, risk adjustment models were created using diagnoses from Medicare claims (hospital and SNF) in the six months before the SNF admission (Table 2.15) and from the five-day MDS assessment that was matched to a SNF claim. If the diagnosis was listed for any stay in the prior six months (either SNF stay or hospital) as either a primary or secondary diagnosis, the casemix covariate was denoted as present for the individual. This specification was selected because the covariates were all chronic conditions that would persist over time but that may not be reported during episodes with different primary diagnoses.

The MDS covariates varied based on the quality measure and included these MDS items:

- Age
- Barthel ADL score
- Bedfast

- Cognitive Performance Scale
- Congestive Heart Failure
- Do not resuscitate
- Dysphagia
- Feeding tube present
- Hypertension with complications
- Renal failure
- Requires assistance to eat
- Respiratory disease

Table 2.15
Covariates Used in CMS Phase II Staffing Study Risk Adjustment Models

Quality Measures	Covariates	ICD-9 CM
Respiratory infection	COPD; Chronic asthmatic bronchitis; emphysema, asthma, bronchiectasis, dysphagia	491.0-492.8; 493.0-494; 496; 787.2
Sepsis	Diabetes, Cancer, HIV	250.00-250.91; 140-208.9; 042; 795.71
UTI	Diabetes; quadriplegia, paraplegia, coma, urinary retention	250.00-250.91; 344; 344.1; 780.0; 788.2
Electrolyte imbalance	Congestive heart failure, renal failure, hypertension with renal failure and/or congestive heart failure	428.0-428.9; 398.91; 584.5-586; 402.01-402.11; 402.91; 403.01; 403.11; 403.91; 404.01-404.03; 404.11-404.13; 404.91-404.93
Congestive heart failure	Diabetes; chronic respiratory disease	250.00-250.91; 491.0-492.8; 493.0-494; 496

Source: CMS Phase II Staffing Study, 2002.

2.2.7. Minimum Required Sample

Recommendations:
Calculate the hospitalization measure only for homes with at least 25 residents (short-stay or long-stay) used in the short-stay hospitalization rate calculation.

We recommend that the hospitalization measure only be used for homes that have at least 25 residents (either short-stay or long-stay) that resided in the nursing home during the demonstration year that are available for calculating hospitalization rates. Note that this recommendation is based on the count of residents available to use in calculating hospitalization rates, not the number of resident days, as we do not have sufficient resident day information to make recommendations about minimum sample size requirements that are based on resident days.

Because the points allocated to the short-stay and long-stay measures are weighted based on the methods described in Table 2.13, the fact that some nursing homes may have none or very few residents of a given type may not be of concern—the calculation may be unreliable for one type of resident due to the small sample size, but this unreliable figure will count for only a very small portion of the nursing home's hospitalization score.

Analysis of the DataPRO file indicates that homes with between one and 25 short-stay admissions are more likely to have a zero hospitalization rate than homes with more admissions (Table 2.16). (Note that it is not possible with our data to replicate these analyses for long-stay residents). The zero hospitalization rate likely is due to random chance reflecting the small number of residents used in the hospitalization calculation. Homes with small numbers of residents used in the hospitalization rate calculation have a disproportionate share of outlier values. Our analysis indicates that, in 2003, 973 homes had between one and 25 short-stay admissions, and they would be excluded from the calculation of the short-stay hospitalization measure. Note that we are not able to estimate the number of homes that had no short-stay admissions during the year, so cannot provide an accurate estimate of the number of homes that would be excluded from the long-stay calculation using this criterion.

For nursing homes that have too few residents for the hospitalization performance measure to be calculated, our recommendation is that their performance score based on the number of points they have on the other performance measures divided by the maximum score that they could have received. This way, small nursing homes are not penalized because we cannot calculate their hospitalization rate. For example, a nursing home that receives 35 of the 70 points for the non-hospitalization measures, and has too few residents to calculate the hospitalization measure, would have a performance score of 50 (35 points divided by the maximum possible of 70 points that they could receive).

Table 2.16
Hospitalization Rate By Number of Admissions for Short-Stay Residents, 2003

Number of Short-Stay Admissions	Number of Homes (Percentage)	% of Homes with No Potentially Avoidable Hospitalizations	Mean Potentially Avoidable Hospitalization Rate
1- 25	973 (7.5%)	25.18%	14.16%
25-49	1,698 (13.2%)	1.12%	16.69%
50-74	1,649 (12.8%)	0.06%	19.12%
75-99	1,574 (12.2%)	0.00%	20.23%
100-149	2,423 (18.8%)	0.00%	21.55%
150-199	1,546 (12.0%)	0.00%	21.87%
200+	3,043(23.6%)	0.00%	20.69%

N= 12,906 nursing homes.

Note: We are unable to identify nursing homes that had zero short-stay admissions. Potentially avoidable hospitalizations are defined as those with an ambulatory-care sensitive condition as either a primary or secondary diagnosis.

Source: Abt Associates analysis of DataPRO file.

2.3. MDS Based Performance Measures

The use of performance measures based on resident outcomes is consistent with the IOM's recommendations that financial incentives be aligned with the achievement of better patient outcomes. We recommend using a subset of already-developed and validated MDS-based quality measures in this performance payment system design. (See Appendix D for the technical specifications used for these measures). These measures count less in the system than staffing and hospitalization measures.

2.3.1. Criteria for Measure Selection

The following criteria were applied to this selection of chronic and post-acute care quality measures, in order to arrive at a subset of measures from which to choose:

- ***Measures must be valid and reliable***. Selected QMs should reflect the real care processes in nursing homes, and for which accurate data are attainable. Given that there are QM validation studies that show different validity results for some measures (Morris, et. al, 2002, Schnelle et. al, 2004), a suggestion was made that QMs validated by multiple research studies be favored, which we support.

- ***Measures must be under the nursing home's control.*** To permit fair comparisons, selected QMs should not be unduly influenced by extraneous factors that are not under nursing home's control, e.g., random variation or casemix. In general, change measures are better candidates than prevalence measures for a quality-based purchasing system. Change measures are less likely to be influenced by casemix than prevalence measures, and the changes in residents' health conditions after being admitted to nursing home are more relevant to the nursing home's care quality.

- ***Measures should demonstrate good statistical performance, such as***

    - Stability over time

    - Distribution (preference for measures with meaningful variation in nursing home performance)

    - Sample size (preference for measures that can be calculated for most homes)

- ***Measures that reflect societal values should be considered***. Some measures may not meet all statistical criteria, but be appropriately included in the system because they reflect important societal values (i.e., restraint use should be avoided in all but extremely limited circumstances).

In order to arrive upon the final sample of recommended QMs to include in the nursing home performance payment system, we reviewed 1) publicly reported measures on the Nursing Home Compare website, hosted by CMS (http://www.medicare.gov/NHCompare/Home.asp), 2) publicly reported measures on the California Nursing home Search website (http://www.chcf.org/topics/view.cfm?itemID=20150), and 3) newly developed and validated measures of post-acute care quality developed under CMS contract using the "MegaQI" validation dataset (Moore et al, 2004).

All of these chronic and PAC QMs were reviewed against the selection criteria listed above. For example, rather than provide incentives to improve across multiple care domains that likely reflect very different care practices (e.g., catheter use and shortness of breath), we recommend designing the performance payment system to motivate nursing homes to initiate quality improvement across care areas that are clinically and/or functionally inter-related (e.g., incontinence and pressure sores), and therefore have a higher likelihood of achieving true quality improvement.

2.3.2. MDS-Based Performance Measures

Based upon review of candidate measures against established selection criteria, we recommend that a subset of measures for long-stay (or chronic care) residents and for post-acute care residents be used as performance measures in the quality-based purchasing system (Table 2.17).

Recommendation: Include these performance measures for long-stay residents: percent of residents whose need for help with daily activities has increased, percent of residents whose ability to move about in and around their room got worse, percent of high risk residents who have pressure sores, percent of residents who had a catheter inserted and left in their bladder, and percent of residents who were physically restrained.

Long-Stay Residents: We recommend the core set of MDS measures from those that are reported on both Nursing Home Compare and the California Nursing home Search (and were thus found to be valid and appropriate by the developers of this system). This would result in the following MDS-based performance measures:

- Percent of residents whose need for help with daily activities has increased
- Percent of residents whose ability to move about in and around their room got worse
- Percent of high risk residents who have pressure sores
- Percent of residents who had a catheter inserted and left in their bladder
- Percent of residents who were physically restrained

Recommendation: CMS should also consider whether it is appropriate to include short and long-stay performance measures based on pain.

Many nursing home residents have poorly controlled pain, and this pain can be managed by nursing homes, for example through appropriate medications. Poor pain management can have a significant impact on resident quality of life. Given the important relationship of pain to resident quality of life, CMS may also wish to consider pain-related performance measures for both short- and long-stay residents. We did not include pain with the other recommended MDS-based performance measures because of concerns about differences across nursing homes in how they assess pain. Previous studies (e.g., Cohen-Mansfield (2004), Fisher, Burgio, Thorn, et al. 2002) have found that the MDS underreports pain in cognitively impaired residents. As a result, differences in prevalence rates across homes may reflect differences in assessment practices rather than differences in nursing home quality of care

Several pain-related measures have, however, been validated, and using pain as a performance measure can provide incentives for nursing homes to improve their pain management practices. We recommend that CMS explore including pain-related performance measures based on the percentage of residents with moderate to severe pain. This measure would be reported separately for long-stay and short-stay residents.

Recommendation: Include these performance measures for short-stay residents: percent of residents with improving level of ADL functioning, percent of residents who improve status on mid-loss ADL functioning, failure to improve bladder incontinence.

Short-Stay Residents: We recommend that the short-stay measures be specified using one of the measures posted on Nursing Home Compare and a subset of the post-acute (PAC) quality measures

that were validated in a later study (Moore et al., 2004). These measures should reflect parallel care processes and/or outcomes as the chronic care measures. Recommended PAC QMs are:

- Percentage of residents with improving level of ADL functioning
- Percent of residents who improve status on mid-loss ADL functioning (transfer, locomotion) or remain completely independent in mid-loss ADLs
- Failure to improve bladder incontinence

Table 2.17
Recommended MDS-Based Performance Measures

Measure	Comments
Long-Stay Measures:	
Percent of residents whose need for help with daily activities has increased	This is a change measure that was endorsed by the NQF. Maintenance of ADLs is also related to an environment in which the resident is up and out of bed and engaged in activities. The CMS Staffing Study found that higher staffing levels were associated with lower rates of increasing dependence in activities of daily living.
Percent of residents whose ability to move about in and around their room got worse	This is a change measure that measures nursing home rules/practices related to use of mobility aides like eating, dressing, or getting to the bathroom. Residents who lose mobility may also lose the ability to perform other activities of daily living, like eating, dressing, or getting to the bathroom. There is substantial variation in this measure across homes.
Percent of high-risk residents who have pressure sores	The QM Validation Study identified a number of nursing home care practices that were associated with lower pressure sore prevalence rates including more frequent scheduling of assessments for suspicious skin areas, observations on the environmental assessment of residents, and care practices related to how the nursing home manages clinical, psychosocial, and nutritional complications. The CMS Staffing Study found that higher staffing levels were associated with lower pressure sore incidence rates.
Percent of residents who have/had a catheter inserted and left in their bladder	Using a catheter may result in complications, like urinary tract or blood infections, physical injury, skin problems, bladder stones, or blood in the urine. Our analysis indicates that this measure tends to be relatively stable across time at the nursing home level.
Percent of residents who were physically restrained	A resident who is restrained daily can become weak, lose his or her ability to go to the bathroom by themselves, and develop pressure sores or other medical complications. This is a measure that is more directly under the nursing home's control than some of the other measures. Our analysis indicates that, at the nursing home level, this measure tends to be relatively stable across time.
Short-Stay Measures	
Percent of residents with improving level of ADL functioning	These are change measures that we recommend including given that a primary focus of post-acute care is on the restoration of residents' function.
Percent of residents who improve status on mid-loss ADL functioning (transfer, locomotion) or remain completely independent in mid-loss ADLs	
Failure to improve bladder incontinence	

Source: Abt Associates, 2006

We considered all of the quality measures that are posted on Nursing Home Compare as potential performance measures, but rejected some of the measures based on the criteria described above. Table 2.18 provides additional details on the publicly reported measures that are not included as recommended performance measures.

Table 2.18
Potential MDS Performance Measures: Quality Measures That Were Rejected as Performance Measures for the NHQBP Demonstration

Measure	Comments
Percent of residents who spent most of their time in bed or in a chair	It may not be appropriate to include this as a performance measure. The prevalence rate is low (median of around 4 percent) and skewed, making comparisons of rates across homes problematic.
Percent of residents with a urinary tract infection (UTI)	We instead include as a performance measure the percent of short-stay residents with failure to improve bladder incontinence.
Percent of residents who have become more depressed or anxious	We do not recommend including this as a performance measure. There is some concern about the reliability of this item on the MDS. Identifying depression and anxiety can be difficult in elderly patients because the signs may be confused with the normal aging process, a side effect of medication, or the result of a medical condition.
Percent of low risk residents who have pressure sores	The statistical performance of the low-risk measure was inferior to that of the high-risk measure, as there were many nursing homes that had a zero percent rate of pressure ulcers for low-risk residents.
Percent of low risk residents who lose control of their bowels or bladder	Incontinence is a difficult issue for homes to address with the chronic population, and there was concern about how much control homes have over this measure.
Percent of residents who lost too much weight	We do not recommend including this as a performance measure. There are validity concerns about this item-- it failed validation in the pilot testing and was not included in the initial set of performance measures posted on Nursing Home Compare.
Percent of Short-Stay Residents With Delirium	This measure has a very low prevalence rate (median of 2 percent) and more than 25 percent of homes have any short-stay residents with delirium. Thus, the statistical performance of this measure is problematic for use in the quality-based purchasing system.
Percent of Short-Stay Residents Who Have Pressure Sores	We do not recommend including this as a performance measure. It was not found to be a valid measure in the "Validation of Long-Term and Post-Acute Care Quality Indicators" study.

2.3.3. Relative Weight of MDS-Based Performance Measures

Recommendation: MDS-based performance measures should count for 20 percent (20 points) of a nursing home's performance score.

We recommend that the MDS-based performance measures count for 20 points, with the points distributed equally across all of the measures that can be calculated (Table 2.19). For example:

- For homes for which both the long- and short-stay measures can be calculated (using the same minimum sample criteria as are used to determine whether measures are reported on Nursing Home Compare), each of the 8 measures would count for 2.5 points.

- For homes for which only the long-stay measures can be calculated, each of the 5 measures counts for 4 points.

- For the relatively small number of homes for which only the short-stay measures can be calculated, each of the 3 measures counts for 6.667 points.

Table 2.19
MDS-Based Measures: Points

Measure	Scoring rules
Long-Stay: Percent of residents whose need for help with daily activities has increased Percent of residents whose ability to move about in and around their room got worse Percent of high-risk residents who have pressure sores. Percent of residents who have/had a catheter inserted and left in their bladder Percent of residents who were physically restrained	Equal points for all measures that can be calculated: -- For homes for whom both short and long-stay measures can be calculated, each measure counts 2.5 points. -- If only long-stay measures can be calculated, each measure counts 4 points. --If only short stay measures can be calculated, each counts 6.67 points.
Short-Stay Percent of residents with improving level of ADL functioning Percent of residents who improve status on mid-loss ADL functioning (transfer, locomotion) or remain completely independent in mid-loss ADLs Failure to improve bladder incontinence	

Source: Abt Associates, 2006

2.3.4. Scoring Rules

Recommendation: Use the national baseline statistical distribution for MDS-based performance measures to determine the number of points associated with given performance levels.

There is little in the literature about what constitutes good performance on MDS-based quality measures. We recommend using an approach that is similar to what we recommended for the staffing and hospitalization performance measures.

- For each measure, homes would receive no points if their score was below the baseline 5^{th} percentile (i.e., the lowest 5 percent)

- Homes at or above the baseline top 95^{th} percentile (i.e., the highest 5 percent) earn the maximum number of points for the measure.

- Within the 5th and 95th percentile, points are awarded proportionately over the range using this formula:

Points= Maximum number of points for measure * (Nursing home value for measure- 5th percentile value of measure)/(95th percentile value of measure - 5th percentile value of measure)

Table 2.20 describes the scoring rules for the MDS-based measures.

Table 2.20
MDS-Based Measures: Scoring Rules

Measure	Scoring Rules
Long-Stay: Percent of residents whose need for help with daily activities has increased Percent of residents whose ability to move about in and around their room got worse Percent of high-risk residents who have pressure sores. Percent of residents who have/had a catheter inserted and left in their bladder Percent of residents who were physically restrained	For both short and long-stay measures: For each measure that can be calculated: • Zero points if at or below baseline 5h percentile • Maximum number of points if at or above baseline 95th percentile. • Within the 5th and 95th percentile, points distributed proportionately and continuously within the range using this formula: Points= Maximum number of points for measure * (Nursing home value for measure- 5th percentile value of measure)/(95th percentile value of measure - 5th percentile value of measure)
Short-Stay Percent of residents with improving level of ADL functioning Percent of residents who improve status on mid-loss ADL functioning (transfer, locomotion) or remain completely independent in mid-loss ADLs Failure to improve bladder incontinence	Maximum number of points is based on the rules described in Table 2.19.

Source: Abt Associates, 2006

2.4. Performance Measures Based on Survey Deficiencies

Onsite surveys, conducted by trained professionals, provide another dimension of quality assessment of nursing homes. All nursing homes that participate in the Medicare or Medicaid programs must be certified as meeting certain federal requirements. Certification is achieved through nursing home surveys, which occur on a regular basis (on average once every 12 months). We recommend that information from certification surveys be used in two ways: as a qualifying condition for receiving a performance payment and as a performance measure used in determining nursing home performance scores.

Recommendation: Nursing homes should be disqualified from any performance payment if they received one or more of certain types of serious deficiencies.
We recommend that homes be ineligible for any performance payment if they received one or more citations for substandard quality of care or received one or more citations for actual harm or higher in certain regulatory groups such as quality of life, quality of care, resident rights, resident behavior and nursing home practices and life safety. Given that the certification survey is the federal government's assessment of the nursing home's ability to meet even minimal requirements, this specification would help to address concerns that homes that otherwise have good performance measures would receive a performance payment even though surveyors may have identified serious quality-of-care issues.

Recommendation: Homes' survey performance score should be based on relative performance within a state, based on the number and level of deficiencies received by the nursing home.
The survey performance score uses a ranking system for nursing homes that is based on survey deficiency data. Individual citations, both health and life safety, are assigned points based on a scoring matrix according to their scope and severity.

2.4.1. Background

All nursing homes that participate in the Medicare or Medicaid programs must be certified as meeting certain federal requirements. Certification is achieved through nursing home surveys, which occur every 9-15 months. These surveys, which are unannounced, serve to evaluate the quality of care and services provided by nursing homes, as well as the nursing home's building, equipment, staffing, policies, procedures and finances. The surveys provide a snapshot of a nursing home's quality of care at the time of the survey.

When a nursing home fails to meet a specific requirement, the nursing home receives a deficiency citation. There are a total of 190 different types of deficiencies. These are categorized into 17 major areas (e.g., nursing, physical environment, food service, quality of care). Surveyors assign a scope and severity rating for each deficiency. The scope measures the number of residents affected by the deficiency, and is either isolated (affects one or a limited number of residents, staff, or occurrences), pattern (affects more than a limited number of residents or staff), or widespread (has the potential to affect a large portion of residents). Severity is a measure of the potential level of harm of the deficiency and is either: potential for minimal harm, minimal harm/potential for actual harm, actual harm[19], or immediate jeopardy.[20]

In 2004, more than 97 percent of homes received at least one deficiency, and the average number of deficiencies per nursing home was 8.4 (Table 2.21). More than 90 percent of homes received one or more "D" level citation, while only 0.5 percent received one or more "L" level citations (Table 2.22). There was considerable variation in deficiency patterns across states. In Nevada, the average number of deficiencies was 15.8, more than 2/3 of which were at the "D" level (Table 2.23). By contrast, the average North Dakota nursing home had only 3.95 deficiencies. In Vermont, more than 12 percent of deficiencies were at the "G" level, compared to only about 1 percent of deficiencies for California

[19] This is defined as a deficiency that results in a negative outcome that negatively affects the resident's ability to achieve their highest functional status.

[20] This is defined as a deficiency has caused or is likely to cause serious injury, impairment, or death to a nursing home resident.

homes. In 2002, about 15 percent of nursing homes received one or more deficiencies for substandard quality of care (Lieberman and Cheemalapati, 2003)

Table 2.21
Survey Deficiency Patterns for 2004

Item	Mean
Average number of deficiencies	8.4
Percentage of homes with one or more deficiency	97.6%

Source: Deficiency data from the Centers for Medicare & Medicaid Services, 2004

Table 2.22
Percentage of Nursing homes That Received a Deficiency, by Scope and Severity in 2004

Severity	Scope		
	Isolated	Pattern	Widespread
Immediate jeopardy to resident health or safety	J 3.1%	K 1.6%	L 0.5%
Actual harm that is not immediate jeopardy	G 23.8%	H 1.1%	I 0.001%
No actual harm with potential for more than minimal harm that is not immediate jeopardy	D 90.6%	E 62.5%	F 20.9%

Note: Shaded cells denote deficiency scope/severity levels that constitute substandard quality of care if the requirement which is not met is one that falls under the following federal regulations:42 CFR 483.13 resident behavior and nursing home practices; 42 CFR 483.15 quality of life; 42 CFR 483.25 quality of care.

Source: Deficiency data from the Centers for Medicare & Medicaid Services, 2004

Table 2.23
Average Number of Deficiencies, By State, 2004

State	Average Number of Deficiencies By Scope and Severity											Total
	B	C	D	E	F	G	H	I	J	K	L	
Alabama	0.17	0.48	5.35	0.95	0.57	0.39	0.01	0.02	0.12	0.04	0.04	8.14
Alaska	0.64	1.27	3.36	0.64	1.45	0.00	0.00	0.00	0.00	0.00	0.00	7.36
Arizona	2.21	0.54	4.59	2.02	0.14	0.28	0.07	0.00	0.00	0.05	0.00	9.91
Arkansas	0.94	1.00	2.88	4.92	0.97	0.32	0.20	0.00	0.16	0.32	0.10	11.81
California	2.53	0.57	6.19	1.75	0.20	0.15	0.01	0.00	0.01	0.01	0.00	11.43
Connecticut	0.25	0.39	8.93	0.53	0.12	1.52	0.06	0.00	0.00	0.00	0.04	11.85
Colorado	0.69	0.08	5.93	2.27	0.04	0.67	0.03	0.00	0.00	0.01	0.01	9.72
DC	1.90	1.60	8.60	1.65	0.05	0.95	0.00	0.00	0.00	0.00	0.00	14.75
Delaware	1.70	0.16	9.11	2.27	0.38	0.68	0.00	0.00	0.00	0.03	0.00	14.32
Florida	0.23	0.21	5.75	1.49	0.79	0.16	0.00	0.00	0.02	0.02	0.01	8.68
Georgia	0.80	0.55	4.85	1.37	0.29	0.44	0.02	0.00	0.12	0.13	0.00	8.57
Hawaii	0.33	0.86	4.61	1.14	0.33	0.36	0.03	0.06	0.08	0.00	0.00	7.81
Idaho	0.99	0.46	5.09	1.59	0.66	0.97	0.00	0.00	0.21	0.01	0.00	9.97
Illinois	0.66	0.57	3.83	1.11	0.12	0.68	0.01	0.00	0.15	0.02	0.01	7.15
Indiana	0.31	0.06	4.03	1.89	0.09	0.83	0.04	0.00	0.04	0.05	0.02	7.35
Iowa	0.28	0.18	3.09	1.87	0.44	0.43	0.00	0.00	0.03	0.01	0.00	6.33
Kansas	0.11	0.55	4.92	3.41	1.08	0.83	0.08	0.01	0.11	0.01	0.00	11.11
Kentucky	0.33	0.36	3.99	1.47	0.38	0.32	0.01	0.00	0.03	0.02	0.01	6.92
Louisiana	0.75	0.20	4.86	4.70	0.36	0.38	0.00	0.00	0.12	0.07	0.04	11.48
Maine	1.54	0.95	4.98	1.94	0.38	0.22	0.01	0.00	0.03	0.00	0.00	10.05
Maryland	1.59	0.45	5.51	2.77	0.14	0.54	0.01	0.00	0.00	0.00	0.00	11.01
Massachusetts	0.16	0.12	3.97	1.15	0.20	0.54	0.02	0.00	0.01	0.00	0.00	6.16
Michigan	0.83	0.44	5.49	2.20	0.15	0.27	0.00	0.00	0.02	0.02	0.00	9.42
Minnesota	0.83	0.44	5.49	2.19	0.15	0.27	0.00	0.00	0.02	0.02	0.00	9.42
Mississippi	0.12	0.31	2.52	0.94	0.52	0.31	0.00	0.01	0.25	0.05	0.25	5.29
Missouri	0.17	0.20	4.45	3.11	0.63	0.47	0.09	0.00	0.16	0.01	0.00	9.29
Montana	0.34	0.46	2.96	2.29	0.70	0.22	0.00	0.00	0.04	0.02	0.01	7.04
Nebraska	0.11	0.14	3.41	2.19	0.41	0.39	0.01	0.00	0.00	0.01	0.00	6.68
Nevada	1.30	0.58	10.65	2.18	0.48	0.58	0.00	0.00	0.05	0.00	0.00	15.80
New Hampshire	0.14	0.20	4.84	1.38	0.73	1.05	0.00	0.00	0.11	0.00	0.00	8.45
New Jersey	0.47	0.09	3.59	1.48	0.35	0.22	0.04	0.00	0.12	0.01	0.02	6.37
New Mexico	0.54	0.29	4.90	3.35	0.33	0.68	0.05	0.00	0.02	0.03	0.00	10.19
New York	0.44	0.15	3.36	1.13	0.07	0.23	0.01	0.01	0.03	0.06	0.01	5.49
North Dakota	0.65	0.28	2.06	0.62	0.11	0.19	0.01	0.00	0.01	0.01	0.00	3.95
North Carolina	0.53	0.28	4.43	1.34	0.23	0.59	0.02	0.00	0.16	0.06	0.01	7.63
Ohio	0.62	0.29	3.41	1.11	0.20	0.22	0.00	0.00	0.03	0.00	0.00	5.89
Oklahoma	0.91	0.57	3.28	4.67	0.68	0.37	0.08	0.00	0.08	0.10	0.11	10.85
Oregon	0.35	0.14	2.84	1.76	0.19	0.73	0.05	0.00	0.04	0.05	0.02	6.16
Pennsylvania	0.33	0.30	3.92	1.59	0.30	0.49	0.01	0.00	0.00	0.01	0.00	6.96
Rhode Island	0.26	0.43	4.63	0.83	0.60	0.23	0.04	0.00	0.00	0.00	0.00	7.01

South Carolina	0.18	0.29	5.43	1.78	0.32	0.91	0.07	0.00	0.13	0.38	0.11	9.60
South Dakota	0.50	0.65	2.45	1.12	0.08	0.40	0.12	0.00	0.00	0.00	0.01	5.32
Tennessee	0.07	0.36	5.40	1.67	0.44	0.53	0.02	0.00	0.10	0.08	0.03	8.70
Texas	0.80	0.92	3.23	2.43	0.61	0.43	0.01	0.00	0.04	0.04	0.01	8.54
Utah	0.94	0.20	1.99	2.06	0.16	0.35	0.00	0.00	0.06	0.05	0.00	5.82
Vermont	0.11	0.28	4.06	1.14	0.11	0.83	0.22	0.00	0.00	0.03	0.03	6.81
Virginia	0.59	0.42	5.08	0.83	0.29	0.42	0.02	0.00	0.03	0.01	0.02	7.73
Washington	0.80	0.24	5.71	2.10	0.38	1.18	0.06	0.00	0.05	0.04	0.00	10.57
West Virginia	1.05	0.99	5.28	2.20	0.81	0.31	0.00	0.00	0.01	0.01	0.00	10.65
Wisconsin	0.25	0.22	3.16	1.16	0.08	0.36	0.02	0.00	0.07	0.02	0.00	5.36
Wyoming	0.77	0.09	5.89	1.49	0.34	0.46	0.03	0.00	0.14	0.00	0.00	9.20

Source: Deficiency data from the Centers for Medicare & Medicaid Services, 2004

Several rating systems have been developed to rank nursing home performance based on survey deficiencies (American Health Care Association, 2003). Most of these rating systems use survey deficiencies received by homes, with deficiencies over a specified time period receiving numeric weights based on the scope and severity of each deficiency. These are aggregated to obtain a nursing home's total survey performance score. These systems vary with respect to the types of deficiencies that are considered, the relative weight given to deficiencies of different scope/severity, the number of surveys used, whether complaint surveys are considered, and whether nursing home performance is based on an absolute performance score or a relative score, for example, based on nursing home quintile.

2.4.2. Survey Performance Measures

We believe that it is important that outcomes from state survey deficiencies be used in the quality-based purchasing system. In addition to using survey deficiencies to determine nursing home performance scores, we recommend that certain types of survey deficiencies make a nursing home ineligible for receiving any performance payment.

Recommendation: Nursing homes should be disqualified from any performance payment if they were cited for a serious deficiency during their most recent survey.

We recommend that homes be ineligible for any performance payment if they received one or more citations for substandard quality of care or for being out of compliance with actual resident harm or jeopardy on their most recent survey (See Table 2.24 for the definition of sub-standard quality of care). Given that the certification survey is the federal government's assessment of the nursing home's success in meeting even minimal requirements, this specification would help to address concerns that homes that otherwise have good performance measures would receive a performance payment even though surveyors may have identified serious quality-of-care issues.

Recommendation: Survey performance should be defined based on a subset of deficiencies, weighted based on scope and severity.

For each deficiency, the score should be weighted based on scope and severity. We recommend that weights be assigned based on deficiencies at the "D" level or higher, as follows:

- D: Weighting factor is 2
- E: Weighting factor is 4

- F: Weighting factor is 6
- G: Weighting factor is 10
- H: Weighting factor is 20
- I: Weighting factor is 30
- J: Weighting factor is 50
- K: Weighting factor is 100
- L: Weighting factor is 150

For example, using these weighting factors, a deficiency with a scope/severity of "H" (severity: actual harm; scope: pattern) would count 10 times more than a deficiency with a scope/severity of D (severity: no actual harm with an isolated or pattern scope). The weighting factors do not consider deficiencies at the "A","B", or "C" levels, deficiencies with a severity level of no actual harm with potential for only minimal harm. This is because we believe that differences across homes in citations for these minor deficiencies likely reflect differences across surveyor teams in what is cited than it does differences in quality of care across homes. Figures 2.3 and 2.4 show the average weights by state for the year 2004.

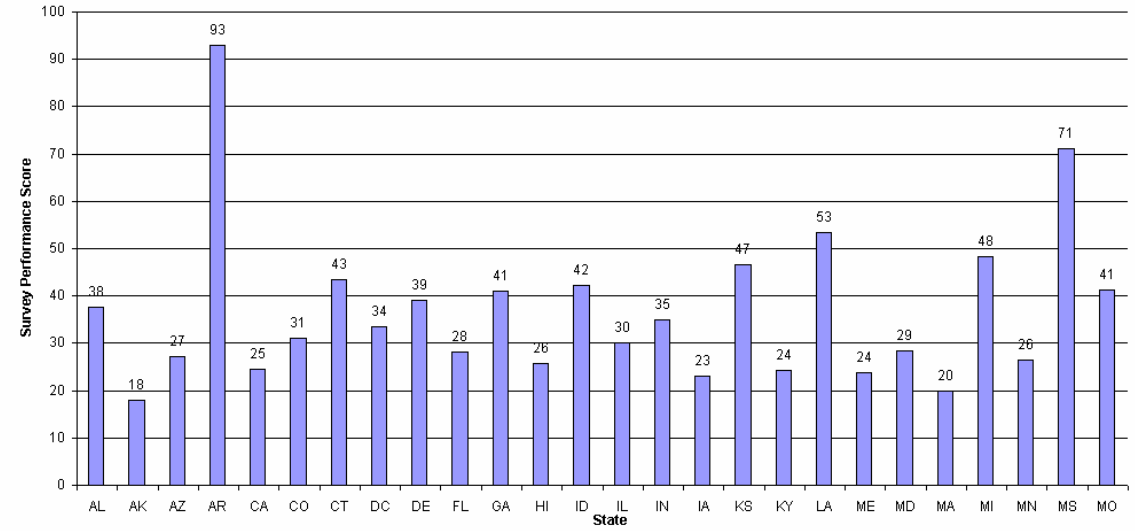
As with the other performance measures, the distribution of weights could be used to rank nursing homes. Those nursing homes with a lower weight would be ranked higher in terms of quality. The relative ranking would include all demonstration homes in a state, including those who are ineligible for receiving a performance payment due to a finding of substandard quality of care.

Table 2.24
Survey Performance Measures: Definitions

Measure	Definition
Qualifying condition for receiving any performance payment	Homes with a finding of sub-standard quality of care on their most recent survey are ineligible for a performance payment, regardless of their performance on other performance measures. A determination of substandard quality of care indicates that one or more requirements under the federal regulations 42 CFR 483.13 (resident behavior and nursing home practices), 42 CFR 483.15 (quality of life), or 42 CFR 483.25 (quality of care) which constitutes either immediate jeopardy to resident health or safety; a pattern of widespread actual harm that is not immediate jeopardy or a widespread potential for more than minimal harm, but less than immediate jeopardy with no actual harm have not been met.
Survey weights	The number of deficiencies received by the nursing home, weighted by scope and severity, using the following: A-C- Weighting factor is zero D: Weighting factor is 2 E: Weighting factor is 4 F: Weighting factor is 6 G: Weighting factor is 10 H: Weighting factor is 20 I: Weighting factor is 30 J: Weighting factor is 50 K: Weighting factor is 100 L: Weighting factor is 150 A relative scoring system could be used. Participating homes would be ranked within each demonstration state with points awarded based on percentile ranking. Homes with zero deficiencies would receive the maximum score of 20 points, while the nursing home with the highest survey weight (corresponding to the worst survey outcomes) would receive zero points. Note that, as with other performance measures, performance scores could be based either on the baseline distribution or the distribution during the demonstration period. The exact number of points corresponding to each weighted deficiency depends on the number of deficiencies and number of surveys that are used. Homes cannot have a survey weight that is less than zero.

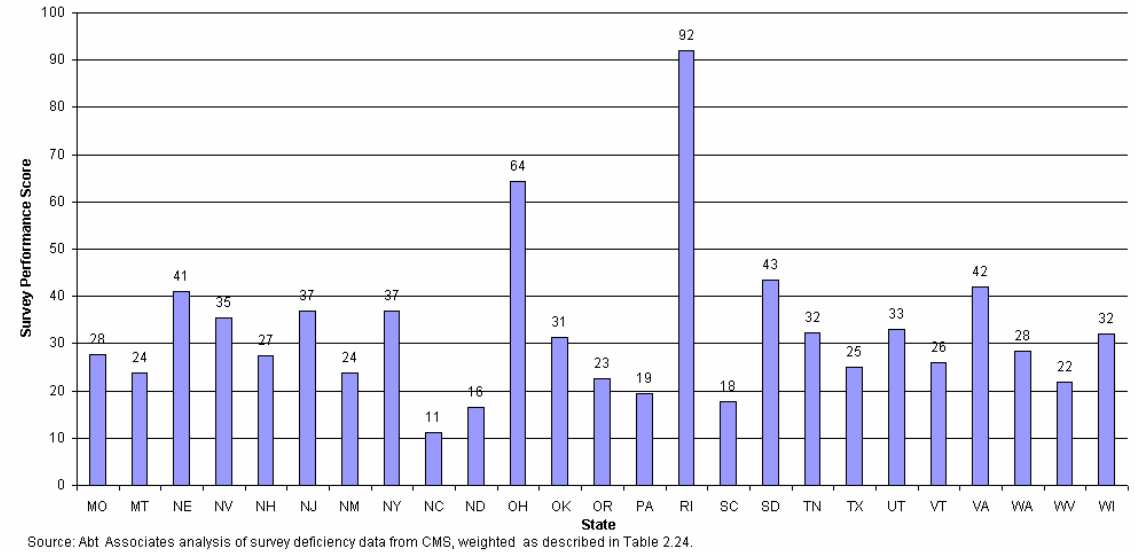
Source: Abt Associates, 2006

Figure 2.3: Weighted Survey Deficiencies By State, 2004



Source: Abt Associates analysis of survey deficiency data from CMS, weighted as described in Table 2.24.

Figure 2.4: Weighted Survey Deficiencies By State, 2004



Source: Abt Associates analysis of survey deficiency data from CMS, weighted as described in Table 2.24.

Recommendation: We recommend that survey performance measures should count for 20 percent of a nursing home's performance score.

Our recommendation is that the staffing performance measures count for a total of 20 points (20 percent of the total points). Note that performance payments will be determined on a state-by-state basis, reducing concerns about the variations in survey outcomes across states.

Example:

To show how nursing home survey results are used to determine the survey performance score and determine how many points to give the nursing home for their survey performance, we give an example using actual survey deficiency data from 11 nursing homes (Table 2.25):

- Nursing home 1, which was cited for 3 D-level deficiencies had the lowest survey weight of the nursing homes in this example (i.e., the best survey outcome), and would receive the maximum 20 points for survey performance.

- Nursing homes 4 and 5 had the same survey weight (26 points), and they would both receive 15 points (the average of the number of points given to nursing homes with their relative ranking).

- Nursing home 11 had the worst survey performance and would receive no points for the survey performance category.

- Note that any nursing home that had a citation for substandard quality of care would be ineligible to receive an incentive payment, but they would be included in the relative ranking of nursing homes used to determine points for the survey performance category.

Table 2.25
Example of How Survey Deficiencies Are Used to Determine Survey Weights and Associated Performance Score

Nursing Home	Deficiencies Cited on Most Recent Survey	Survey Weight	Survey Performance Score
1	3 D-level	6	20
2	2 B-level, 1 C-level, 5 D-level	10	18
3	7 D-level. 1 E-level	18	16
4	1 C-level, 5 D-level, 1 F-level, 1 G-level	26	15
5	11 D-level. 1 E-level	26	15
6	1 C-level, 7 D-level, 2 G-level	34	10
7	2 C-level, 16 D-level, 2 E-level, 1 G-level	50	8
8	2 C-level, 15 D-level, 4 E-level 3 F-level, 1 G-level	74	6
9	3 C-level, 14 D-level, 5 E-level 3 F-level, 1 H-level, 1 I-level	122	4
10	10 D-level, 1 E-level 1 F-level, 3 I-level	220	2
11	7 D-level, 1 G-level 2 L-level	324	0

Notes: The data presented in this table are based on actual survey deficiency data for 11 selected nursing homes.

Source: Abt Associates, 2006

Recommendation: Only use the most recent survey in the demonstration year and related complaint surveys in measuring survey performance.

Our recommendation is that only the most recent standard survey in the demonstration year and related complaint surveys be considered for determining a nursing home's survey performance score. There are two main reasons for this recommendation:

- The intent of the demonstration is to reward homes for their current performance level, not penalize them for past performance. Penalizing homes for survey outcomes that occurred before the demonstration started may deter homes that had major deficiencies on previous surveys from participating in the demonstration, and this may limit the relevance of findings from the evaluation for a national quality-based purchasing model in which these types of homes would participate.

- None of the other performance measures consider performance from the pre-demonstration period, and considering past performance for survey outcomes only is inconsistent and adds unnecessary complexity to the system.

2.4.3. Data Source for Survey Deficiencies

Survey deficiency data is recorded in the CMS OSCAR system. OSCAR is continually updated when new survey data are received from states.

2.4.4. Risk Adjustment of Survey Performance Score

There would be no risk adjustment of the survey performance score. Depending on the states that are selected for the demonstration, however, it may be appropriate to refine the weights given to different types of deficiencies to ensure that the measure has good statistical performance (i.e., good variation across homes). For example, in states that issue low numbers of deficiencies, it may be appropriate to increase the weights given to different scope/severity levels so that homes do not tend to cluster near the ten point maximum, while it may be appropriate to decrease these weights in states with high deficiency citation rates (i.e., to prevent most homes from receiving zero points on the measure).

2.5. Overview of Performance Measures and Their Relative Weights

In the first year of the demonstration, the system will include the four domains described above:

- Staffing (staffing ratio and turnover)
- Rate of potentially avoidable hospitalizations (measured separately for short- and long-stay residents)
- Resident outcomes (MDS quality measures)
- Survey/certification

These domains have the following weights in the quality-based purchasing system:

- Staffing: 30 points
- Hospitalization: 30 points
- Resident outcomes: 20 points
- Survey/certification: 20 points

If additional performance measures are added after year one, then the maximum score would be greater than 100. Table 2.26 summarizes the pay-for-scoring rules and scoring.

Table 2.26
Recommended Performance Measures and Their Relative Weights

Measure	Maximum Points
Staffing Domain (30 points)	
RN hours per resident day	10 points
Total nursing hours per resident day	10 points
Total nursing staff turnover percentage	10 points
Hospitalization Domain (30 points)	
Long Stay: Percentage of long-stay residents with a potentially avoidable hospitalization **Short Stay:** Percent of short-stay residents with a potentially avoidable hospitalization	30 points. Relative weight of long-stay and short-stay hospitalization rate depends on mix of short- and long-stay patient days at nursing home.
Resident Outcomes (MDS Quality Measures) (20 points)	
Long-Stay: Percent of residents whose need for help with daily activities has increased Percent of residents whose ability to move about in and around their room got worse Percent of high-risk residents who have pressure sores. Percent of residents who have/had a catheter inserted and left in their bladder Percent of residents who were physically restrained	Equal points for all measures that can be calculated: -- For homes for whom both short and long-stay measures can be calculated, each measure counts 2.5 points. -- If only long-stay measures can be calculated, each measure counts 4 points. --If only short stay measures can be calculated, each counts 6.67 points.
Short-Stay Percent of residents with improving level of ADL functioning Percent of residents who improve status on mid-loss ADL functioning (transfer, locomotion) or remain completely independent in mid-loss ADLs Failure to improve bladder incontinence	
Survey Deficiencies (20 points)	
Survey performance score	Scores will be assigned based on relative ranking of weights assigned based on scope and severity.
Total 100 points	

Source: Abt Associates, 2006

2.6. Additional Potential Performance Measures

There are a number of other measures that are conceptually appealing as performance measures for the NHQBP demonstration, but that we do not recommend including in the demonstration during its first year because of a need for further development. For example, these measures would require development of a suitable data collection instrument, to develop a suitable performance measure specification, and/or to further understand the link between the measure and resident outcomes. We refer to these as "developmental measures."

Several of these measures are process measures. Process measures are appealing for the quality-based purchasing system because they may be more directly under the control of the nursing home than resident outcomes or hospitalization rates. There is little evidence, however, of a link between process measures and resident outcomes. A concern with including these types of performance measures in the quality-based purchasing system is that these measures are self-reported and it may not be feasible to have any type of verification/audit process in place to ensure the accuracy of reported information. These limitations are why no process measures are included in the list of performance measures that we recommend using in the first year of the demonstration. It may later become appropriate to add these measures as research continues on data collection instruments and a link is established between processes of care and resident outcomes.

Adding additional performance measures to the demonstration after the first year is consistent with MedPAC's general recommendation that performance measures be improved and adapted over time (MedPAC, 2005).

2.6.1. Performance Measures That May Be Added to the System After the First Year (Developmental Measures)

Recommendation: Consider adding additional performance measures after the first year of the demonstration based on end-of-life care, resident perceptions of their care experiences, and staff immunization rates.

There are several types of performance measures that seem appropriate to include as performance measures that could be added after the first year of the demonstration. These include:

- Measures of the end-of-life care provided by homes
- Measures of whether the nursing home collects and monitors resident care experience using some type of survey and whether they have a program to monitor care based on the assessment results
- Measures of resident care experiences based on a survey instrument such as the Nursing Home Consumer Assessment of Health Plans Survey (CAHPS)
- Nursing home staff immunization rates

These measures are not recommended to be included in the system initially because of a need for further development work, but it is appropriate to consider adding these to the quality-based purchasing system in year 2. Note that information for several of the developmental measures will be

collected as part of the initial application completed by homes that want to participate in the demonstration. Additional measures may also be considered.

End-of-Life Care

Recommendation: Consider adding as performance measures two process measures based on end-of-life care: contract with a hospice agency and percentage of residents with an advance care plan that includes certain specific elements.

A performance measure that rewards homes that can certify that they provide a bundle of services that ensures the capacity for providing excellent care to nursing home residents at the end- of-life may complement the potentially avoidable hospitalization measures.

Two end-of-life care related measures seem particularly promising as performance measures:

- Whether the nursing home has a contract with at least one hospice agency
- Percentage of residents with an advance care plan that includes certain specific elements

These performance measures are developmental measures that are not included in the system during its first year pending specification of the elements that would be required in the advance care plan and the development of a method of collecting this information from homes.

Use of Measures of Resident Experiences with Care Surveys

Recommendation: Consider adding a performance measure based on nursing home use of resident assessment of care surveys.

CMS may wish to consider a developmental measure that gives credit to homes for the administration and use of resident assessment of care surveys. This measure could be based, for example, on whether the nursing home collects and monitors resident experience of care annually and how they use the data. For example, data from resident assessment of care surveys could be used to inform quality improvement activities, as a measure of nursing home quality of care, to identify strengths and weaknesses, for peer group comparisons, for accreditation purposes, or for other uses. While there is no research that links the use of resident assessment of care surveys to resident outcomes, baseline data collected for the NHQBP demonstration could be used to explore for these relationships, allowing evaluation of whether this is an appropriate performance measure.

Recommendation: Consider adding performance measures derived from the Nursing Home CAHPS survey once development and testing of this instrument is completed.

A nursing home with good performance on clinical measures of quality might not have the most comfortable and satisfied residents. For nursing home residents, satisfaction with the environment, food and delivery of care may be as important if not more important than their clinical outcomes. Performance measures based on resident satisfaction or quality of life may be desirable to include in the quality-based purchasing system, but cannot be included initially due to data limitations.

The Nursing Home Consumer Assessment of Health Plans Survey (CAHPS) survey is one potential method of collecting this type of information. Each CAHPS item covers aspects of care residents can report on and aspects of care that residents consider important (see Table 2.27 for a listing of the domains included in Nursing Home CAHPS). Because development and testing of the instrument is

ongoing, we are unable to develop performance measures based on Nursing Home CAHPS at this time.

Table 2.27
Domains in the Nursing Home CAHPS Survey

Domain	Items
Global ratings	Staff care Nursing home
Getting needed care	Help with activities of daily living Help with pain Ease of seeing doctor when need one Help for eye, dental, and hearing problems (long stay) Help with therapy (short stay)
Getting care quickly	Staff come quickly when needed
Staff helpfulness/courtesy	Staff are respectful to you
Staff communication	Staff listen carefully to you Staff explain things you need to know

Source: CAHPS Survey Users Network (https://www.cahps-sun.org/Products/NHCAHPS/NH_Domains.asp)

Nursing Home Staff Immunization Rates

Recommendation: Consider adding a performance measure based on the percentage of nursing home staff that receive an influenza immunization if it proves feasible for homes to report this information and a suitable reporting form can be developed.

A few studies have found positive impacts on patients associated with health care worker immunizations (see http://www.immunizeseniors.org/website/p1O.htm), making a performance measure based on staff influenza immunization rates appealing. There are, however, concerns about whether homes have the information necessary to track staff immunization rates. Given the lack of staff immunization rate data, there is little to guide specification of a performance measure based on staff immunizations and no knowledge about the validity and reliability of staff immunization rate information reported by homes. As a result, staff immunization rates will not be used as a performance measure in the first year of the demonstration, but may be added later if further research addresses these issues, including the feasibility of collecting immunization rate data from homes.

Potential Performance Measures That Are Not Feasible To Include in the Demonstration

There are several other potential performance measures that we evaluated for the NHQBP demonstration that have some conceptual appeal but for which so much additional research is required that it is unlikely that they could be added to the system for year 2. It may be that, if the quality-based purchasing system is implemented nationwide, at some point it may be appropriate to add these as performance measures, but our recommendation is that these measures not be considered for the demonstration, as we recommend that the performance measures not change between years 2 and 3 to facilitate evaluation of the demonstration. Measures that fall into this category include:

- ***Medication errors:*** Our concern is that these are jointly under the control of patients' physicians, pharmacists, and nursing home staff and thus may not be appropriate as NHQBP measures. In addition, there is concern about the feasibility of having homes self-report this information, since they would have an obvious disincentive to report negative outcomes.

- ***Nursing home use of electronic medical records, information technology (IT) systems, or computerized physician order entry (CPOE) systems:*** Some believe that the use of electronic health records or other information technology (IT) systems will improve the quality of health care and the data available for measuring quality. MedPAC (2005) notes that use of IT is low due to barriers such as implementation costs and lack of return on investment. Including a performance measure based on use of IT systems is one way that the government can encourage adoption of these systems. Note that this MedPAC report focused on IT use for non-nursing home providers.

  We explored the feasibility of performance measures based on electronic health records and CPOE systems, focusing on electronic medical record systems that are associated with reduced errors and increased patient safety, but do not believe that such a measure is feasible at this time, nor likely to become feasible during the demonstration period. Developing a specific definition of what constitutes an electronic health record for nursing homes is challenging and little is known about how these systems are related to resident quality of care.

  Research on the impact of nursing home adoption of IT systems is ongoing. We recommend waiting until the results of an AHRQ study on the impact of CPOE systems in nursing homes become available before deciding whether to proceed further with this measure.[21] The study is examining the extent to which a computer-based clinical decision-support system (accompanying computerized provider order-entry) can improve the quality of medication ordering and monitoring for residents in the long-term care setting through a randomized trial.

- ***Process measures for the screening and treatment of pain and depression based on the Nursing home Improvement and Feedback Tool (NHIFT):*** NHIFT is an electronic data collection tool that includes a series of questions about processes of care for four clinical areas: depression, pain, pressure ulcers, and restraints. Given limitations in the MDS quality

[21] This "Health Information Technology in the Nursing Home" study R01 HS15430 has a period of performance from September 2004- September 2007. The Principal Investigator is Jerry Gurwitz or the University of Massachusetts. Source: http://www.ahrq.gov/RESEARCH/hitfact.htm.

measures related to pain and depression, we investigated whether it would be feasible to use NHIFT for process measures for the screening and treatment in these two areas. NHIFT focuses on new admissions, so a new version of the tool would have to be adapted for use with the long-stay population. NHIFT is intended to be used as an internal quality improvement tool that homes can use to track adherence to recommended care processes rather than a tool used for reimbursement purposes.

- ***Discharge to the community:*** MedPAC has recommended that CMS consider a short-stay quality measure based on discharge to the community, which may be a measure of whether residents benefited from the care they received in the nursing home. If MDS discharge assessments were regularly and reliably completed, then it would be possible to use the MDS to determine whether patients remained in a nursing home after the Medicare-covered nursing home stay ended. A certain amount of caution would be required so as to avoid an increase in inappropriate discharge to the community, and such a measure would seem to require risk adjustment. Given the lack of data and these concerns, we do not believe that it will be feasible to include this as a performance measure in the demonstration.

Table 2.28 provides a summary of these potential performance measures.

Table 2.28
Potential Performance Measures That Are Not Feasible to Include in the Demonstration

Measure	Description	Status
Medication errors	Measure of the incidence of medication errors.	Lack of suitable data and nursing home disincentive to report makes this impractical as a performance measure. There is also concern about the ability to distinguish medication errors that are due to the nursing home vs. those that are due to other factors such as physicians or pharmacists.
IT Systems/Use of computerized provider order entry	Some measure of nursing home use of electronic medical record or computerized physician order entry system.	The lack of current knowledge about the impact of computerized provider order entry on medication errors for nursing home residents suggests that it may be appropriate not to include this in the initial set of performance measures.
Process measures for screening pain and depression	We explored using the Nursing home Improvement and Feedback Tool (NHIFT) to measure these processes of care.	We dropped this as a core measure because the tool is only appropriate for new admissions (i.e., not long-stay residents). Further development work is needed for long-stay residents.
Discharge to the community	MedPAC has recommended that CMS consider a short-stay quality measure based on discharge to the community, which may be a measure of whether residents benefited from the care they received in the nursing home.	This measure has not been developed yet, and there are concerns about the ability to measure *appropriate* discharges to the community.

Source: Abt Associates, 2006

2.6.2. Potential Performance Measures Considered Inappropriate Because They Are Already Required by CMS Regulations

We also considered two other measures that we believe are inappropriate to use as performance measures in the NHQBP demonstration because they are required by recent regulatory changes.

- ***Resident immunization rates:*** Pneumonia and influenza are a major cause of death for the over-65 population and immunizations are something that the nursing home can influence through their care practices. Information on resident immunizations is included in the new MDS Section W, which homes began using in October 2005. CMS recently adopted a requirement that, as a condition of participation, long-term care homes must offer all residents annual flu immunizations and at least one pneumococcal vaccination, unless medically contraindicated. We do not believe that it is appropriate to reward homes in the quality-based purchasing system for doing something that they are required to do as a condition of participation.

  During the October 2005- December 2005 period, influenza vaccinations were reported as having been received in the nursing home for about 54 percent of quarterly and 55 percent of annual assessments. It should be noted that the percentage of assessments indicating that an

influenza vaccine was received increased steadily over the three-month period, which corresponded to the first part of the flu season.[22]

- ***Presence of a certified medical director[23]:*** We also explored a performance measure based on whether the nursing home has a certified medical director. A recently revised survey deficiency (tag F501), which became effective in November 2005, requires that homes designate a physician to serve as medical director and specifies the responsibilities of the medical director.

These measures are summarized in Table 2.29.

Table 2.29
Potential Performance Measures That Are Required By CMS Regulations

Measure	Description	Status
Resident immunization rates	Resident immunization rate from MDS Section W.	Reliability of this item is not known, and opinions are mixed about the use of this as a performance measure since it is already required.
Presence and role of the nursing home's medical director	Medical Directors may become certified through the American Medical Directors Association (AMDA) by meeting certain educational and experiential criteria.	The revised tag F501, Medical Director (for nursing homes), which became effective on November 18, 2005. Tag F501 (42 CFR 483.75(i)(2) mandates that the medical director be responsible for resident care policies and coordination of clinical care. The regulation has not changed, but there is additional guidance in the *State Operations Manual*, to clarify the essential functions and tasks of a medical director.

Source: Abt Associates, 2006

2.7. Use of Quality Improvement Organizations (QIOs) in the NHQBP Demonstration

Recommendation: CMS should ensure that providers are able to access technical assistance from QIOs in order to assist them in improving their quality of care.

While we do not recommend any performance measures based on the quality improvement technical assistance that QIOs provide, we believe that this technical assistance may be very important to homes as they attempt to improve their performance, and we recommend that CMS explicitly include QIOs and their quality improvement technical assistance to demonstration homes. This type of

[22] Source: Abt Associates, "Nursing Home Pay for Performance: Proposed New Quality Measures (QMs): Influenza and Pneumococcal Vaccinations." Draft Report March 2006.

[23] According to the American Medical Director's association, a Medical Director refers to a physician who oversees the medical care and services in a health care organization or long-term care nursing home. In nursing homes, the medical director is responsible for implementation of resident care policies and coordination of medical care in the nursing home. (Source: http://www.amda.com/federalaffairs/ftag/consumerinfo.htm)

technical assistance and support may be essential to providers as they seek to improve their performance on the measures included in the quality-based purchasing system.

2.8. Simulations

We conducted a series of simulations to estimate the nursing home performance scores using performance measures and scoring rules described above. Analyses of the distribution of performance measures scores are useful for refining scoring rules and for determining how performance payments should be linked to measures of nursing home performance. For these analyses, we used these data sources:

- OSCAR data from 2003 that contains information on nursing home staffing levels but not turnover (2003);
- Staff turnover rate of nursing homes in California (2003);
- National QM data published by CMS (2003);
- Survey deficiency data of nursing homes in California (2003);
- A file with information on re-hospitalization of short-stay nursing home residents for the ambulatory-care sensitive conditions described above (2003). Note that no hospitalization data are available for long-stay residents.

2.8.1. Sample

We conducted our simulations based on the data of 50 homes randomly sampled from California. The reason is that information of staff turnover rate was only available for nursing homes in the state of California. In addition, we expected that about 50 homes per state would participate the NHQBP demonstration. Since some quality measures were not uniformly collected at the national or state level, we also expected that the evaluation of quality performance would be based on the comparison of quality measures amongst participating homes rather than comparing to the national or state averages. Of the 50 homes, 5 were hospital-based/SNF and 45 were freestanding/non-SNF homes. We specifically chose one of the freestanding homes from the 11 homes with substandard quality of care in 2003. According to the design, homes with substandard quality of care, i.e., certain type of survey deficiency, would be automatically disqualified for receiving the performance payment regardless of how well they performed in other domains. The inclusion of a nursing home with substandard quality of care in the simulation is to examine the possible performance scores such homes may get.

2.8.2. General Scoring Rules

We compared the scores using one the method that assigns points based on the relative ranking (i.e., percentile) of homes, using the full range of the distribution to award points.

2.8.3. Distribution of Performance Scores for Staffing Level Measures

We analyzed the distribution of performance scores for the three measures on staffing level:

- Total nursing hours (RN, LPN, nurse aide) per resident day
- RN hours per resident day
- Staff turnover percentage

Reflecting the performance measure specification that is discussed above, we include 50 percent of DON hours in the RN and total nurse hours and counted 80 percent of agency staff. Note that average DON hours per resident day was small (mean of 0.09), although smaller homes tended to have higher DON staffing levels on a per resident day basis.[24] For the 50 randomly selected homes, the addition of DON hours per resident day to the staffing level had a small influence on the distribution of the RN and total nurse hours per resident day (Table 2.31).

Table 2.31
Distribution of Staffing Levels in 50 Randomly Selected Nursing Homes

Variable	Mean	Std Dev	Minimum	Maximum
DON hours	0.08	0.03	0.00	0.18
RN hours	0.48	0.19	0.16	0.90
RN hours + 0.5*DON hours	0.52	0.19	0.21	0.97
Total nursing hours	3.73	0.46	2.88	4.98
Total nursing hours + 0.5*DON hours	3.76	0.46	2.93	5.07

Source: OSCAR, 2003

In this simulation, the staffing score that a nursing home may get ranges between 0 and 30 points, with a maximum of ten points for each of the three staffing measures. Since we are not able to apply the casemix adjustment to these staffing figures, we scored freestanding and hospital-based homes separately. Note that this is slightly different from our recommendation described above, which called for separate comparisons only for the RN measure. Of the sampled homes, the RN and total nurse hours per resident day were slightly lower in freestanding/non-SNF homes than in hospital-based homes, whereas the staff turnover was much higher (Table 2.32). Because we applied separate scoring criteria to the two types of homes, we expect the obtained staffing scores were in the similar ranges.

[24] DON hours per resident day was negatively associated with the size of a nursing home (Pearson correlation with total beds per nursing home: -0.43, $p<0.0001$; Pearson correlation with total resident per nursing home: -0.46, $p<0.0001$),

Table 2.32
Staffing Level and Staff Turnover Rate in Sampled Nursing Homes

Variable	Mean	Std Dev	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
Freestanding (n=45)							
RN hours	0.51	0.20	0.21	0.37	0.50	0.59	0.97
Total nurse hours	3.75	0.42	3.00	3.44	3.72	4.06	4.88
Turnover percentage	51.15	26.96	0.00	30.53	47.78	68.57	121.84
Hospital-based (n=5)							
RN hours	0.56	0.14	0.41	0.43	0.63	0.64	0.72
Total nurse hours	3.87	0.81	2.93	3.55	3.57	4.21	5.07
Turnover percentage	35.68	4.80	29.41	31.82	37.62	39.29	40.28

Source: OSCAR, California Medicaid Cost Reports

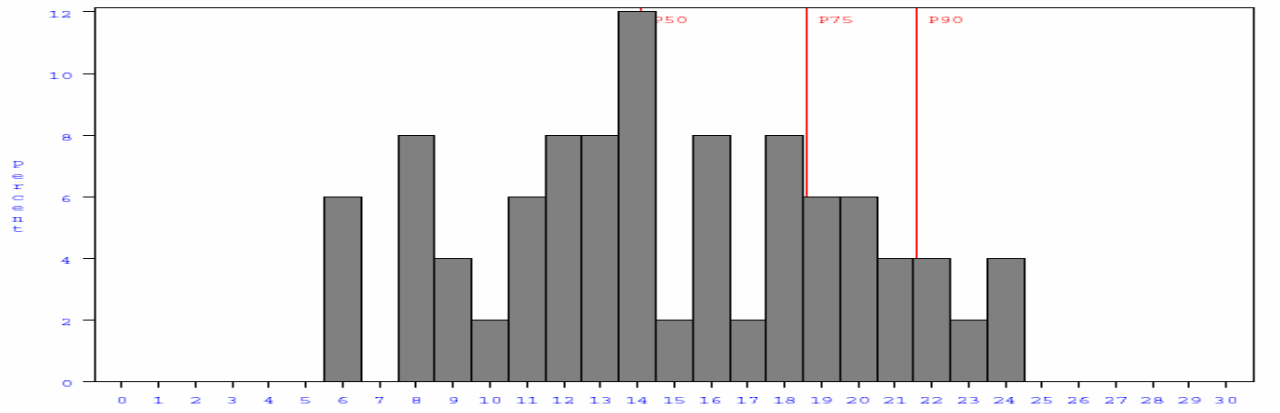
The use of relative rankings (percentiles) to determine points ensures a uniform distribution for the scoring of each measure, with the median nursing home receiving 5 points for each measure, a nursing home at the 75th percentile receiving 7.5 points, and a nursing home at the 90th percentile receiving 9 points (Table 2.33). Across all three staffing performance measures, the median nursing home received 11.4 points (Figure 2.5).

Table 2.33
Distribution of Performance Scores Derived from Staffing Performance Measures

Measures	Mean	Std Dev	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
RN hours (10 points)	4.90	2.80	0.20	2.60	5.00	7.20	9.60
Total nursing hours (10 points)	4.90	2.80	0.20	2.60	5.00	7.20	9.60
Turnover percentage (10 points)	4.91	2.80	0.20	2.60	5.00	7.20	9.60
Total score for the staffing domain (maximum 30 points)	14.72	4.96	5.80	11.40	14.10	18.60	23.80

Source: Abt Associates, 2006

Figure 2.5
Distribution of Total Points for Staffing Performance Measures



Source: Abt Associates, 2006

2.8.4. Distribution of Performance Scores for Short-Stay Hospitalization Measure

Our recommendations for the quality-based purchasing system include two performance measures based on the rate of hospitalizations for ambulatory-care sensitive conditions: the rate for short-stay residents and the rate for long-stay residents. The hospitalizations for ambulatory-care sensitive conditions should be avoidable given good quality of care. We do not have any data on the hospitalization rate for long-stay residents, but do have data that permit us to measure the proportion of short-stay residents that were hospitalized within 7 days of discharge for one of the ambulatory-care sensitive conditions listed in Table 2.9. We calculated the rate of potentially avoidable hospitalizations for short-stay residents, awarding between zero and 30 points to homes using the scoring rules described in Table 2.14. Note that, given the lack of data on hospitalization rates for long-stay residents, we were not able to apply the relative weights for the short- and long-stay hospitalization rates described in Table 2.13. We awarded progressively more points to homes with a lower hospitalization rate.

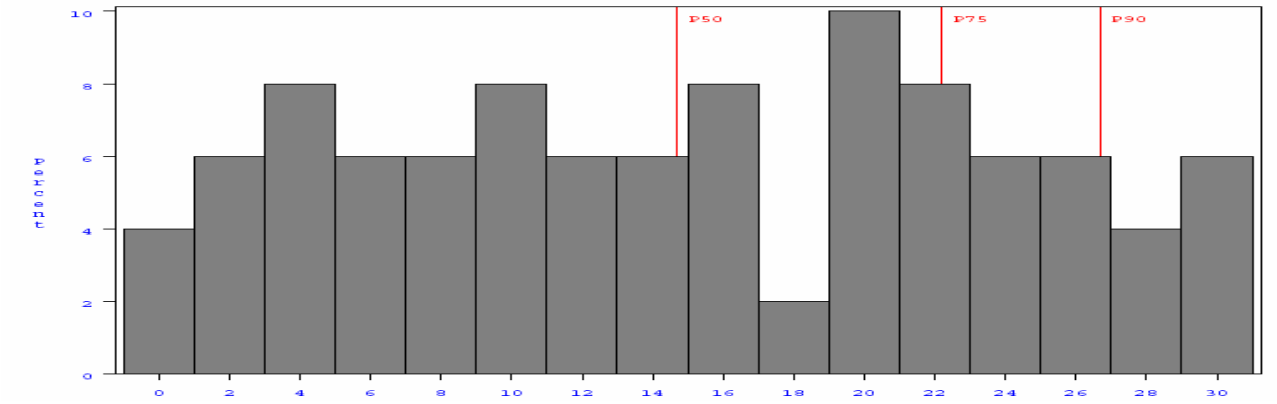
On average, 18.3 percent of short-stay residents per nursing home in the simulation had a potentially avoidable hospitalization within 7 days of SNF discharge (Table 2.34). Using relative hospitalization rates to determine points, the distribution of points for the hospitalization measure was uniform (Figure 2.6). Note that, in this example, nursing homes in the lowest 10 percent in terms of hospitalization rate received the maximum number of points for this measure; this differs from the recommendation above that the 25 percent of nursing homes with the lowest hospitalization rate should receive the maximum number of points for the hospitalization measure.

Table 2.34
Distribution of Hospitalization Rates and Hospitalization Performance Scores for 2003

Label	Mean	Std Dev	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
Number of SNF Stays	113.10	95.06	3.00	42.00	90.50	152.00	412.00
Number of ACS Rehosp within 7 Days of SNF Discharge	22.18	19.74	0.00	6.00	17.50	30.00	74.00
Percentage of stays that had a hospitalization for an ambulatory-care sensitive condition within 7 days of discharge	18.3%	8.7%	0.0%	13.8%	18.0%	23.5%	37.5%
Hospitalization performance score	14.80	8.81	0.00	7.20	14.70	22.20	29.40

Source: Abt Associates analysis of DataPRO SNF file, 2003

Figure 2.6
Distribution of Total Points for Short-Stay Hospitalization Performance Measure



Source: Abt Associates, 2006

2.8.5. MDS-Based Performance Measures

The proposed performance measures include five MDS-based quality measures for long-stay residents and three MDS-based measures for short-stay residents. Because we only have information on the long-stay measures for 2003, we estimated the resident outcome scores using only the long-stay measures.

Outcome scores of long-stay residents were derived using data from quarter 4 of 2003. Two steps were involved in estimating the scores. Using the scoring rules described above, we gave homes from 0 to 1 points for each measure. Given our recommendation that MDS-based measures count for 20 points, we converted the sum of individual measures to a 0-20 point scale, adjusted by the number of quality measures that could be calculated for the nursing home. Measures are set to missing if there are fewer than 20 residents for whom the measure can be calculated. For the long-stay MDS measures, higher values imply the occurrence of more adverse events that triggered the measure, suggesting a worse quality of care in the nursing home. So, more points are given to homes with lower rates of the quality measures.

In Table 2.35, we show the distribution of the long-stay quality measures and resident outcome scores for the homes in the simulation, using data from the fourth quarter of 2003. The resident outcome scores for the five long-stay measures ranged from 3 to 17 points (with a possible range between 0 to 20), with an average score of 10.5 and a median score of 11.0. A majority of the homes had scores between 5 and 15. The distribution of performance scores for the MDS-based measures were bell-shaped and slightly left-skewed, with few homes receiving more than 14 points (Figure 2.7). This suggests that few homes had poor performance in all the five long-stay quality measures.

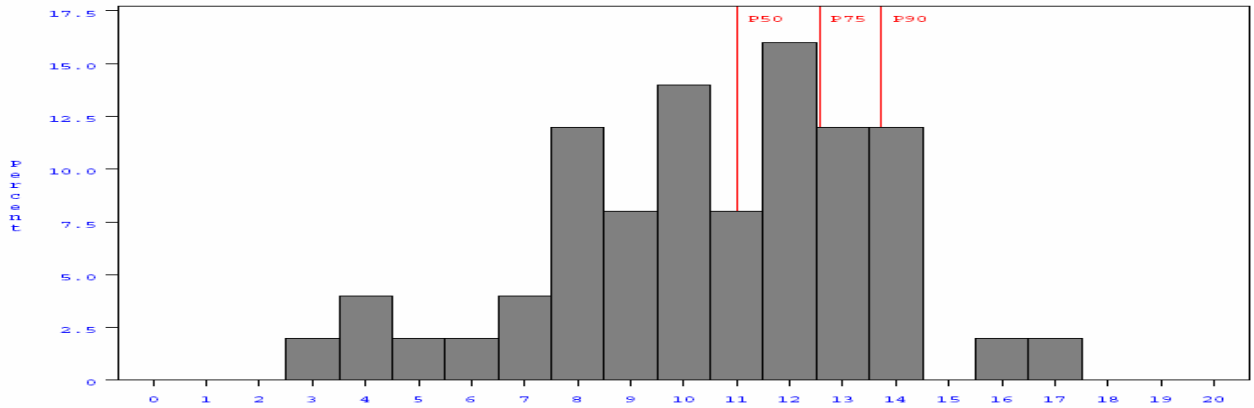
Table 2.35
Distribution of Chronic Care Quality Measures and Resident Outcome Scores for 2003, Quarter 4

Variable	N	Mean	Std Dev	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
CADL1	49	14.00	7.21	2.00	10.00	14.00	17.00	34.00
CCAT2	50	5.12	3.08	0.00	3.00	4.00	7.00	14.00
CMOB1	36	13.44	8.42	2.00	9.00	11.50	16.00	40.00
CPRU2	45	15.04	7.18	0.00	10.00	14.00	19.00	35.00
CRES1	50	16.30	11.54	0.00	8.00	14.00	22.00	46.00
Outcome Score	50	10.49	3.06	3.20	8.40	11.00	12.56	17.07

CADL1 % of residents with late loss ADL worsening, no adj.
CMOB1 % of residents with locomotion worsening, adjusted
CPRU2 % of residents with pressure ulcers (high risk), no adj.
CCAT2 % of residents with indwelling catheter, adjusted
CRES1 % of residents with physical restraints, no adj.

Source: Abt Associates analysis of MDS data from Quarters 3 and 4 of 2003.

Figure 2.7
Distribution of Total Points for Resident Outcome Measures



Source: Abt Associates, 2006

2.8.6. Survey Performance Score

We calculated the performance scores based on the survey deficiency information of sampled nursing homes using the approach described in Section 2.4. Using this approach, a survey performance score can be calculated for homes that is based on the number of deficiencies that the nursing home received, weighted by scope and severity. Points for the survey domain are based on homes' relative

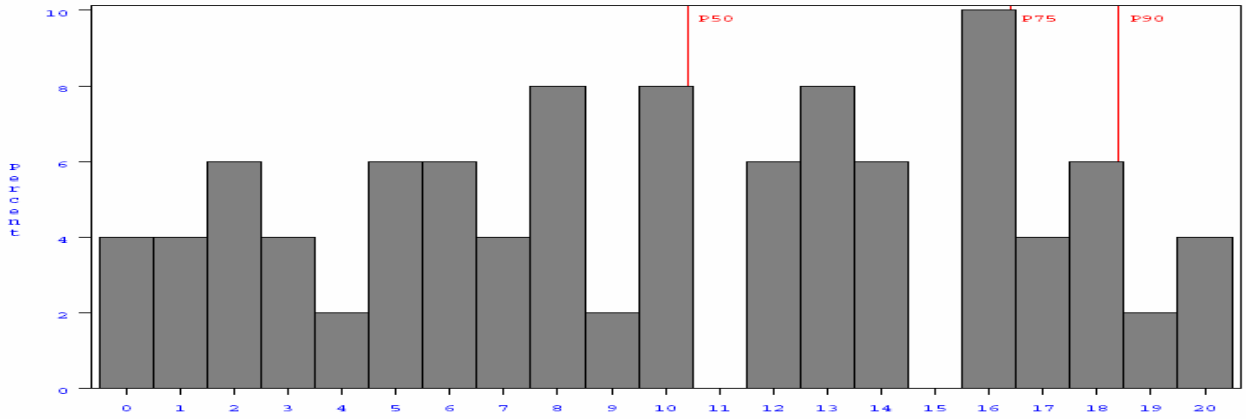
performance, and the survey domain counts for 20 points. Of the homes in our simulation, none had any deficiencies at level J or higher (Table 2.36). Reflecting the relative ranking system used for the survey domain, the distribution of points had a uniform distribution (Figure 2.8).

Table 2.36
Distribution of Survey Deficiencies and Survey Performance Score (2003)

Deficiency	Mean	Std Dev	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
D	4.98	4.09	1	2	4	6	16
E	1.16	1.48	0	0	1	1	7
F	0.12	0.48	0	0	0	0	3
G	0.16	0.68	0	0	0	0	4
H	0	0	0	0	0	0	0
I	6	0	6	6	6	6	6
J	0	0	0	0	0	0	0
K	0	0	0	0	0	0	0
L	0	0	0	0	0	0	0
Deficiency summary score	21.32	17.24	0	8	16	32	84
Survey performance scores (A)	10.13	5.96	0.00	4.80	10.40	16.40	19.60

Source: Abt Associates, 2006

Figure 2.8
Distribution of Total Points for Survey Performance Measures



Source: Abt Associates, 2006

2.8.7. Total Performance Score

Finally, we examined the distribution of total performance score using the information on staffing, hospitalization rate, MDS performance measures and survey deficiencies. Homes could receive a score of between zero and 100 points, with each domain counting according to the weights described in Section 2:

- Staffing level: 30 points (10 each for RN and total nurse hours per resident day and staff turnover rate)

- Rate of hospitalizations for ambulatory care sensitive conditions: 30 points
- MDS resident outcomes: 20 points
- Survey deficiency: 20 points

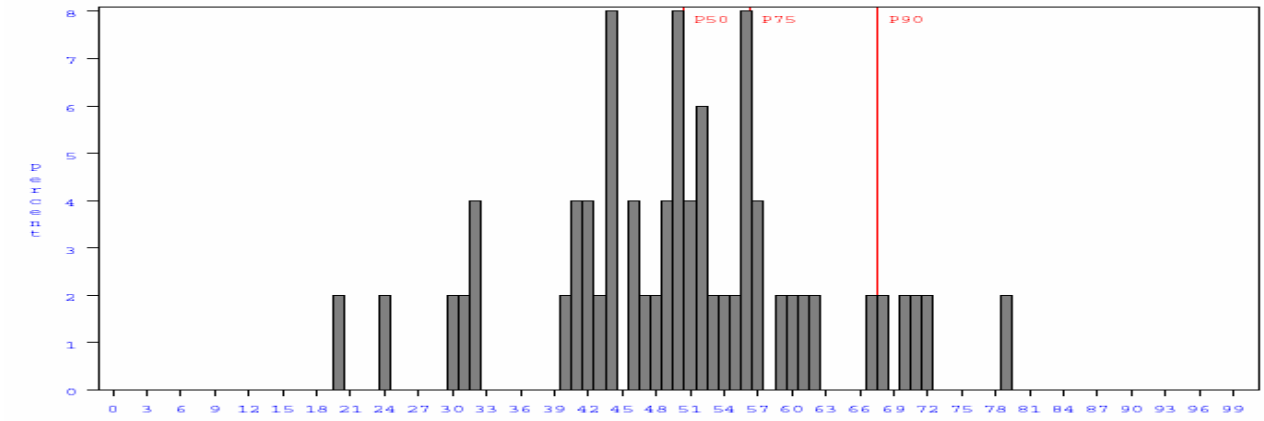
In our simulations, nursing home performance scores ranged from about 10 to 80 points (Table 2.37). The distribution approximately resembled the shape of a normal distribution: bell-shaped, symmetric around the average 50, with small tails at both ends (Figure 2.9).

Table 2.37
Distribution of Total Performance Scores for 2003

Score	Mean	Std Dev	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
Staffing measures	14.72	4.96	5.80	11.40	14.10	18.60	23.80
Hospitalization measures	14.80	8.81	0.00	7.20	14.70	22.20	29.40
Resident outcomes	10.49	3.06	3.20	8.40	11.00	12.56	17.07
Survey performance scores	10.13	5.96	0.00	4.80	10.40	16.40	19.60
Total performance score	50.13	12.03	20.20	43.76	50.35	56.32	78.90

Source: Abt Associates, 2006

Figure 2.9
Distribution of Total Points Across All Performance Measures



Source: Abt Associates, 2006

3. Linking Performance Scores to Performance Payments

Using the performance measures and scoring rules described in Chapter 2, each nursing home will have a performance score between zero and 100. A set of rules is needed for linking performance scores to performance payment amounts. These rules are guided by several guiding principles:

- Performance payments should be based on overall performance scores rather tha performance on individual measures or performance measure categories.

- Performance payments should be made to homes with high levels of performance and also to homes that show improvement over time.

- Performance payments should be reserved for the subset of homes that have high performance or large improvement. Not every participating nursing home will qualify for a performance payment in the NHQBP demonstration.

Below we describe our recommendations for how performance payments should be linked to performance scores in the NHQBP demonstration.

3.1. Performance Score Specification

Recommendation: Performance payments should be allocated based on overall nursing home performance score rather than the allocated based on the score for individual measures or categories.

There are three basic ways that performance scores could be used to determine performance payments:

- Overall performance score (across all domains)

- Performance score within each domain

- Performance score for individual measures (i.e., a performance level target and an improvement target for each measure)

The intent of the quality-based purchasing model is to reward homes that provide overall high-quality care rather than rewarding homes for high performance on individual performance measures or categories of measures. As a result, it is our recommendation that performance payments be based on overall nursing home performance scores rather than the scores for individual measures or domains.

This method of basing performance payments on overall performance is the basic one that is used in state quality-based purchasing systems, but is different from other CMS quality-based purchasing models like the physician group practice model, for which performance payments are tied to meeting individual scoring rules. Under this method, a nursing home that had excellent performance on one category of measures, for example staffing, may not receive any performance payment if their performance on the other measures was so low that they did not achieve the minimum score required to receive a performance payment. Using overall performance scores to determine performance payments minimizes the probability that a nursing home that has extremely low performance on one performance measure category will qualify for a performance payment.

Recommendation: Performance payments should be given to homes with high levels of performance and also homes that show substantial improvement over time (subject to some minimum performance level).

Awarding performance payments to homes that show considerable improvement will provide incentives to homes with low performance levels at baseline to make improvement. If performance payments were made solely on the basis of performance level (i.e., with no consideration given to improvement), then homes with lower performance levels will almost certainly be less likely to participate in the demonstration and also have less incentive to improve their quality of care since even considerable improvements may not be sufficient to earn them a performance payment. The demonstration should offer financial incentives to participating nursing homes that demonstrate the ability to provide high quality care and/or improve the level of care that they provide. However, because we do not want to reward homes with large improvement if their performance level is still poor, we recommend that homes that receive a performance payment based on improvement over time must have a performance level that is at or above the 40th percentile during the demonstration year in the state in terms of overall performance score in the state.

Improvement could be measured relative to baseline, relative to the preceding year, or some combination of the two. Measuring improvement relative to the baseline allows nursing homes that show slow, steady improvement the opportunity eventually to earn an incentive payment based on improvement, but this method could repeatedly reward nursing homes that had low baseline performance. Measuring performance relative to the previous year avoids the problem of giving multiple improvement payments for initial improvement, but would likely make it so some nursing homes that showed substantial improvement over the course of the three-year demonstration would never qualify for an incentive payment based on improvement. One option would be to measure improvement based on the change in overall performance score relative to the baseline until a nursing home receives a performance payment based on improvement. After that, change in performance should be measured relative to change from their score in the year for which they received a performance payment based on improvement.

Note that, in no case, would a nursing home that had a decreased level of performance relative to the preceding year be eligible for an incentive payment based on improvement.

3.2. Performance Payment Pool Allocation

Recommendation: Award performance payments to homes with an overall performance score that is in the top 20 percent based on the distribution of performance scores in the state

The demonstration is intended both to reward high performing homes and to encourage improvement for homes that may not have good quality initially. As a result, the performance payment will be determined based both on the level of performance and improvement in performance over time. Under the demonstration, no homes will face payment reductions as a result of not meeting quality targets.

There are two basic options for identifying nursing homes that are in the top 20 percent:

- One option is to use the baseline distribution of performance scores in each demonstration state to determine the minimum performance score required to receive an incentive payment based on performance level. For example, using this approach, if 20 percent of participating

nursing homes had a performance score of 60 or higher during the baseline period, then nursing homes with a performance score of 60 or higher during the demonstration period would be eligible for incentive payments based on performance level. Establishing targets ahead of time may make it easier for homes to be able to monitor their performance and have some certainty about whether their performance is sufficiently high to earn a performance payment. If the demonstration leads to improved quality, then more than 20 percent of nursing homes may have a performance score high enough to qualify for an incentive payment. This would, of course, reduce the average incentive payment received by each participating nursing home since the incentive pool would be allocated across more nursing homes.

- A second option uses the distribution of performance scores during each demonstration year and in each state to identify nursing homes in the top 20 percent. The minimum score required to be in the top 20 percent may change over time. Under this approach, incentive payments based on performance level are reserved for nursing homes with excellent performance relative to other nursing homes. Under this option, nursing homes would have some uncertainty about the performance score that would be required to receive an incentive payment based on performance level.

Note that both of these options introduce what may be a considerable threshold into the quality-based purchasing system, since homes in the top 20 percent receive a performance payment that may be considerable, while a nursing home that just misses being in the top 20 percent receive nothing for their performance level.

Recommendation: Homes in the top ten percent in terms of performance level should receive a proportionately higher performance payment than homes in the next ten percent.
Using the baseline distribution of performance scores to set thresholds, our recommendation is that homes with a performance score in the top 20 percent based on the baseline distribution receive a performance payment for their level of performance, as long as these homes are not ineligible due to a survey finding of sub-standard quality of care. Homes in the top decile should receive a higher performance payment amount than homes in the second decile, with the performance payment amount weighted based on resident census. For example, the second decile could receive 70 percent the performance payment amount (measured in terms of performance payment per resident day) of the top decile.

Recommendation: Award performance payments to homes in the top 20 percent in terms of improvement over time, as long as their performance level is above the 40th percentile.
The 20 percent of homes with the largest improvement in performance will be eligible for a performance payment, as long as their performance level is higher than the 40th percentile in the demonstration year. Similar to the performance payment for level, homes in the top decile in terms of performance would receive a proportionately larger performance payment than homes in the next decile, with the performance payment amount weighted based on resident census.

Recommendation: Homes can receive a performance payment based on level of performance or improvement over time, but not both.
Homes that qualify for a performance payment based on both performance level and improvement would receive payment for either performance or improvement but not both. They would receive the higher of the two performance payments for which they qualified.

Recommendation: The performance payment pool should be allocated evenly to homes with high performance levels and those with the largest improvement over time.
Our recommendation is that 50 percent of the performance payment pool be allocated to homes with a high performance level and 50 percent given to homes with significant improvement.

Recommendation: Performance payments should be weighted based on nursing home resident census.
Other factors held constant, the costs of improving performance on the measures used in the quality-based purchasing system are related to nursing home size. For example, it costs a large nursing home more to increase staffing levels than it does small homes, since the staffing level measures are based on hours per resident day. We believe that performance payments should be weighted based on nursing home resident census during the period covered by the performance payment. The resident census information would be collected directly from homes, and would include all residents regardless of payer source.

3.3. Use of Non-Monetary Rewards as Recognition of Quality Care

Non-financial incentives have been incorporated into several states' reward recognition programs. In some cases, the non-financial reward makes homes eligible for a monetary reward or there are future plans to incorporate the non-monetary award into a financial incentive program at some later date. For others, the reward is strictly non-financial.

As part of the Better Jobs Better Care Demonstration project, Vermont and North Carolina have devised non-monetary recognition processes for homes that exhibit improvement in staff recruitment and retention. Vermont's "Gold Star" program recognizes nursing homes that institute at least two evidence-based workplace improvement practices for recruitment and retention of direct care staff (Lipson, 2005). To win one of five annual Quality Awards of $25,000, starting in 2005, homes are required to gain Gold Star recognition to be eligible. North Carolina's New Organizational Vision Award (NC-NOVA) involves a special licensure program for nursing homes (and home care agencies and adult care homes) that demonstrate a positive workplace culture that enhances the recruitment and retention of direct care workers. In the future, North Carolina would like to use the special licensure designation as a basis for awarding Medicaid reimbursement differentials, or Medicaid wage pass-throughs, or other types of labor enhancements (Lipson, 2005).

Other states have instituted strictly non-financial rewards as part of quality improvement activities. As part of a 2003 study on state-initiated quality improvement programs, Abt reviewed programs in seven states with the particular goal of providing information to states that may wish to develop similar programs in their state.[25] [26] At the time, both Florida and Iowa had programs in which homes may be nominated for evidence of innovative quality care. Homes must submit descriptions of the best practice and the resulting resident outcomes or the unique or special care or services provided by the nursing home. Survey performance data is also used to determining nursing home quality either

[25] Abt Associates Inc. 2003. State Nursing home Quality Improvement Programs. Task Order No. 30 under Contract Number 282-98-0006. Prepared for HHS/Program Support Center, Division of Acquisition Management, AOS.

[26] States included Florida, Iowa, Maine, Maryland, Missouri, Texas and Washington.

by examining the nursing home's "report care" or the assigned "quality of care rank" within the applicant's geographic region.

Florida's nominees must, in addition to providing a description of the innovative care, pass a number of other rigorous criteria to quality for the award. These include strict standards of performance on survey inspection results, history of complaints, family involvement, assessment of consumer satisfaction, staff turnover rates and in-service training. They must also demonstrate financial soundness as evidenced by a formal financial audit. Those unwilling to expend the resources to obtain such an audit as well as homes that have been the subject of bankruptcy proceedings (or whose parent organization have been the subject of bankruptcy proceedings) during the preceding 30 months are disqualified from the application. In both states, approximately one or two percent of homes have received the quality awards, which consists of a certificate presented to the nursing home administrator in a recognition ceremony.

Additionally, Iowa presents a Certificate of Recognition to any nursing home that receives a deficiency-free survey. The certificate is intended to acknowledge the "hard work and dedication" of the nursing home's staff meeting the established standards of care and is considered to be a way of providing positive feedback to providers with good survey results.

Providers reportedly saw the awards as powerful marketing tools that can boost revenues (especially when bed occupancy is low and consumers have more choices) and possibly reduce liability insurance costs. Advocates reported welcoming any type of information that could assist consumers in making informed decisions about nursing home placement. Concerns about the above reward programs focused on bias in the selection processes, the high level of effort and expense associated with the application process, and the lack of evidence that the rewards were effectively capturing or promoting quality care. In Iowa, these concerns were realized when some homes that were awarded the Governor's Quality Awards had problems on later surveys, and this resulted in bad publicity for the homes, the state and the program. There was also some concern that Iowa's Deficiency Free certificates of Recognition gave a false sense of security to consumers. At the time of the study, neither state had performed a formal analysis of whether the award had any effect on promoting quality resident care.

3.4. Example: Determining the Size of the Performance Payment Pool

Similar to the Physician Group Practice Demonstration[27] the size of the performance payment pool for participating homes in a given state will be determined based on the overall reduction in Medicare expenditures (across certain types of services) for residents at participating homes. Medicare program savings will be estimated by comparing the rate of change in certain Medicare expenditures for Medicare beneficiaries in demonstration homes to the rate of change in certain Medicare expenditures for a comparison group.

A major difference between the NHQBP and Physician Group Practice demonstrations is that, in the NHQBP model, savings are calculated across all participating homes in a state rather than at the level

[27] See Appendix D for more details on the methodology used in the Physician Group Practice demonstration for measuring Medicare savings),

of the individual nursing home. If the demonstration does not result in any savings for homes in a state, then no performance payments will be made to any nursing home regardless of the nursing home's performance. If the demonstration does result in savings, then these savings would be used to fund performance payments. The performance payments are allocated to homes based on their level of performance and their improvement over time. While the size of the performance payment pool is determined based on the estimated reduction in certain Medicare costs, the distribution of the performance payment pool across homes is based on a set of nursing home-specific performance measures.

In this section, we give an example of one method that could be used to determine the size of the performance payment pool. These calculations would be done for the baseline year and each year of the demonstration. These are the basic steps that are used in calculating the size of the performance payment pool:

- Specify the comparison group
- Identify eligible Medicare beneficiaries at demonstration and comparison group homes
- Determine which types of Medicare claims are to be included in the savings calculation
- Measure time period to use for Medicare beneficiaries
- Measure Medicare costs per day
- Apply risk adjustment model
- Estimate Medicare savings

3.4.1. Specify Comparison Group

We are assuming that many homes will be interested in participating in the demonstration, permitting a randomized design in which some homes that apply to be in the demonstration are assigned to a comparison group. The comparison group will likely include the same number of nursing homes as the demonstration (i.e., approximately 50 in each of four or five demonstration states). We will use a separate comparison group for each demonstration state.

3.4.2. Identify Eligible Medicare Beneficiaries

Medicare beneficiaries at participating homes can be identified using MDS assessments, which collects information on the beneficiary's Medicare number (Item AA5b). The Medicare number can be used to identify and pull the relevant Medicare claims for measuring Medicare program savings and also for creating the avoidable hospitalization measure described above.

Beneficiaries that would be used in the savings calculation include those who have a record in the Medicare enrollment files and who are not enrolled in Medicare managed care for any of the period that they were in a nursing home. The exclusion of managed care enrollees is necessary because of incomplete claims data for managed care enrollees.

3.4.3. Types of Claims Used in Calculating Medicare Savings

Our recommendation is that measures of Medicare program savings use Inpatient, Skilled Nursing home (SNF), Outpatient, Hospice, and Physician/Supplier Part B claims. Durable Medical Equipment and Home Health Agency claims would not be used. This is because neither of these benefits are covered for beneficiaries in Part B stays (i.e., the long-term population).

3.4.4. Time Period Used in Calculating Medicare Savings

In estimating Medicare program savings, we recommend including claims with a service date that is within the period that the beneficiary resided in the nursing home and the seven days following discharge (based on the starting date of the claim). Note that, if a hospitalization begins within 7 days of nursing home discharge, then the entire hospital stay should be included in the savings calculation. Considering claims that occurred soon after discharge allows hospital-transfers that may be related to the care provided by the nursing home to be considered in the savings calculation. One might consider using claims more than 7 days after discharge but the further the expenditure date is after nursing home discharge, the less the expenditure is under the nursing home's control.

Medicare savings will be calculated separately for each year of the demonstration, likely using the calendar year. So, for stays that started in a prior year, the savings calculation would consider all claims incurred in the year up through seven days after discharge (based on the starting date of the claim).

MDS admission and discharge assessments can be used to determine the beginning and end dates of nursing home stays. The Admission Assessment includes information on the date that the nursing home stay started (item AB1) and the Discharge Tracking Form records the date of death/discharge (item R4). CMS intends to require that homes participating in the demonstration complete discharge assessments for all residents whose nursing home stay ends during the demonstration period.

By linking MDS assessments for residents, it should be possible to determine admission and discharge dates, and thus the dates to use in the determination of Medicare savings. Table 3.1 gives an example of the time period that would be used in calculating savings.

Table 3.1
Example of Time Period Used In Calculating Medicare Savings for year 2005

Resident	Nursing Home Admission Date	Nursing Home Discharge Date	Dates to Use in Medicare Expenditure Calculation	Notes
1	3/21/04	5/21/05	1/1/05 – 5/28/05	Use claims in 2005 through 5/28/05 (seven days after discharge).
2	7/15/05	N/A	7/15/05-12/31/05	Use claims incurred after 7/15 nursing home admission, as discharge has not occurred.
3	4/14/05	4/19/05	4/14/05-5/10/05	Patient was admitted to hospital on 4/20/05 (within 7 days of nursing home discharge) and discharged from the hospital on 5/10/05
4	3/25/05 4/3/05	4/1/05 8/31/05	3/25/05- 9/6/05	The two stays for this individual were less than 7 days apart, so all claims within the two stays are considered.
5	7/8/05 11/5/05	7/21/05 12/5/05	7/8/05-7/28/05 115/05-12/12/05	Use claims with date of service that occurred between admission and 7 days of discharge for both of the nursing home stays of this resident.
6	1/21/05 8/5/05	6/27/05 NA	1/21/05-7/4/05 8/5/05-12/31/05	Use claims with date of service within 7 days of end of first stay and all claims during second stay.

Source: Abt Associates, 2006

3.4.5. Measure of Medicare Costs Per Day

For the claim types and time period specifications described above, calculate total Medicare allowed charges. Use MDS assessments to determine the number of days used in the expenditure calculations. For each participating nursing home, create a measure of Medicare costs per day:

$$\text{Costs / day}_{\text{Actual}} = \frac{\sum \text{Medicare Costs}}{\sum \text{Resident Days}}$$

Medicare costs are summed across all the beneficiaries who resided at the nursing home during the year and consider the types of Medicare services described in Section 3.4.3 and resident days are the number of days used in the calculation of Medicare costs (i.e., including the seven days following discharge for which claims are considered). Note that this specification implicitly gives larger weight to residents who resided in the nursing home for a longer period—for example, a long-stay resident who was at the nursing home for the entire year counts much more heavily than a short-stay resident who was at the nursing home for only a few weeks.

Costs can be summed up across homes in a state to create state-level Medicare costs per day measures for demonstration and comparison group homes.

3.4.6. Apply Risk Adjustment Model

While the use of random assignment to assign homes to the demonstration or comparison groups reduces the need for risk adjustment, it is still possible that beneficiaries in the two groups may differ with respect to characteristics related to Medicare costs, and we want to minimize any disincentive that demonstration homes have to admit sicker residents who are at higher risk of hospitalization. It is also possible that the risk-adjustment profile of beneficiaries in the demonstration and comparison groups may change during the course of the demonstration. The lack of an existing data source with hospitalization data for nursing home residents (including both short and long-stay residents) limits our ability to propose a specific risk-adjustment model. Once a linked file is created, it should be possible to use an index model approach to develop the most statistically powerful model that is feasible. Development of an index model begins with a systematic search for all variables associated with large differences in costs for residents. Using an iterative process, all variables that are associated with significant cost differences can be identified, using these steps:

- Examining each variable independently, all potential risk-adjustors that had a significant positive relationship (at the five percent level) with cost differences are identified.

- For variables that are significantly related to costs in the first step, a backward stepwise regression is estimated to identify the subset of items that in a multivariate context are still related to costs at the five percent level.

- Surviving variables are reviewed to evaluate their clinical validity.

- Once variables are identified, a risk-adjustment index can be calculated for residents. These can be aggregated for groups of residents, weighting by the number of days used in the Medicare cost calculation. The risk-adjustment score is based on how many of the selected variables apply to the resident, weighted by the importance of the variable in predicting ancillary charges. These weights could be obtained as coefficients estimated from an ordinary least squares (OLS) regression of costs on the list of selected variables.

3.4.7. Estimate Medicare Savings

Medicare savings are estimated by comparing the rate of change in Medicare costs per day for beneficiaries in demonstration homes to the rate of change in Medicare costs per day for beneficiaries in comparison group homes. The calculation is made separately for each demonstration state. The following steps are used to estimate Medicare savings for demonstration homes in each state.

Step 1: Calculate expected Medicare costs.

Expected Medicare costs are what we would expect costs for beneficiaries in demonstration homes to be in the absence of the intervention and are calculated using baseline costs for the demonstration group and the change in costs for the comparison group:

$$\text{Costs/day}_{\text{Expected}} = (\text{Demonstration group costs/day}_{\text{Baseline}}) * (\Delta\text{Comparison group costs/day}_{t})$$

where "Medicare costs/day" refers to the measure of Medicare costs per day described above and the change in comparison group costs for year t is calculated relative to comparison group costs at baseline.

Step 2: Calculate Medicare savings.

Medicare savings are calculated as the difference between actual and expected Medicare costs per day. The calculation is made separately for each demonstration state.

$$\text{Medicare savings}_t = \text{Costs/day}_{\text{Actual}} - \text{Costs/day}_{\text{Expected}}$$

The intuition is straightforward. Medicare savings result if the rate of change in costs for beneficiaries in demonstration homes is lower than the rate of change for beneficiaries in comparison group homes. The calculation is made separately for each year of the demonstration.

3.4.8. Determine Size of Performance Payment Pool

If there are no Medicare savings for a state, then no performance payments will be made to any nursing home regardless of the nursing home's performance. If the demonstration does result in savings, then these savings would be used to fund performance payments, which would be allocated to homes based on how well they achieve the performance measures described above or retained by Medicare as program savings.

The size of the performance payment pool depends on the Medicare savings per day associated with demonstration homes and the number of days used in the calculation:

$$\text{Incentive Pool}_t = \text{Medicare Savings}_t * Days_t$$

This design report does not address issues related to the allocation of the performance payment pool between participating homes and CMS such as any minimum savings threshold, amount of performance payments that are withheld each year (e.g., to cover potential future losses), or the amount of savings retained by Medicare as program savings. See Appendix E for a discussion of how these issues are dealt with in the Physician Group Practice Demonstration.

This section shows how the performance payment pool would be determined using the procedures described above using a hypothetical example that is based on a combination of actual data and assumptions. Note that, while this example focuses on the steps used to determine the size of the performance payment pool for year 1, the procedures would be the same for other demonstration years. For this example, we assume that there are 50 demonstration homes and 50 comparison homes in a state.

Step 1: Identify eligible Medicare beneficiaries at demonstration and comparison group homes and measure number of days to be used in Medicare cost calculation.

The Medicare ID numbers reported on MDS assessments are linked to Medicare enrollment files to identify eligible Medicare beneficiaries (i.e., excluding those who are enrolled in Medicare managed care). A linked file of MDS assessments for given residents is used to measure the number of days

included in the Medicare cost calculation. The first row of Table 3.2 shows the number of days included in the cost calculations for demonstration and comparison group homes for both the baseline year and the first year of the demonstration.

Step 2: Measure Medicare costs for relevant time period and beneficiaries.

In the example discussed here, baseline Medicare costs for the relevant time period were $91.37 million for beneficiaries in demonstration homes and $90.8 million for beneficiaries in comparison homes (Table 3.2). In the first year of the demonstration, these costs increased to $93.2 million for demonstration nursing home beneficiaries and to $96.57 million for the comparison group.

Step 3: Measure Medicare costs per day.

Medicare costs per day equal Medicare costs divided by the number of days used in the Medicare cost calculation. In this example, Medicare costs per day in the baseline year are $68.52 for demonstration homes and $69.50 for the comparison group.

Step 4: Determine risk adjustment index.

Risk adjustment models are used to adjust for the expected change in Medicare costs due to the change in the characteristics of enrollees across time and to adjust for differences in the characteristics of beneficiaries in demonstration and comparison homes. The 0.998 risk adjustment index for demonstration homes in year 1 indicates that the risk adjustment profile of demonstration group beneficiaries declined somewhat in year 1.

In this example, the risk adjustment index for comparison group beneficiaries is slightly higher than that of demonstration beneficiaries, meaning that, other factors held constant, we would expect the Medicare costs of comparison group beneficiaries would be slightly higher than the costs of demonstration group beneficiaries. In this example, the risk adjustment index is relative to the baseline risk adjustment profile of beneficiaries at demonstration homes.

Step 5: Calculate risk-adjusted Medicare costs.

Adjusted Medicare costs are calculated by multiplying Medicare costs per day times the appropriate risk adjustment index. This is a measure of Medicare costs that adjusts for casemix differences. Assuming that an appropriate risk-adjustment methodology is developed, it is the risk-adjusted cost measure that would be used to measure Medicare savings.

Step 6: Measure percent change in risk-adjusted Medicare costs.

In this example, the percentage change in risk-adjusted Medicare costs is 1 percent for demonstration homes and 5 percent for the comparison group. This indicates that demonstration homes achieved Medicare savings, and these savings will be used to fund performance payments. If the rate of change in risk-adjusted Medicare costs is higher for demonstration homes in a state, then no performance payments will be made to any demonstration homes, regardless of their performance.

Step 7: Measure expected costs for demonstration homes.

The expected costs for demonstration beneficiaries depend on baseline costs, the change in risk-adjusted costs for the comparison group, and the change in the risk-adjustment index for the demonstration group. In this example, expected Medicare costs for the demonstration homes are $71.80 per day. This is based on the $68.52 Medicare costs for demonstration beneficiaries in the baseline period and the 5 percent expected increase in costs based on the change between the baseline and demonstration year 1 for beneficiaries at comparison group homes.

Step 8:Measure Medicare savings per day.

Medicare savings per day are the difference between actual and expected costs for demonstration beneficiaries. In this example, the estimated savings are $2.74 per day.

Step 9: Determine size of the performance payment pool.

The size of the performance payment pool is determined by multiplying the Medicare savings per day by the number of resident days for demonstration homes during the demonstration year. In this example, the size of the performance payment pool is $3.69 million. Note that CMS may decide to retain some of the performance payment pool as program savings rather than distributing it to demonstration homes.

Table 3.2
Example of Determination of Medicare Savings for the NHQBP Demonstration

	Demonstration Homes		Comparison Group Homes	
	Base Year	**Demonstration year 1**	**Base Year**	**Demonstration year 1**
Number of days[1]	1,333,600	1,346,936	1,306,928	1,323,265
Medicare costs for relevant time period[2]	$91,375,000	$93,211,638	$90,837,500	$96,571,617
Medicare costs per day[3]	$68.52	$69.20	$69.50	$72.98
Percent change in Medicare costs per day		1.00%		5.00%
Risk adjustment index[4]	1	0.998	0.985	0.9831
Risk adjusted Medicare costs[5]	$68.52	$69.06	$68.60	$71.75
Percent change in risk-adjusted Medicare costs[6]		1.0%		5.0%
Expected costs[7]		$71.80		
Medicare savings per day[8]		$2.74		
Size of the performance payment pool[9]		$3,691,520		

Notes:

1: Based on information on annual resident days for California nursing homes, based on the state's Long-Term Care Annual Financial Data, includes the seven days following discharge for those discharged during the year.

2: Base year assumption is that baseline Medicare costs per enrollee are $8,500 for demonstration homes and $8,800 for comparison homes, and that the average nursing home has 215 admissions per year (admissions figure based on data for California nursing homes.

3: Total Medicare costs divided by total days.

4: While the specific risk adjustment method is not known at this time, the risk adjustment index would be used to adjust costs for changes in casemix across time and differences in casemix between demonstration and comparison homes. In this example, the baseline risk adjustment index is higher for comparison group homes than for demonstration homes. In the demonstration year, the risk adjustment index decreases slightly for demonstration homes and is unchanged for the comparison group.

5: Adjusted Medicare costs are Medicare costs multiplied times the appropriate risk adjustment index. Adjusted Medicare costs are a measure of Medicare costs that adjusts for the differences in the risk adjustment index.

6: This is different from the change in actual Medicare costs because the risk adjustment index for demonstration homes decreased (indicating that they were treating somewhat healthier residents), while the risk adjustment index for comparison homes increased (indicating that they were treating somewhat sicker residents).

7: Expected costs are an estimate of what Medicare costs for demonstration beneficiaries would have been in the absence of the demonstration. Expected costs are calculated by multiplying base year Medicare costs per day for demonstration homes by one plus the expected growth rate (the growth rate in expected Medicare costs per day for the comparison group).

8: This is calculated as the difference between expected and actual Medicare costs per resident day for demonstration homes.

9: This is calculated by multiplying Medicare savings per day times the number of resident days for demonstration homes in year 1. Rules for determining what share of the performance payment pool is allocated to homes vs. retained by CMS are not addressed in this report.

Source: Abt Associates, 2006

Step 10: Allocate performance payments based on level of performance and improvement over time.

Our recommendation is that 50 percent of the performance payment pool is allocated to homes with high performance levels and 50 percent to homes based on improvement. Given this even split, $1.84 million would be given to homes with high performance levels and $1.84 million would be given to homes with large improvement.

Step 11: Determine performance payment amount for homes.

In this example, there are 50 homes participating in the demonstration for a state. The top 10 (i.e., the top 20 percent) in terms of overall performance score qualify for a performance payment based on performance level, with the top 5 (i.e., top 10 percent) receiving a proportionately larger performance payment than the next 5 homes. Table 3.3 presents performance measures and performance payments for the homes in this example.

Performance payments are allocated based on number of resident days. Note that the performance payment amount for nursing home 1 is almost twice that of nursing home 3, reflecting the nearly double average daily census for Nursing home 1. In this example, homes in the second 5 in terms of either performance level or improvement relative the base year, receive a performance payment that is 70 percent as high as that of the top 5. Note that nursing home 6, which qualified for an performance payment based on both performance level and improvement, received the performance payment based on improvement, since it was for a larger amount.

We determined the performance payment amount for homes with high performance levels using these steps:

- Rank homes based on year 1 performance scores.
- For homes in the top 10, determine nursing home share of the $1.84 million that is allocated to high performers.
    - Determine the total weighted resident census for the homes that receive a performance payment based on performance level. This is defined as the sum of average census for homes in the top 10 percent and 70 percent of the average census for homes in the next 10 percent.
    - The share of the performance pool for homes in the top 10 percent equals average resident census divided by the total weighted resident census for the homes that will receive a performance payment based on performance level.
    - The share of the performance pool for homes in the next 10 percent equals 0.7 times their resident census divided by the total weighted resident census for the homes that will receive a performance payment based on performance level.
    - The performance payment equals the size of the performance pool for high performing homes times the nursing home's share of the performance pool.

The process for determining the size of performance payments based on across-time improvement is similar, except that homes must have an overall performance level above the 40th percentile (i.e., a rank in the top 30) to be eligible for a performance payment. In this example, note that Homes 31, 33 and 35 were among the top 10 in terms of improvement in performance scores relative to baseline, but they do not receive any performance payment because their overall performance level is not high enough.

Also, note that homes that qualify for a performance payment based on both level of performance and improvement receive the higher of the performance payment for either level or improvement, but not for both. Nursing home 6 was in the top 10 percent in terms of both level and improvement, but their payment reflects their level of performance only, as this was slightly higher than what their payment would be for improvement. In this example, all of the nursing homes that qualified for an performance payment based on the change in their performance had a higher performance score in year 1 than in the baseline. It is possible that nursing homes with the largest change in performance may not show positive improvement from year to year (i.e., if the demonstration is associated with reductions in nursing home performance). To receive an performance payment based on improvement, nursing homes would have to show a positive change in their performance score.

Table 3.3
Example of Allocation of Performance Payment to Nursing homes

Nursing Home	Average Census	-Performance Score			Performance Ranks		Performance payment
		Baseline	Year 1	Change	Level	Change	
1	166	74	78.9	4.9	1	23	$386,717
2	109	67.5	71.9	4.4	2	26	$253,929
3	83	72.2	71.2	-1	3	35	$193,359
4	48	76.5	69.6	-6.9	4	46	$111,822
5	100	61.3	66.8	5.5	5	18	$232,962
6	125	44.3	63	18.7	6	1	$244,848
7	85	56.9	61.6	4.7	7	25	$138,613
8	107	55.4	60.5	5.1	8	21	$174,489
9	32	67.6	60.1	-7.5	9	49	$52,184
10	100	57.7	59.2	1.5	10	29	$163,074
11	85	47.8	59	11.2	11	5	$138,613
12	180	50.5	57	6.5	12	16	$0
13	97	46.9	56.9	10	13	8	$133,001
14	61	45.1	56.3	11.2	14	6	$119,486
15	89	49.8	56.3	6.5	14	16	$0
16	156	47.9	56.1	8.2	16	12	$213,899
17	142	63.2	56.1	-7.1	16	47	$0
18	66	59.5	54.9	-4.6	18	43	$0
19	59	41.5	54.4	12.9	19	3	$115,568
20	114	59.8	53	-6.8	20	45	$0
21	43	56.6	52.4	-4.2	21	42	$0
22	105	43.4	52.3	8.9	22	11	$143,970
23	167	44.5	52.2	7.7	23	14	$228,982
24	75	46.6	51.9	5.3	24	20	$0
25	95	55.1	51.4	-3.7	25	40	$0
26	171	39.1	51	11.9	26	4	$334,952
27	65	36	50.4	14.4	27	2	$183,734
28	43	56.8	50.4	-6.4	27	44	$127,321

29	72	57.6	50.3	-7.3	29	48	$0
30	120	50.6	50	-0.6	30	33	$0
31	134	38.9	48.7	9.8	31	10	$0
32	78	56.1	48.6	-7.5	32	50	$0
33	105	36.7	47.8	11.1	33	7	$0*
34	24	41.9	47	5.1	34	21	$0
35	89	36.4	46.4	10	35	8	$0
36	181	44.9	44.2	-0.7	36	34	$0
37	74	42.2	44.1	1.9	37	28	$0
38	14	46.1	43.9	-2.2	38	36	$0
39	89	36	43.8	7.8	39	13	$0
40	67	43	42.9	-0.1	40	32	$0
41	78	38.6	41.6	3	41	27	$0
42	141	43.7	40.8	-2.9	42	37	$0
43	56	43.9	40.8	-3.1	42	38	$0
44	100	44.1	40.2	-3.9	44	41	$0
45	60	27.1	32.5	5.4	45	19	$0
46	120	27.7	32.5	4.8	45	24	$0
47	95	34.5	30.9	-3.6	47	39	$0
48	82	28.8	29.8	1	48	31	$0
49	105	17	24.1	7.1	49	15	$0
50	43	18.7	20.2	1.5	50	29	$0

*: Nursing home would have qualified for a performance payment based on improvement in performance score being in the top 20 percent, but was ineligible because their overall performance in the demonstration year was below the 40th percentile.

Source: Abt Associates, 2006

4. Demonstration Design

The demonstration is expected to include an average of 50 nursing homes per state in 4 or 5 states (a total of 200 to 250 nursing homes). Participation will be voluntary. We are assuming that many homes will be interested in the demonstration, permitting a randomized design in which some homes that apply to be in the demonstration are assigned to a comparison group. The comparison group will likely include the same number of nursing homes as the demonstration (i.e., 200 to 250).

Homes that indicate an interest in participating in the demonstration will be stratified and then randomly assigned to either the intervention or a comparison group. This design allows a comparison of homes that participate in the demonstration to be compared to other homes that expressed an interest in participating but were assigned to the comparison group. Since the characteristics and behavior of homes that express an interest in the demonstration are likely different from other homes, this design will not allow any inferences to be drawn regarding the potential impact of quality-based purchasing for homes that declined to participate in the demonstration.

The first year of the demonstration can be thought of as a "formative stage," with refinements to the performance measures and the design considered. For example, one or more of the developmental measures described in Chapter 2 may be added as performance measures. To permit evaluation of the demonstration, we recommend that the performance measures not be changed in years 2 and 3. Note that we recommend that the scoring criteria for the measures should also not be changed during the demonstration.

Appendix A: Technical Expert Panel

A nine-member technical expert panel (TEP) was recruited to provide feedback on the pay-for-performance draft demonstration design. Panel members were selected jointly by CMS and Abt Associates, and included experts on long-term care clinical and payment issues from private, state government and academic settings. TEP members included:

- Michael Bailit, President Bailit Health Purchasing
- David Gifford, Director Rhode Island Department of Health
- Bob Godbout, CEO Stepwise Systems
- Charlene Harrington, Professor of Sociology and Nursing in the Department of Social and Behavioural Sciences, University of California, San Francisco
- Andrew Kramer, Professor of Health Care Policy in the Department of Medicine and Head of the Division of health care policy research at the University of Colorado-Denver Health Sciences Center (UCDHSC).
- Dana Mukamel, Associate Professor at the University of California Irvine and a Senior Fellow at the Center for Health Policy Research
- Charles Phillips, Department of Health Policy and Management, School of Rural Public Health, Texas A&M University System Health Science Center
- Kathy Wade, Principal, Myers and Stauffer

The panel was asked to review the draft demonstration design and provide comments during several teleconference calls and a one-day meeting held at the Centers for Medicare & Medicaid Services in September 2005.[28] Each TEP member's comments and suggestions were considered in the development of the demonstration design.

[28] The TEP meeting was scheduled on September 21, 2005, the day after CMS hosted an Open Door Forum on the Pay-for-Performance Demonstration. The TEP was invited and most were available to sit in on the Open Door Forum to hear industry representative questions and comments.

Appendix B: Background Information: State Quality-Based Purchasing Systems

According to Joslin and Manard (2004), there is great interest among states in payment incentive programs, but only a few states that have actually implemented or have specific plans for incorporating quality-based purchasing into their Medicaid payment rates. State programs have been limited because of budget constraints, inadequate data sources, and technical issues. We identified only two states-- Iowa and Vermont-- that currently have a payment incentive program. Minnesota has designed but not yet implemented a "value-based" reimbursement (VBR) system, and three additional states (Colorado, North Carolina, and Kansas) are considering a quality-based purchasing program in the future. Several state quality-based purchasing programs, including those in California (San Diego County), Illinois, Massachusetts, New York and Texas are no longer active.

In this section, we review the performance measures and payment methodologies that states have used for their NHQBP systems. These state systems may provide insights useful in the design of the Medicare NHQBP demonstration.

Performance Measures in State Quality-Based Purchasing Systems

State payment incentive programs have used a variety of performance measures, including:

- Quality indicators derived from the Minimum Data Set (MDS)
- Staffing levels, staff turnover and retention
- Measures of resident satisfaction and quality of life
- Performance payment based on the adoption of culture change initiatives
- Deficiency citations or other survey outcomes

In this section, we describe the measures that states have used for their nursing home performance payment programs.

Performance Measures Based on MDS-based Quality Indicators

Texas' Performance-based Add-on Program (PBAO) and Minnesota's proposed Value-Based Nursing home Reimbursement System (VBR) both utilize(d) MDS-based quality indicators in their quality-based purchasing programs.[29]

Texas:
Texas used 24 CHRSA Quality Indicators (QI) to determine resident outcomes. Two indices were used to describe resident outcomes: Potential Advantages Score (Table B-1), which reflects the number of QIs in which a nursing home appears to have better resident outcomes than 90 percent of Texas homes and a Potential Disadvantages Score (Table B-2), that reflects the number of QIs in which a nursing home appears to have worse resident outcomes than 90 percent of Texas homes. Under the PBAO program, 50 percent of a nursing home's per diem add-on payment is based on

[29] The Texas PBAO program ran from 2001-2002, discontinued due to a $9 billion State budget shortfall.

performance on the MDS quality indicators, with the other 50 percent based on survey compliance. Texas nursing home providers were reportedly very familiar with the selected QIs as they were the basis for the Texas nursing home consumer report card, the Quality Reporting System (QRS).

Table B-1
Texas Performance-Based Add-On Payment Methodology
Potential Advantage Score

Potential Advantage Score	Definition	Weight
Most Advantages	More than four QIs suggest potentially superior performance.	0.500
More Advantages	Three or four QIs suggest potentially superior performance.	0.375
Some Advantages	Two QIs suggest potentially superior performance.	0.250
Fewer Advantages	One QI suggests potentially superior performance.	0.125
Fewest Advantages	No QIs suggests potentially superior performance.	0.0
No Rating	Lack of MDS data for QI processing.	0.0

Source: Texas Health and Human Services Commission

Table B-2
Texas Performance-Based Add-On Payment Methodology
Potential Disadvantage Score

Potential Disadvantage Score	Definition	Weight
Fewest Disadvantages	No more than one QI suggests potential performance problems.	0.500
Few Disadvantages	Two or three QIs suggest potential performance problems.	0.375
Some Disadvantages	Four or five QIs suggest potential performance problems.	0.250
More Disadvantages	Six or seven QIs suggest potential performance problems.	0.125
Most Disadvantages	Eight or more QIs suggest potential performance problems.	0.0
No Rating	Lack of MDS data for QI processing.	0.0

Source: Texas Health and Human Services Commission

Minnesota:

Minnesota's original proposed VBR system would have paid for services based on target price, quality, efficiency and each nursing home's specific costs. The original system, however, remains in the proposal phase with a number of modifications under discussion in response to provider concerns. Minnesota contacts explained that the identification of quality measures has not been an issue, but the weighting of the measures in the payment structure is something that they continue to work on. Quality measurement will likely be based on the proportion of quality indicators where the nursing

home scores better than the national average. The state is considering 18 MDS-based quality measures - nine CMS quality measures and nine Center for Health Systems Research and Analysis (CHSRA) QIs (see Table B-3). Zero points would be awarded if the nursing home did not score better than the national average on any QI, and a nursing home can receive as many as 14 points if they perform better than the national average on all 18 quality measures. In the Minnesota system as originally proposed, 14 percent of the performance payment would have been based on MDS quality indicators, whereas in the current proposed version, 40 percent of the payment would be based on the MDS-based measures.

Table B-3
Minnesota Value-Based Reimbursement
Quality Indicators Used in Nursing home's QI Score

Quality Indicator	Source
Prevalence of Incontinence of Bowel/Bladder Hi Risk	CMS – Quality Measures
Prevalence of Incontinence of Bowel/Bladder Lo Risk	CMS – Quality Measures
Prevalence of Infections	CMS – Quality Measures
Prevalence of Pressure Sores Hi Risk	CMS – Quality Measures
Prevalence of Pressure Sores Lo Risk	CMS – Quality Measures
Prevalence of Burns, Skin Tears, Cuts	CMS – Quality Measures
Prevalence of Anti-Psychotic w/o Psychiatric Dx Hi Risk	CMS – Quality Measures
Prevalence of Anti-Psychotic w/o Psychiatric Dx Lo Risk	CMS – Quality Measures
Incidence of Loss of ADL Function	CMS – Quality Measures
Incidence of New Fractures	CHRSA QI
Prevalence of Falls	CHRSA QI
Prevalence of Depression w/o Anti-Depressant Medication	CHRSA QI
Prevalence of Incontinence w/o a Toilet Plan	CHRSA QI
Prevalence of Fecal Impact	CHRSA QI
Prevalence of Weight Loss	CHRSA QI
Prevalence of Dehydration	CHRSA QI
Prevalence of Physical Restraints	CHRSA QI
Prevalence of Little or No Activity	CHRSA QI

Source: Minnesota Department of Human Services, Continuing Care Administration

Iowa

Iowa does not currently base any part of their performance payments on MDS-based quality indicators, because at the time their system was implemented (2002) the QIs had not been around long enough. Contacts explained that there is a workgroup that is still active and from time to time discussion on adding quality indicators to the payment methodology comes up.

Performance Measures Based on Staffing Outcomes

Staffing-based performance measures are an important part of the quality-based purchasing programs in several states:

- Iowa's Accountability Measures include a measure for nursing hours provided. Homes are awarded one or two points (out of a total of 12 possible) based on nursing hours per resident day (for RNs, LPNs, rehabilitation nurses, nurse aides, and contracted nursing services). Homes receive one point for staffing that falls between the 50th and 75th percentile and two

points if staffing is at or above the 75th percentile. A casemix index is used to adjust for differences in resident acuity. Staffing Information is reported on a specific state form, the Financial and Statistical Report, Form 470-0030. In addition, homes can receive one point if their staff retention is more than 72.73 percent. The casemix index is based on the Resource Utilization Group (RUG-III) classification system that the state uses.

- Kansas is considering a system, Quality and Efficiency Outcomes Incentive Factor (Kansas, DSRS, 2005) that would award points (nine possible total) and base performance payments on six outcome measures, three of which are staffing related: casemix-adjusted nurse staffing ratio, staff turnover rate and staff retention rate. Up to two points would be awarded for a casemix-adjusted staffing ratio at or above 120 percent of the statewide median. One point is awarded for ratios below 120 percent but above or equal to 110 percent of the statewide median. Providers also earn one point if they perform better than the statewide median for low staff turnover and high staff retention. The state uses the RUG-III system and this is the basis for calculating casemix-adjusted staffing levels.

- Minnesota's original and current proposed VBR system includes several staffing measures. The original system allowed homes to earn up to 63 (out of a possible 100) points based on their performance on nursing hours per standardized resident day (30 maximum quality points); staff turnover (12 maximum points); staff retention (12 maximum points); and use of pool staff (9 maximum points). The current proposed system has reduced the staffing component – the staffing level measure was dropped altogether, staff retention was increased to 25 percent; staff turnover increased to15 percent and pool use increased to10 percent. In the original proposed system, staffing measures accounted for 63 percent of a homes' score with MDS indicators only 14 points out of the total possible 100. The current proposed system has brought these two measure more in balance with staffing accounting for 50 percent of the payment and MDS-based indicators 40 percent. In both systems staffing remains much more heavily weighted than survey deficiencies, which count for a maximum of only 10 points (Minnesota, DHS, 2004). The staffing level performance measure is adjusted for casemix using the nursing home's average casemix index under the RUG-III system used by the state.

- Texas did not include a staffing measure in its PBAO program due to a lack of current and audited staffing information. Also, Texas homes have the option of participating in a voluntary Direct Care Enhancement Program that provides additional funds for homes whose staffing levels exceed the state averages (adjusted for casemix based on the Texas Index for Level of Effort (TILE) system for Medicaid reimbursement system).

Performance Measures Based on Resident Satisfaction/Quality of Life Measures

Two states, Iowa and Vermont include resident satisfaction as a performance measure in their quality-based purchasing system. Minnesota uses a quality of life measure in its system.

- Iowa uses a measure of resident satisfaction as an optional measure. Homes must be at or above the 50th percentile of resident satisfaction based on a Resident Opinion Survey (Iowa, 2003). Homes distribute the survey to their residents for completion between September and December. The surveys are returned to an independent entity that compiles the survey results and completes a state form, the Resident Opinion Survey Transmittal Report. The resident

satisfaction measure is worth one point (out of the 12 possible). The resident opinion survey that the state uses has 31 items, including questions about nursing home staff (e.g., nurses are well trained, the staff understands how residents feel, the staff is patient), quality of life (comfort of residents, variety and taste of meals, safety, odors), housekeeping issues, activities, and satisfaction (with aides, dietary service, nursing service, housekeeping, administration). Each item is scored on a scale from 1 (strongly disagree) to 5 (strongly agree). The nursing home score is calculated as the total survey score divided by the number of completed questions.

- Vermont's evidence-based best practice award program provides financial rewards for homes that have instituted evidence-based best practices in recruitment and retention of direct care staff (Lipson, 2005). In order to qualify for the potential evidence-based best practice award, nursing homes must have a resident satisfaction survey score around the state average (Joslin and Manard, 2004).

- North Carolina has created the New Organizational Vision Award (NC-NOVA), which awards a special licensure classification for homes that can demonstrate they have "a positive workplace culture designed to improve the recruitment and retention of direct care workers" (Lipson, 2005).

- The original proposed Minnesota system was to award up to 13 (out of 100) points based on the proportion of single rooms at the nursing home. This measure has been dropped. The State is considering adding a sixth measure on consumer satisfaction, worth about 30 – 35 points. Face-to-face interviews with 25 percent of residents in all nursing homes were due to be completed by July 2005. Annual consumer satisfaction surveys are planned to provide updated information for the measure.

Performance Measures Based on Survey Outcomes/Deficiencies

Iowa, Kansas, Minnesota, Texas and Vermont include measures based on survey outcome or deficiency citations.

- Iowa awards two points (of the total 12 possible) for a deficiency free survey or one point for regulatory compliance with survey. To be deficiency free, homes must have no deficiencies cited on the annual state and federal survey and any subsequent surveys, complaint investigations or revisit investigations. Homes with any deficiencies at the scope and severity "A" level are considered as deficiency free. Homes are considered in regulatory compliance if no on-site revisit is required for recertification surveys or for any substantiated complaint investigations (Iowa, 2003).

- The proposed Kansas system would award 1 or 2 points (out of 9 total) based on whether the nursing home had no deficiencies (2 points) or no substandard care deficiencies and no more than five total deficiencies (1 point).

- Both Minnesota's original and current proposed systems award points in this area based on whether deficiencies for patient-care related F-tags (see Table B-4) are above or below scope and severity level F. A maximum of 10 points (out of the possible 100) is awarded if all nursing home deficiencies are below level F. Zero points are awarded if deficiencies are at

level H or higher with five points if the nursing home had deficiencies at level F or G (Minnesota, 2004). Minnesota contacts explained that even though there is a great deal of variability in survey outcomes across the state, especially at the D and E levels, they feel it's important to include a survey deficiency measure to send a message that the survey is considered valid and furthermore that providers accept it as part of the process.

Table B-4
Minnesota Value-Based Reimbursement
Quality Indicators Used in Nursing home's QI Score

Deficiency
F-221: Physical Restraints
F-222: Chemical Restraints
F-223: Abuse
F-241: Dignity
F-242: Choice of activities & schedules
F-310: ADLs
F-311: Maintain or improve physical abilities
F-314: Pressure sores
F-315: Catheters
F-316: Bladder treatment
F-321: NG tubes
F-325: Nutrition
F-327: Hydration
F-329: Drug prescribing
F-330: Antipsychotic use
F-332: Medication errors
F-221: Physical Restraints
F-222: Chemical Restraints

Source: Minnesota Department of Human Services, Continuing Care Administration

Texas included survey compliance in its payment formula along with the QIs and number of Medicaid days of service. To qualify for a performance award, a nursing home must never show deficiencies at or above the level of Actual Harm or Substandard Quality of Care. There are three levels of regulatory compliance that earn performance awards: Deficiency-free, substantial compliance and the minimum acceptable level of compliance (Carter, 2002). Vermont requires that, in order to qualify for a workforce-related award, homes must be in substantial compliance for the most recent survey, have no substandard complaints, have a life safety deficiency score of five or less, and a scope and severity less than level E in the last full survey.

The proposed Kansas program would include a performance measure based on survey performance, with up to two (out of a maximum of nine) incentive points based on survey performance. Two points are awarded to providers that have no health survey deficiencies on any survey conducted during the review period. Providers that have no more than five health survey deficiencies, nor any one health survey deficiency that falls in the range of substandard care, on any survey conducted during the review period will earn one incentive point. All other providers receive no incentive points.

Performance Measures Based on "Culture Change"

North Carolina and Vermont include elements of "culture change" in their quality-based purchasing methodology. North Carolina provides a special licensure classification for homes that have a "positive workplace culture" designed to improve direct care worker recruitment and retention (Lipson, 2005). The program focuses on human resource policies and management practices that create an environment conducive to caregiving. Vermont has created a system with potential financial incentives for homes that have implemented evidence-based best practices in recruitment and retention of direct care workers. Nursing homes that implement at least two workforce improvement practices are eligible to win one of five annual quality awards of $25,000 (Lipson, 2005). North Carolina has created the New Organizational Vision Award (NC-NOVA), which awards a special licensure classification for homes that can demonstrate they have "a positive workplace culture designed to improve the recruitment and retention of direct care workers" (Lipson, 2005).

Other Performance Measures Used by States

The proposed Kansas system includes performance measures based on occupancy and operating expense:

- Providers with occupancy at 95 percent or higher earn one point. Those with Medicaid occupancy at 65 percent or higher also earn one point.

- Providers with per diem operating expenses below the statewide median per diem operating expense will earn one point.

Relative Mix of Outcome, Structural and Other Measures in State Quality-Based Purchasing Systems

State quality-based purchasing systems differ in the relative weights placed on MDS-based measures, staffing measures, quality of life measures, measures based on survey deficiencies, and other measures.

- For the Texas system, 50 percent of the performance payment is based on MDS-based quality indicators; in Minnesota, the original proposed system had 14 percent of the payment based on measures derived from the MDS (Table B-5). Forty percent of the current proposed system is based on MDS. Neither Kansas nor Iowa use MDS-based quality measures in their systems.

- Staffing measures were weighted heavily in the original Minnesota system (63% of total points) and decreased in the current proposed system to 50 percent. Staffing is weighted to a lesser extent in Kansas (44%) and Iowa (25%). The Texas system did not use any staffing measures.

- All four states considered survey deficiencies in determining the performance payment with Texas placing the highest weight on survey performance. Texas contacts explained that their system was conceived as rewarding those homes that could show consistent survey compliance along with quality improvements. The Texas payment formula uses survey compliance as a multiplier, i.e., quality improvement scores are multiplied by survey

compliance. Total survey compliance has a 1.0 multiplier, anything less than total compliance has a multiplier less than one, reducing (or eliminating) the impact of any quality improvement.

- Occupancy rate was considered by two states (Iowa and Kansas), while performance payments in Kansas and Minnesota (original proposed system) also were based partially on nursing home costs.

Table B-5
Relative Mix of Outcome Measures in State Quality-based purchasing systems

State	MDS-Based Measures	Staffing Measures	Quality of Life Measures	Survey Deficiencies	Other
Iowa[ǂ]	0%	25%	16%	25%	33%
Kansas*	0%	44%	0%	22%	33%
Minnesota	14%	63%	13%	10%	0%
Original + Minnesota Modified ++	40%	50%	0%	10%	0%
Texas	50%	0%	0%	50%	0%

ǂ: For Iowa, quality of life measures Include resident satisfaction and resident advocate committee resolution rate; other measures include occupancy rate, administrative costs/use of contracted nursing; special licensure classification, and Medicaid utilization.

*: For Kansas, other measures include total occupancy, Medicaid occupancy, and operating expenses.

+: For Minnesota, use of pool staff was counted as a staffing measure and we ignored the portion of the performance payment based on the difference between actual costs and nursing home target price.
++ Minnesota's original proposed VBR has been modified due to industry concerns.

Source: Abt Associates, 2006.

Payment Methodologies in State Quality-Based Purchasing Systems

Iowa, Minnesota and Texas systems utilize different payment systems.

Iowa: Since 2002, Iowa has included an additional payment component in the casemix portion of its Medicaid rates to nursing homes meeting ten "Accountability Measures." Homes may receive additional points for meeting ten quality measures including:

- Deficiency free survey
- Regulatory compliance with survey
- Casemix adjusted nursing hours per resident day
- Resident satisfaction
- Resident advocate committee resolution rate
- Employee retention
- High occupancy
- Low administrative costs

- Special Licensure Classification
- High Medicaid Utilization

See Table B-6 for the definitions and points associated with these measures. Homes can have a maximum of 12 points.

Table B-6
Iowa Accountability Measures: Performance Measures and Points

Performance Measure	Definition	Points
Deficiency free survey	Based on the latest annual survey completed	2
Regulatory compliance with survey	Based on the latest annual survey completed	1
Casemix adjusted nursing hours per resident day	For nursing homes with nursing hours per patient day at or above 3.204 hours (50th percentile) and below 3.691 hours (75th percentile), the point value is equal to 1. For nursing homes at or above 3.691 hours, the point value is equal to 2.	1-2
Resident satisfaction	Nursing homes with an average score of 4.066 (50th percentile) or greater receive 1 point.	1
Resident advocate committee resolution rate	Nursing homes that have a resident advocate committee resolution rate of 60% or greater receive 1 point.	1
Employee retention	Nursing homes that have an employee retention rate of 72.7273 (50th percentile) or greater receive 1 point.	1
High occupancy	Nursing homes with occupancy at or above 95% receive 1 point.	1
Low Administrative Costs	Nursing homes with per patient day administrative costs of $10.82 (50th percentile) or less and no contracted nursing (50th percentile) receive 1 point.	1
Special Licensure Classification	Nursing homes with units licensed for the care of residents with chronic confusion or dementing illness (CCDI units) receive 1 point.	1
High Medicaid Utilization	Nursing homes with Medicaid utilization at or above 50.41% receive 1 point.	1

Source: Iowa Department of Human Services

Data are taken from the Financial and Statistical Report, information reported by the Department of Inspections and Appeals, the long-term care ombudsman, and a resident survey (optional). In order for a nursing home to qualify for additional Medicaid reimbursement, it must achieve a minimum score of 3 points. The amount of the performance payment varies slightly from year to year and depends on a nursing home's performance score. (Table B-7)

Table B- 7
Iowa Accountability Measures: Performance Measures and Points

Total Points	Percentage Payment	Per Diem Amount 2005
0 – 2 points	No additional reimbursement	$0 per day
3 – 4 points	1% of the direct care and non-direct care medians	$1.05 per day
5 – 6 points	2% of the direct care and non-direct care medians	$2.09 per day
7 or more points	3% of the direct care and non-direct care medians	$3.14 per day

Source: Iowa Department of Human Services

According to Lipson (2005), "In the current fiscal year, 373 homes qualified for an add-on; while 57 homes did not qualify for any add-on. A little over $8 million was paid through add-ons in the most recent fiscal year."

Iowa contacts explained that their performance payment system was a legislative mandate put into effect at the same time their Medicaid reimbursement system was converted to an MDS-based RUG system. Eight million dollars was allocated for performance payments, however no funding was allocated for data collection, so measures were limited to those calculated from data already gathered through Medicaid Cost Reports, survey and certification, and ombudsman reports. Only one optional measure, a resident satisfaction survey, involves data collection effort on the part of the nursing home. A workgroup assembled in the early development phase continues to be active. After the first year, several modifications were made to the payment methodology with the group considering additional changes as necessary, including the addition of MDS-based quality indicators and a change from percentile based measures to standard measures. The workgroup is considering changing the staffing measure to a standard number of hours per resident day because only about half of the homes achieve the percentile measure. The workgroup also looks at measures highly correlated to determine if both should be included in the system.

Contacts state that statistics show that homes are moving in the desired direction. Information on Accountability Measure statistics from 2003 to 2005 in Table B-8 was provided by the State as well as performance on individual measures for 2004 and 2005 (Table B-9).

Table B- 8
Iowa Accountability Measure: Statistics for Fiscal years 2003, 2004 and 2005

Points Available	2003		2004		2005	
	Number of Providers	Percent of Total	Number of Providers	Percent of Total	Number of Providers	Percent of Total
0-2 Points = No Add-on	101	23	72	17	57	13
3-4 Points = Add-on 1 % of Median	185	43	153	35	158	42
5-6 Points = Add-on 2 % of Median	118	27	145	34	150	40
7+ Points = Add-on 3 % of Median	29	7	62	14	65	17
Total	433	100	432	100	430	100

Notes: Add-on amounts varied by year, e.g., add-on of 1 % in 2003 was $ 0.95 per day, in 2004 $1.02 per day and in 2005 was $1.05 per day.

Additional reimbursement is not available to Medicare-certified hospital based nursing homes, which there were 13 in 2004 and 2005.

Source: Iowa Department of Human Services

Table B-9
Number of Iowa Providers Achieving Measures by Measure for Fiscal years 2004 and 2005

Measure	Number of Providers 2004	Number of Providers 2005
# 1 Deficiency Free Survey	60	75
# 2 Regulatory Compliance with Survey	245	250
# 3 Nurse Staffing Hours	215	217
# 4 Resident Satisfaction	171	167
# 5 Resident Advocate Committee Resolution Rate	208	230
# 6 High Employee Retention Rate	220	214
# 7 High Occupancy	96	83
# 8 Low Administrative Costs	215	216
# 9 Special Licensure Classification	86	72
# 10 High Medicaid Utilization	216	215

Source: Iowa Department of Human Services

Iowa contacts advised that any system be developed through a collaborative process involving all stakeholders. Also, that it was more important to get something in place to get homes moving in the right direction even if not perfect, and then go back and make adjustments as needed along the way. Iowa was also cautious not to report these payments as part of their nursing home report card system. Homes may be out of regulatory compliance and still receive a performance payment.

Kansas:

In the proposed Kansas system, providers can earn incentive points based on the outcome measures listed in Table B-10. A total of 9 incentive points are available. Homes that have 4 or more points receive a per diem performance payment of up to $1- $3 based on the schedule listed in Table B-11. Total funding for the performance payments is limited to $1.2 million, and if the estimated cost of

performance payments exceeds this amount, the performance payments would be reduced proportionally.

Table B-10
Kansas Quality and Efficiency Outcomes Incentive Factors

Performance Measure	Points
Casemix adjusted staffing ratio >= 120% of state median (2) or adjusted staffing ratio between 110% and 120% (1)	1-2
Total occupancy >= 95%	1
Medicaid occupancy >= 65%	1
No health survey deficiencies during review period (2) or no substandard care or more than 5 deficiencies/survey (1)	1-2
Operating expenses < state median	1
Staff turnover rate < state median	1
Staff retention > state median	1
Total	9

Source: Kansas Department of Social and Rehabilitation Services, Department on Aging

Table B-11
Kansas Provider Incentive Factors

Total Incentive Points:	Incentive Factor Per Diem:
Tier 1: 8-9	$3.00
Tier 2: 6-7	$2.00
Tier 3: 4-5	$1.00

Source: Kansas Department of Social and Rehabilitation Services, Department on Aging

Minnesota: Original Proposed System

The VBR system, as originally conceived, was a "hybrid between a pricing system and a cost-based system." Nursing home payment rates depended on their quality scores and their cost structure. The performance measures were applied only to the direct care services component of the payment rate. Table B-12 lists the performance measures considered in the system along with the criteria for determining points. Based on these criteria, a quality score between zero and 100 was to be calculated for each nursing home. Based on this score, homes were to be placed into one of ten quality tiers. Tiers are established in 10-point increments. Homes with scores of 0-10 are assigned to Quality Tier One; 11 – 20 to Quality Tier Two, etc (Table B-13).

Table B-12:
Minnesota Value-Based Reimbursement: Quality Measures and Points

Measure	Definition	Quality Points	Minimum Points	Maximum Points	Points Between Minimum and Maximum
Nursing Hours per Standardized Day	Nursing home average nursing hours per resident day for RN, LPN, CNA and TMA (adjusted for nursing home casemix).	30 points	0 points if nursing home is below 2.0 hours per resident day.	30 points if nursing home is at or above 4.5 hours per resident day.	Points distributed proportionately according to hours between 2.0 and 4.5
Staff Turnover	Nursing staff who left between 10/1 of one year and 9/30 of the following year divided by the number of staff.	12 points	0 points if nursing home has turnover rate equal to or greater than 0.70.	12 points if nursing home has turnover rate equal to or greater than 0.2.	Points distributed proportionately according to rates between 0.7 and 0.2
Staff Retention	Nursing staff 10/1 who were still employed on 9/30 of the following year divided by the number of staff.	12 points	0 points if nursing home has retention rate less than 50%.	12 points if nursing home has retention rate equal to or greater than 85%.	Points distributed proportionately according to rates between 50% and 85%
Use of Pool Staff	Pool staff hours as a percentage of total nursing hours.	9 points	0 points if nursing home had greater than 10 % pool staff hours.	9 points if nursing home had no pool staff hours.	Points distributed proportionately according to percentage pool staff from 10% to 0%
Proportion of single rooms	Proportion of all beds that were in single rooms	13 points	0 points if nursing home had no beds in single room	13 points if nursing home had 75% or more beds in single room	Points distributed proportionately according to percentage of beds in single room from 0% to 75%
Quality indicators from MDS	The proportion of quality indicators where the nursing home was better than the national average (based on 18 QIs)	14 points	0 points if nursing home did not do better than national average on any QI	14 points if nursing home did not do better than national average on all 18 QIs	Points distributed proportionately according to percentage of QIs where nursing home did better than the national average
Survey deficiencies	Survey deficiencies at Level F or higher for patient care related F-tags	10 points	0 points if nursing home had deficiencies at Level H or higher	10 points if all deficiencies were below Level F	5 points if nursing home had deficiencies at Level F or G

Source: Minnesota Department of Human Services, Continuing Care Administration

Table B-13
Minnesota Value-Based Reimbursement: Quality Scores and Quality Tiers

Quality Score	Quality Tier
0-10	1
11-20	2
21-30	3
31-40	4
41-50	5
51-60	6
61-70	7
71-80	8
81-90	9
91-100	10

Source: Minnesota Department of Human Services, Continuing Care Administration

Within each of the quality tiers, the VBR system established a "target price." This was based on two factors:

- Per diem nursing home costs. The target price for the highest quality tier is the per diem costs of the nursing home with costs at the 70th percentile (multiplied by the appropriate budget factor). The target price for the lowest quality tier is the per diem costs for homes with costs at the 30th percentile.

- Nursing home type: Separate target prices are established for homes that specialize in sub-acute residents (defined as homes with 3 or more admissions per bed per year or hospital-based homes), homes with more than 50 percent of their beds licensed as Boarding Care Home beds, and all other homes.

For the direct care services component of the payment rate, homes get the lesser of their specific costs or the target price.

- For homes with actual direct care costs greater than the target price, they would have received part of the difference, depending on their quality tier and the amount of the difference (Table B-14). Under the system, homes that provided higher quality care would have had a higher target price and could have received a higher payment rate. High quality homes would also have been able to recoup a larger proportion of the difference between their actual costs and the target price.

- Homes that had actual direct care costs less than the target price may have received a portion of the difference as a reward for efficiency, with the amount depending on their quality tier (Table B-13).

Under this system, "a nursing home that had low quality and low costs would get less than a specified target rate, while a low quality/high cost nursing home would get the target rate. A high quality/high cost nursing home typically only gets reimbursed for its costs.

To assure budget neutrality upon implementation, the state had planned to apply a "budget neutrality factor" when determining target prices. This was needed because some nursing homes would have had rates that went up while others would have had rates that went down.

Table B-14:
Minnesota Value-Based Reimbursement: Additional Payments Based on Quality and Efficiency

	Quality Tier	1	2	3	4	5	6	7	8	9	10
	Amounts between	**Amount of Additional Payment**									
Cost greater than target price	$10.01 to $14								10%	20%	30%
	$8.01 to $10							10%	30%	40%	50%
	$6.01 to $8						20%	30%	50%	60%	80%
	$4.01 to $6					20%	40%	50%	70%	90%	100%
	$2.01 to $4				20%	50%	70%	70%	90%	100%	100%
	0 to $2			20%	40%	70%	100%	105%	110%	110%	120%
Cost less than target price	0 to $2	10%	10%	20%	30%	50%	50%	60%	80%	90%	100%
	$2.01 to $4			10%	15%	25%	25%	30%	40%	45%	50%

Source: Minnesota Department of Human Services, Continuing Care Administration

Minnesota: Current Modified Proposed System

The current modified proposed system is a Quality Add-On only, which is seen as a temporary step, according to Minnesota contacts, in the implementation of the full quality-based purchasing model. Minnesota has been working toward implementation of a performance-based system since 1999. Currently, the industry just cannot tolerate a negative rate impact. The State has worked with industry representatives, consumer advocates and employee unions. There was agreement on the MDS-based measures but the weighting of the various measures was problematic. Unions and consumer groups want more emphasis on staffing. The State would like greater weight on quality indicators and consumer satisfaction. With the original system, the industry wanted to more heavily weight staffing levels making the system closer to a cost-based system. With a cost-based system, the nursing home investment is more likely to yield some reward. Each year, they explained, they move forward by small increments, but there is still a lot of work to be done to come up with a mutually acceptable system. Small work groups have had limited success, and the State is considering brining in a group of experts to come up with independent weights.

According to Minnesota contacts, he add-on is based on a quality score of five measures, uses cost of living increase dollars and due to go into effect October 1, 2006. The measures include a set of MDS-based measures (40 percent); a measure of staff retention (25 percent); staff turnover (15 percent); pool use (10 percent) and survey performance (five or ten percent). With a score of 100 points, the nursing home receives a 2.4 percent quality add-on. If 40 points there's no add-on. Between 40 and

100 points, it's a straight-line relationship. The staffing level and private room measures were removed from the original proposal. The state is currently gathering data for a consumer satisfaction measure, which will be worth 30 – 35 points.

Contacts related that the add-on is "really small." If a quality improvement activity costs 20 percent with only a three or four percent reward, homes will skip the add-on. They fear that a small payment is an incentive for lower quality and hope that this temporary measure will only be in effect for one or two years. They plant to monitor how the State's quality measures, consumer satisfaction and turnover change over time.

Texas:

Texas payments are based on three criteria: residents' clinical outcomes (as measured by MDS-based quality indicators (QIs), compliance with federal regulations, and the number of days of Medicaid services provided by the nursing home (Carter, 2002).

As described above, 24 MDS-based quality indicators are used to determine the potential advantage score and potential disadvantage score for each nursing home. Compliance with state and federal regulations is a prerequisite for performance-based add-on payments (Table B-15).

Table B-15
Texas Performance-Based Add-On Payment Methodology: Regulatory Compliance

Compliance	Definition	Compliance Level	Weight
Total Compliance	No deficiencies.	5 (Highest)	1.00
Substantial Compliance	No deficiency was written at a level higher than the scope and severity levels of A, B, or C as defined by the Health Care Financing Administration in Transmittal 274.	4	0.75
Out of Compliance with No Harm or Jeopardy	No deficiency was written at a level higher than scope and severity levels of D, E, or F as defined by the Health Care Financing Administration Transmittal 274, and no deficiency constituted Substandard Quality of Care.	3	0.50
Out of Compliance with Actual Harm or Jeopardy	A deficiency was written at scope and severity levels G, H, I, J, K or L as defined by the Health Care Financing Administration in Transmittal 274, and did not constitute Substandard Quality of Care.	2	0.00
Substandard Quality of Care	A deficiency was written at scope and severity levels F, H, I, J, K, or L as defined by the Health Care Financing Administration in Transmittal 274, and the deficiency was written in either the Resident Behaviors and Nursing home Practices, Quality of Care or Quality of Life chapters.	1 (Lowest)	0.00

Source: Texas Health and Human Services Commission

For each nursing home, a measure of "provider performance units" is calculated using this formula:

Provider TPU = #Medicaid Days x C x (A + B)

where # Medicaid Days is the number of Medicaid days of service that were provided during the service period; C is the nursing home's regulatory compliance score (from Table B-15); A is the nursing home's potential advantage score (from Table B-1) and B is the nursing home's potential disadvantage score (from Table B-2).

Texas contacts explained that they were aiming for a methodology system that would be fairly transparent to providers – one that would not require hours of study. They explained that providers could understand the top 10 percent, and the bottom 10 percent. Nursing home quality measure scores were displayed as histograms so that the top and bottom 10 percent could be identified. For measures that were skewed, such that the best homes could not be identified, they identified the worst homes. They looked at the histograms for the Advantages and Disadvantages scores, identified cut-offs, quantized it into a scale and looked for breaks in the scores, admitting a certain amount of arbitrariness as to where the cutoffs were.

The provider performance unit is translated into a performance payment by dividing the total funds that the state allocated to the program (this amount was $4 million in 2001) by the aggregate sum of performance units across all providers. For example, in 2001, there were a total of 3,547,145.96 performance units, resulting in a per unit payment of $1.13 (Carter, 2002). In 2001, 590 (57.8%) of eligible homes received a performance payment. The mean payment for homes receiving payments was $6,799.66. The range was from $10.00 to $36,858.63 (Carter, 2002). Texas contacts explained that most of the scores and payment was driven by survey outcomes. There is no data available to show any resident quality improvement. Some homes reportedly earned a performance payment in one year but not the next year. Smaller homes were said to have fared better.

The Texas contact noted that, "It's hard to drive quality with little bits of money." He suggested that a meaningful incentive would be a staff FTE – preferably for an RN, which would require $50 – $70,000. He also noted that some quality issues like staffing require funding not only for additional employees but also for training existing staff in management and supervision techniques to ensure that staff are utilized in the most beneficial manner. In contrast, he suggested that there are some inexpensive, achievable measures that can make a big difference, e.g., staff immunization against the flu.

Appendix C: Nursing Home Data Collection Form

Nursing Home Quality-Based Purchasing (NHQBP):
Data Collection Form

Reporting Period:

- January 1 - March 31
- April 1 - June 30
- July 1 - September 30
- October 1 - December 31

Date Submitted: M M D D Y Y

Using the Instructions provided, complete Sections A - H.

Section A: General Information

Name of Facility	Medicare Provider number		
Street Address	City	State	Zip Code

Telephone number	

Section B: Resident Census

	Primary Payor	Total resident days
Line 1	Medicare	
Line 2	Medicaid Dual Eligible	
Line 3	Medicaid Only (Not Medicare eligible)	
Line 4	Other	
Line 5	Total (Sum of Lines 1-4)	

Section C: Admissions

Number of admissions during reporting period	
Number of discharges during reporting period	
Number of discharges due to death during reporting perio	

Section D: Nurse Staffing Hours

Part I: Nursing Facility Staff

	Staff Type	Hours worked
Line 1	Director of Nursing	
Line 2	RN	
Line 3	LPN/LVN	
Line 4	Nurse aides (including Certified Nurse Aides, nurse aides in training, medication aides/technicians)	

Part II: Employment Agency Staff

	Staff Type	Hours worked
Line 5	Director of Nursing	
Line 6	RN	
Line 7	LPN/LVN	
Line 8	Nurse aides (including Certified Nurse Aides, nurse aides in training, medication aides/technicians)	

Section E: Nursing Staff Turnover

Payroll Frequency:	☐ Weekly
	☐ Every two weeks
	☐ Two times per month
	☐ Monthly
	☐ Other (please explain)

Payroll Period Begin Date (SEE INSTRUCTIONS) : ☐☐ M M ☐ D ☐☐ Y Y

Payroll Period End Date (SEE INSTRUCTIONS) : ☐☐ M M ☐ D ☐☐ Y Y

	Total Nursing Department	RN	LPN/LVN	Nurse Aides*
Total number of staff employed during the reporiting period:	☐☐☐	☐☐☐	☐☐☐	☐☐☐
Number of employees in each category who were hired during the reporting period. (Include those who were hired during the year. Do not include agency staff.)	☐☐☐	☐☐☐	☐☐☐	☐☐☐
Number of employees in each category whose employment ended during the past 12 months. (Do not include agency staff.)	☐☐☐	☐☐☐	☐☐☐	☐☐☐

Payroll Periods	Number of Nursing Employees by Type			
	Total Nursing Department	RN	LPN/LVN	Nurse Aides*
Pay period # 1 Ending Date:				
Pay period # 2 Ending Date:				
Pay period # 3 Ending Date:				
Pay period #4 Ending Date:				
Pay period # 5 Ending Date:				
Pay period # 6 Ending Date:				
Pay period # 7 Ending Date:				
Pay period # 8 Ending Date:				
Pay period # 9 Ending Date:				
Pay period # 10 Ending Date:				
Pay period # 11 Ending Date:				
Pay period # 12 Ending Date:				
Pay period # 13 Ending Date:				

* Includes Certified Nurse Aides, nurse aides in training, medication aides/technicians.

Section F: End-of-Life Care

1	Does your nursing home contract with a Medicare certified hospice to offer these services to end-of-life care residents?	Yes ☐ No ☐
2	If your answer to question 2 is yes, please list the names of one of the approved hospice providers that served residents of your facility during the past year.	Hospice Name Address City State Zip Code
3	Does your facility provide an end-of-life care plan for residents? (SEE INSTRUCTIONS)	Yes ☐ No ☐
4	Record the number of long stay residents residing in the facility on the last day of the quarter	
5	Record the number of hospice days for nursing home residents	
6	Record the number of long-stay residents that have an end-of-life care plan developed with the involvement of the resident and/or family that include signatures on the care plan (or attendance sheet) as evidence of this involvement.	

Section G: Staff Influenza Immunizations

Required only for quarters beginning in October and January

1	How many staff were employed at your facility as of December 31? **(Complete for the October - December quarter only).**	1 Number of Staff Employed
2	Of the staff employed in your facility on December 31, 2005, how many were immunized against influenza for the 2005-2006 influenza season, regardless of where the vaccine was received? (Note: 3a + 3b + 3c should equal Total Number of Staff employed as a 12/31/05 in # 1 above). **(Complete for the January - March quarter only).**	2a Number of staff immunized 2b Number of staff not immunized 2b Number of staff not eligible for immunization due to contraindications
		2d If insufficient supply of vaccine available, check here

Section H: Use of Resident Care Experience Surveys

1	Does your facility conduct any resident care experience survey? *	☐ Yes ☐ No

If your answer to question 1 is yes, please answer questions 2-4.

2	Is the survey conducted in-house or by an external vendor?	☐ In-house ☐ External vendor
3	What percentage of total residents were included in the survey sample?	☐☐☐
4	Who has access to the survey results? Check all that apply.	☐ Residents ☐ Facility management ☐ All facility staff ☐ Families ☐ Facility owners/operators ☐ Medical Director ☐ Physicians/nurse practictioners/physician assistants ☐ Pharmacy/pharmacy consultant ☐ Consultants - please specify ☐ Other - please specify
5	How is the survey information used? (Check all that apply)	☐ Informing quality improvement activities ☐ As a measure of quality of care ☐ Identifying strengths and weaknesses ☐ Peer group comparison (I.e.,benchmarking) ☐ To identify service-related issues ☐ Linked to financial incentives (e.g., bonuses) ☐ Marketing purposes ☐ Accreditation purposes ☐ Other (please specify)

*The survey must be administered to residents (does not include family or resident representative surveys) and include feedback, for example, on domains such as dining, food, staffing, activities, cleanliness, or communication.

General Instructions and Definitions

Reporting Period

Quarter Ending: Data is to be submitted on a quarterly basis. Check the quarter for which data is being submitted.

Date Submitted: Enter the date submitted using the MMDDYY format.

Section A: General Information

Name of Facility: Use the official name of the facility for business and mailing purposes.

Medicare Provider Number: Enter the facility's assigned six-digit provider code.

Street Address: Street address refers to the physical location, not mailing address, if the two addresses differ.

City: The city in which the facility is located. Rural facilities should include the city of the nearest post office.

State: The state in which the facility is located.

Zip Code: The zip code of the facility. If available, report the "zip-plus-four" code.

Telephone Number: The main business phone number of the facility. Include the area code.

Section B Resident Census

Total Resident Days: - The number of days that all patients spent in the facility by payor during the reporting period as counted at the census taking time each day. Patient days include the day of admission, but not the day of discharge.

Definitions of the three payer categories follows:

Medicare – Enter the number of residents days for which Medicare was the primary payer.

Medicaid - Enter the number of resident days for which Medicaid was the primary payer.

Other Payers – Enter the number of resident days for which neither Medicare nor Medicaid was the primary payer.

Section C: Admissions

Number of Admissions During the Reporting Period - The number of residents formally admitted to the facility, or transferred from a residential care unit to the nursing care unit of the facility. This does not include residents returning to the facility under a bed-hold or leave, where a bed has been held open specifically for the resident's return. If a resident is admitted and discharged on the same day, count as one admission.

Section D: Nurse Staffing Hours

Part I: Nursing Home Staff

This section requires the facility to enter the specific number of hours worked during the specified period. To complete this section, base your calculations on facility payroll records. Hours worked do not include hours paid for any type of leave or non-work related absence from the facility, e.g., do not include vacation, sick, holiday and on-call hours. Report hours for the entire reporting period.

Staff Type –

Director of Nursing – The Director of Nursing is primarily involved in the direction, supervision, and coordination of nursing activities.

Registered Nurses - Includes all Registered Nurses (RNs) employed in the performance or supervision of direct nursing care to patients. May include geriatric nurse practitioners and clinical nurse specialists who are employed by the facility.

Licensed Nurses - Includes Licensed Vocational Nurses (LVNs) or Licensed Practical Nurses (LPNs) employed in the performance or supervision of direct nursing care to patients.

Nurse Assistants (Aides & Orderlies) - This classification includes non-technical personnel employed in the performance of direct nursing care to patients. Examples of job titles include Nurse Assistant, Certified Nurse Assistant/Aide (CNA), Orderlie, Medication Technician/Assistant and nurse aide/assistant in training.

Part II: Employment Agency Staff

This section requires the facility to enter the specific number of hours that temporary or employment agency staff were contracted. To complete this section, base your calculations on employment agency invoice records. Report hours for the entire reporting period.

Staff Type –

Director of Nursing – The Director of Nursing is primarily involved in the direction, supervision, and coordination of nursing activities.

Registered Nurses - Includes Registered Nurses (RNs) employed in the performance or supervision of direct nursing care to patients.

Licensed Nurses - Includes Licensed Vocational Nurses (LVNs) or Licensed Practical Nurses (LPNs) employed in the performance or supervision of direct nursing care to patients.

Nurse Assistants (Aides & Orderlies) - This classification includes non-technical personnel employed in the performance of direct nursing care to patients. Examples of job titles include Nurse

Assistant, Certified Nurse Assistant/Aide (CNA), Medication Technician/Assistant and nurse aide/assistant in training.

Section E: Nursing Staff Turnover

For this section, facilities should report information on the number of nursing staff employed by category for every payroll period. This will be used to calculate the average number of nursing staff employed at the facility during the period. The facility turnover rate will be determined from the reported information on the average number of staff employed during the period and the number of employees who began and/or ended their employment.

Payroll Frequency – Report how often employees are paid.

Weekly – Employees receive paychecks every week

Every Two Weeks – Employees receive paychecks every two weeks

Two Times Per Month – Employees are paid at two points during the month, e.g., the 1st and 15th of the month or the 15th and 30th or 31st of the month.

Monthly – Employees are paid one time per month

Other – Please describe in space provided.

Payroll Period Begin Date – Report beginning date in MMDDYY format. Select the payroll begin date closest to, but not before, the beginning date of the reporting period.

For example, a facility that pays employees biweekly (every two weeks) is reporting data for the quarter beginning April 1st. The payroll period begins on a Sunday and ends on a Saturday 14 days later. For this facility, the payroll period (March 26 – April 8) spans the quarterly start date, thus the facility selects the next payroll period (April 9 – April 22) and records 04 09 06 as the payroll begin date.

Payroll Period End Date – Report ending date in MMDDYY format. Report the payroll period end date that includes 12 -13 weeks of payroll information. For example, if the reporting period begins April 1, the next payroll period begins April 9th, record July 1st as the last day of the reporting payroll period. Include all payroll periods that end during the period covered by the data collection form.

Total Number of Nursing Staff <u>Employed</u> During the Reporting Period – Report the total number of people employed during the reporting period, regardless of their current employment status. Report the total for the nursing department and by nursing category – RNs, LPN/LVNs and Nurse Aides. Nurse Aides includes Certified Nurse Aides, nurse aides in training and medication aides/technicians. Per diem (or on call staff) should be counted only if they have worked a minimum of 8 hours during the quarter.

Total Number of Nursing Staff <u>Hired</u> During the Reporting Period – Report number of nursing staff with a hire date during the reporting period regardless of their current employment status. Report the total for the department and by nursing category – RNs, LPN/LVNs and Nurse Aides. Nurse Aides includes Certified Nurse Aides, nurse aides in training and medication aides/technicians. Staff employed in full time, part time or per diem positions may be counted.

Total Number of Nursing Staff Who Ended Their Employment During the Reporting Period – Report number of nursing staff who ended their employment during the reporting period regardless of their hire date. Report the total for the department and by nursing category – RNs, LPN/LVNs and Nurse Aides. Nurse Aides includes Certified Nurse Aides, nurse aides in training and medication aides/technicians.

Number of Nursing Employees by Type by Payroll Period – Report the number of nursing staff for each pay period in the reporting period. Report pay period ending dates in MMDD format. Report total number of nursing staff and by nursing category – RNs, LPN/LVNs, and Nurse Aides. Nurse Aides includes Certified Nurse Aides, nurse aides in training and medication aides/technicians.

Section F: End-of-Life Care

1. Does your facility offer hospice services to residents? Indicate if the facility has a current agreement in place with one or more hospice providers in the area. The hospice must be certified by the Medicare program and/or licensed by the State. Facilities that are Medicare-certified as hospice providers should answer, "yes" to this question.

2. If your answer to Question 1 is Yes, please list the name of one of the approved hospice providers that served residents of your facility during the past year. Report the hospice name, street address, city, state and zip code for one of the hospice providers. If the facility has agreements with more than one hospice provider, information on only one provider is necessary. If the facility itself is Medicare-certified as a hospice provider, the facility may report their own name and address.

3. Does the facility provide an end-of-life care plan for residents? Check 'yes' or 'no' to indicate whether the facility provides end-of-life care. Examples of end-of-life care include the following:

- 24/7 on-call by MD/NP with response within 15 minutes by phone and within 12 hours in person.
- Advance care planning for all residents to include at least surrogate decision-maker; CPR; long term artificial nutrition/hydration; appropriate use of hospitalization; any other directives preferred by resident or family/surrogate.
- Treatment in accord with care plan, especially that no resident has an attempt at CPR without affirmatively wanting that tried.
- Arrangements to ensure that the care plan is honored at each hospital that regularly receives the resident in transfer preferably by having the same physician team follow the patient in the hospital setting; but if not, by having firm accord on transfer procedures.
- Contract with at least one hospice program and make it available to resident as part of advance care planning and when first eligible.
- On-site availability of the most likely diagnostic procedures and interventions needed for urgent evaluation and treatment of symptoms: Diagnostic X-rays; Rapid blood counts and urinalyses; injectable opoid; injectable diuretic; injectable steroid; injectable major tranquilizer; injectable antibiotic; IV or clysis fluids.
- Adequate assistance for spoon feeding so that no resident needs to consider a feeding tube because of inadequate time and skill in the feeding staff.
- More residents live their last day on-site that die during or after a non-scheduled hospital admission or emergency transfer.

- Spiritual, psychological, and bereavement services available and offered to residents, family members and staff.
- Ongoing QI program that audits symptoms and treatments and implements strategies to ensure good symptom control.

4. **Record the number of long-stay residents residing in the facility on the last day of the quarter.**

5. How many long stay residents have an end-of-life care plan as the end of the quarter? Report the number of residents with an end-of-life care plan as of the end of the quarter. The end-of-life plan should be developed with the involvement of the resident and/or family and include their signatures on the care plan (or attendance sheet) as evidence of this involvement.

6. Record the number of long-stay residents that have an end-of-life care plan developed with the involvement of the resident and/or family that include signatures on the care plan (or attendance sheet) as evidence of this involvement.

Section G: Staff Influenza Immunizations
COMPLETE ONLY FOR TWO QUARTERS:
OCTOBER 1 – DECEMBER 31 AND
JANUARY 1 – MARCH 31

1. How many staff were employed at your facility as of December 31, 2005 Report the number of staff in all departments employed at the facility as December 31, 2005. Count full, part-time and per diem (or on-call) staff. Count per diem staff if they worked eight or more hours during the quarter. Complete this item for only the October – December quarter. Do not count temporary or employment agency staff.

2. Of the staff employed in your facility on December 31, 2005, how many were immunized against influenza thus far this season, regardless of where the vaccine was received?

2a. Report the number of staff who received the recommended 2005 influenza vaccine between October 2005 and March 2006. Report staff who received the vaccine from the facility as well as those who report having received the vaccine from an outside source (clinic/physician).
2b. Report the number of staff who did not receive the vaccine due to some contraindication, e.g., allergy or physician recommendation.
2c. If there was a vaccine shortage in your area during the flu season, please indicate with a check mark.

This item does not apply to employees hired after December 31, 2005 or temporary or employment agency staff.

Section H: Use of Resident Care Experience Surveys

1. Does your facility conduct any resident care experience survey? The survey must be administered to residents (does not include family or resident representative surveys) and include feedback, for example, on domains such as dining, food quality, staff knowledge and responsiveness, activities, cleanliness and/or communication.

2. Is the survey conducted in-house or by an external vendor? Indicate if the survey is administered and analyzed by facility staff or by an outside vendor. A standardized tool developed by an outside vendor but administered by the facility staff should be reported as conducted by in-house staff.

3. What percentage of total residents were included in the survey sample? Report the number of residents who were surveyed as a percent of the total resident census. Use the facility census as of the first day the survey was administered.

4. Who has access to survey results? (Check all that apply). Report all entities who are allowed to view part or all of the survey results.

5. How is the survey information used? (Check all that apply). Check all of the following list that apply:

- Informing quality improvement activities
- As a measure of quality of care –
- Identifying strengths and weaknesses
- Peer group comparison (i.e., benchmarking)
- To identify service-related issues
- Linked to financial incentives (e.g., bonuses)
- Marketing purposes
- Accreditation purposes
- Other (please specify)

Appendix D: Technical Specifications for MDS Performance Measures

Specifications for MDS-Based Long- and Short-Stay Measures are contained in Table D-1 and Table D-2 below.

For each QM, the first column of the matrix, labeled "Measure Description" provides the following information:

- **QM description.** The first entry in the column is a brief description of the QM.
- **QM short label.** The short label for the QM is the first entry in parentheses.

The second column, labeled "Measure Specifications," gives the information for calculating the QM:

- **Numerator.** The numerator entry gives the logic used to determine whether a resident triggers the QM (if the resident is included in the numerator for the QM rate in the nursing home).
- **Denominator.** The denominator entry defines whether a resident has the necessary records available to be a candidate for the QM (inclusion of the resident in the denominator for the QM rate for the nursing home).
- **Exclusions.** The exclusions entry provides clinical conditions and missing data conditions that preclude a resident from consideration for the QM. An excluded resident is excluded from both the numerator and denominator of the QM rate for the nursing home.
- **Technical comments.** Entries here provide additional technical details pertaining to the QM numerator, denominator, and exclusions. Examples of the type of information provided include specific details for calculating scale scores, definition of missing data values for an MDS item, and selection of the value for an MDS item that may come from different assessments for a resident.

The third column, labeled "Covariates" gives the information for calculating covariate scores (when used) for a QM:

- **Covariates.** The covariates entry defines the calculation logic for covariates. Covariates are always prevalence indicators with a value of 1 if the condition is present and a value of 0 if the condition is not present.

Other notes pertaining to QM calculations: Chronic Care QMs are only calculated for homes that submitted non-PPS admission assessments in the year ending with the target quarter. Thus, all Chronic Care QMs exclude residents from the calculation of the QM if the resident is in a nursing home with a Chronic Care Admission Sample size of 0 (i.e., there are no admission assessments with AA8a=01 in the nursing home over the previous 12 months).

Notes regarding interpreting the specifications table: In the Chronic Care specifications table, the items referred to are from the MDS 2.0. The symbol [t] indicates target assessment, and [t-1] indicates prior assessment.

Table D-1 MDS-Based Long Stay Measures Selected for Quality-Based Purchasing Demonstration		
Measure Description	**Measure Specification**	**Covariates**
Percent of residents whose need for help with daily activities has increased **(CADL01)**	***Numerator**:* Percent of residents with worsening (increasing MDS item score) in Late-Loss ADL self performance at target relative to prior assessment. Residents meet the definition of Late-Loss ADL worsening when at least two of the following are true: 1. Bed mobility – [Level at target assessment (G1a(A)[t]] – [Level at previous assessment (G1a(A)[t-1])] > 0, or 2. Transfer - [Level at target assessment (G1b(A)[t]] – [Level at previous assessment (G1b(A)[t-1])] > 0, or 3. Eating - [Level at target assessment (G1h(A)[t]] – [Level at previous assessment (G1h(A)[t-1])] > 0, or 4. Toileting - [Level at target assessment (G1i(A)[t]] – [Level at previous assessment (G1i(A)[t-1])] > 0, OR at least one of the following is true: Bed mobility – [Level at target assessment (G1a(A)[t]] – [Level at previous assessment (G1a(A)[t-1])] > 1, or Transfer - [Level at target assessment (G1b(A)[t]] – [Level at previous assessment (G1b(A)[t-1])] > 1, or Eating - [Level at target assessment (G1h(A)[t]] – [Level at previous assessment (G1h(A)[t-1])] > 1, or Toileting - [Level at target assessment (G1i(A)[t]] – [Level at previous assessment (G1i(A)[t-1])] > 1. ***Denominator:*** All residents with a valid target and a valid prior assessment. ***Exclusions*:** Residents meeting any of the following conditions: 1. None of the four Late-Loss ADLs (G1a(A), G1b(A), G1h(A), and G1i(A)) can show decline because each of the four have a value of 4 (total dependence) or a value of 8 (activity did not occur) on the prior assessment [t-1]. 2. The QM did not trigger (resident not included in the numerator) AND there is missing data on any one of the four Late-Loss ADLs (G1a(A)), G1b(A), G1h(A), or	

Table D-1 MDS-Based Long Stay Measures Selected for Quality-Based Purchasing Demonstration		
Measure Description	**Measure Specification**	**Covariates**
	G1i(A)) on the target assessment [t] or prior assessment [t-1]. 3. The resident is comatose (B1 = 1) or comatose status is unknown (B1 = missing) on the target assessment. 4. The resident has end-stage disease (J5c = checked) or end-stage disease status is unknown (J5c = missing) on the target assessment. 5. The resident is receiving hospice care (P1ao = checked) or hospice status is unknown (P1ao = missing) on the target assessment or the most recent full assessment.	
Percent of residents whose ability to move about in and around their room got worse (CMOB01)	***Numerator*:** Percent of residents whose value for locomotion self-performance is greater at target relative to prior assessment (G1e(A)[t]>G1e(A)[t- 1]). ***Denominator:*** All residents with a valid target assessment and a valid prior assessment. ***Exclusions*:** Residents satisfying any of the following conditions: The G1e(A) value is missing on the target assessment [t]. 5. The G1e(A) value is missing on the prior assessment [t-1] and the G1e(A) value shows some dependence on the target assessment (G1e(A)[t]>0). 6. The G1e(A) value on the prior assessment is 4 (total dependence) or 8 (activity did not occur). 7. The resident is comatose (B1 = 1) or comatose status is unknown (B1 = missing) on the target assessment. 8. The resident has end-stage disease (J5c = checked) or end-stage disease status is unknown (J5c = missing) on the target assessment. 9. The resident is receiving hospice care (P1ao = checked) or hospice status is unknown (P1ao = missing) on the target assessment or the most recent full assessment.	***Covariates:*** 1. Indicator of recent falls on the prior assessment: Covariate = 1 if J4a checked or J4b checked Covariate = 0 if J4a not checked AND J4b not checked 2. Indicator of extensive support or more dependence in eating on the prior assessment: Covariate = 1 if G1h(A) = 3,4, or 8 Covariate = 0 if G1h(A) = 0,1, or 2 3. Indicator of extensive support or more dependence in toileting on the prior assessment: Covariate = 1 if G1i(A) = 3,4, or 8 Covariate = 0 if G1i(A) = 0,1, or 2

Table D-1 MDS-Based Long Stay Measures Selected for Quality-Based Purchasing Demonstration		
Measure Description	**Measure Specification**	**Covariates**
Pressure sores – Paired Measures **Percent of high-risk residents who have pressure sores (CPRU02)**	**Percent of high-risk residents who have pressure sores:** ***Numerator*:** Percent of residents with pressure sores (Stage 1-4) on target assessment (M2a >0 OR I3a-I3e = 707.0) ***Denominator:*** All residents with a valid target assessment and any one of the following inclusion criteria: 1. Impaired in bed mobility or transfer on the target assessment as indicated by G1a(A) = 3, 4, or 8 OR G1b(A) = 3, 4, or 8. 2. Comatose on the target assessment as indicated by B1 = 1. 3. Suffer malnutrition on the target assessment as indicated by I3a through I3e = 260, 261, 262, 263.0, 263.1, 263.2, 263.8, or 263.9.	
Percent of residents who have/had a catheter inserted and left in their bladder (CCAT02)	***Numerator:*** Percent of residents with indwelling catheters on target assessment (H3d = checked). ***Denominator:*** All residents with a valid target assessment. ***Exclusions:*** Residents satisfying any of the following conditions: 1. The target assessment is an admission (AA8a = 01) assessment. 2. H3d is missing on the target assessment.	***Covariates:*** 1. Indicator of bowel incontinence on the prior assessment: Covariate = 1 if H1a = 4 Covariate = 0 if H1a = 0,1,2, or 3 2. Indicator of pressure sores on the prior assessment: Covariate = 1 if M2a = 3 or 4 Covariate = 0 if M2a = 0, 1 or 2
Percent of residents who were physically restrained (CRES01)	***Numerator:*** Percent of residents who were physically restrained daily (P4c or P4d or P4e = 2) on target assessment. ***Denominator*:** All residents with a valid target assessment. ***Exclusions:*** Residents satisfying the following conditions:	

Table D-1 MDS-Based Long Stay Measures Selected for Quality-Based Purchasing Demonstration		
Measure Description	**Measure Specification**	**Covariates**
	1. The target assessment is an admission (AA8a = 01) assessment. 2. The QM did not trigger (resident is not included in the QM numerator) AND the value of P4c or P4d or P4e is missing on the target assessment.	

Table D-2

MDS-Based Short-Stay Quality Measures Included as Performance Measures

Label/Status	Description	Specifications	Exclusions* #	Covariates

Table D-2

MDS-Based Short-Stay Quality Measures Included as Performance Measures

PAC-ADL04 / HRCA, 2/2004	Percent of short-stay residents with improving level of ADL functioning	**Numerator:** Residents with ADL-Long Form (ADLLF) lower at 14-day assessment than at 5-day assessment (ADLLF [t]-ADLLF [t-1]<0). ADLLF defined as sum of G1aA, G1bA, G1eA, G1gA, G1hA, G1iA, and G1jA, with 8's recoded to 4's. **Denominator:** All residents with a valid 14-day assessment (AA8b = 7) AND a valid preceding 5-day assessment (AA8b = 1)	Residents satisfying any of the following conditions: 1. Comatose (B1 = 1) or comatose status unknown (B1 = missing) on 14-day assessment 2. End stage disease (J5c=checked) or end stage disease status unknown (J5c = missing) on 14-day assessment 3. Hospice (P1ao = checked) or hospice status unknown (P1ao = missing) on 14-day assessment 4. Non-valid ADLLF scale at 5-day OR 14-day assessment. 5. ADLLF at 5-day assessment equal to 0 (ADLLF [t-1] = 0)	CPS on the 5-day assessment (see technical specifications)

Table D-2

MDS-Based Short-Stay Quality Measures Included as Performance Measures

PAC-ADL05 / HRCA, 2/2004	Percent of short-stay residents who improve status on mid-loss ADL functioning (transfer, locomotion) or remain completely independent in mid-loss ADLs	**Numerator:** 1. Residents with a MLADL change score that is negative (MLADL[t]-MLADL[t-1]<0) OR 2. Residents with a MLADL score of 0 at 5-day AND 14-day assessments (MLADL[t]=0 AND MLADL[t-1]=0). MLADL is defined as the sum of G1b(A), G1e(A) and G1d(A), with 8's recoded to 4's) **Denominator:** All residents with a valid 14-day assessment (AA8b = 7) AND a valid preceding 5-day assessment (AA8b = 1)	Residents satisfying any of the following conditions: 1. Comatose (B1 = 1) or comatose status unknown (B1 = missing) on 14-day assessment 2. End stage disease (J5c=checked) or end stage disease status unknown (J5c = missing) on 14-day assessment 3. Hospice (P1ao = checked) or hospice status unknown (P1ao = missing) on 14-day assessment 4. Residents with non-valid Mid-Loss ADL at the 14-day assessment (MLADL[t]=missing) 5. Residents with non-valid Mid-Loss ADL at the 5-day assessment (MLADL[t-1] = missing) AND MLADL is greater than 0 at the 14-day assessment (MLADL[t]>0)	1. CPS on the 5-Day assessment 2. RUG Late Loss ADL Scale (R_ADL; see technical specifications) on the 5-day assessment.

Table D-2

MDS-Based Short-Stay Quality Measures Included as Performance Measures

PAC-CNT0X1/ Validation Report	Percent of short-stay residents who failed to Improve their bladder incontinence	**Numerator:** Residents who satisfy any of the following three conditions: 1. On the 5-day assessment, the resident did not have a catheter (H3d[t-1] not checked (value 0)) AND was fully bladder continent (H1b[t-1] = 0). AND On the 14-day assessment, the resident had a catheter (H3d[t] checked (value 1)) OR was less than fully bladder continent (H1b[t] >0). 2. On the 5-day assessment (AA8b = 1), the resident did not have a catheter (H3d[t-1] not checked (value 0)) AND was less than fully bladder continent (H1b[t-1] > 0). AND On the 14-day assessment (AA8b = 7), the resident had a new catheter (H3d[t] = checked (value 1)) OR was the same or worse on bladder continence (H1b[t] >= H1b[t-1]) 3. On the 5-day assessment (AA8b = 1), the resident did have a catheter (H3d[t-1] checked (value 1)). AND On the 14-day assessment (AA8b = 7), the resident still had a catheter (H3d[t] = checked (value 1)) OR had no catheter but was frequently or fully incontinent (H3d[t] not	Residents satisfying the following condition: 1. There are missing values for H1b or H3d on either the SNF PPS 5-day or 14-day assessment. 2. The resident is comatose (B1 = 1) or comatose status is unknown (B1= missing) on the 14-day assessment. 3. The resident has paraplegia (I1x = 1) or paraplegia status unknown (I1x missing) on the 14-day assessment. 4. The resident has quadriplegia (I1z = 1) or quadriplegia status unknown (I1z missing) on the 14-day assessment.	NONE

Table D-2

MDS-Based Short-Stay Quality Measures Included as Performance Measures

		checked (value 0) AND H1b[t] > 2) **Denominator:** All residents with a valid 14-day assessment (AA8b = 7) AND a valid preceding 5-day assessment (AA8b = 1).		

Appendix E: Methodology Used to Determine Performance Payment Pool Size in the Physician Group Practice Demonstration

The methodology for determining the size of the performance payment pool for homes in a given state will use a methodology similar to that used in the Physician Group Practice (PGP) Demonstration. In the PGP model, providers in the demonstration are eligible to receive annual performance payments for meeting certain efficiency and quality targets. In order to earn any performance payment, a PGP must generate positive Medicare savings. Medicare savings are measured by comparing the rate of growth in Medicare expenditures for the PGP relative to an expected growth rate. If no Medicare savings are generated, no performance payment is made regardless of how well the PGP does in achieving its performance targets. This Appendix contains a description of the methodology in the PGP demonstration to determine the size of the performance payment pool. The information in this Appendix is based on the Physician Group Practice Demonstration Bonus Methodology Specifications report prepared by RTI (Kautter, Pope, Trisolini et al., 2004).

The PGP model uses three basic steps used to calculate Medicare savings:

- Calculate base year per capita expenditures for beneficiaries assigned to the PGP in the base year
- Calculate per capita expenditure target for performance year, which depends on base year expenditures and the expected growth rate[30]
- Estimate Medicare savings, which are the difference between the per capita expenditure target and actual expenditures multiplied by the number of full-time equivalent person years in the PGP

Performance payments are made from the estimated Medicare savings. This approach ensures budget neutrality for the Medicare program.

Calculating Per-Capita Expenditures for Beneficiaries Assigned to the PGP

Assignment Criteria

A first step is to determine which beneficiaries are assigned to the PGP. In the PGP demonstration, this is determined in the base year of the demonstration and in each of the performance years. The goal of the beneficiary assignment is to identify Medicare beneficiaries that have the plurality of their

[30] The expected growth rate is defined as the growth rate in per capita expenditures in a comparison group between the base and performance years, adjusted for casemix change.

'Office or Other Outpatient' Evaluation and Management services at a participating PGP during the year. In the PGP model, beneficiaries are assigned to a participating PGP if they:

- Have a record in the Medicare Enrollment Files
- Are enrolled in both Part A and Part B
- Are not enrolled in a Medicare managed care plan (These beneficiaries are excluded because the required claims data are not available.)
- Are not working aged
- Reside in the United States
- Are not enrolled in hospice on the first day of the year
- Are not enrolled in either the BBA Medicare Coordinated Care Demonstration, the BIPA Disease Management Demonstration, or any other Medicare fee-for-service demonstration.
- Receive at least one Evaluation and Management service from the PGP and more Evaluation and Management Services from the PGP than from any other physician practice.

Calculating Total Medicare Expenditures

For each beneficiary assigned to the PGP, Medicare expenditures are calculated using Inpatient, Skilled Nursing home (SNF), Outpatient, Physician/Supplier Part B, Durable Medical Equipment (DME) and Home Health Agency (HHA) claims. Total Medicare expenditures are calculated as the sum of all of the Medicare claims for the beneficiary. Claims data are not typically considered complete until six months after the end of the year, by which point 98 percent of claims for the year have been received.

Annualizing Medicare Expenditures

After total Medicare expenditures for the year are determined, a measure of annualized expenditures is calculated by dividing total expenditures by the fraction of months in the year each beneficiary was enrolled in Medicare (except for hospice). All annualized expenditures are capped by setting those greater than $100,000 equal to $100,000. This is to prevent a small number of beneficiaries with outlier costs from significantly affecting the per capita expenditure estimates.

Creating a measure of annualized expenditures ensures that payments are correctly adjusted for months of beneficiary eligibility. It is this measure of annualized expenditures that is used to measure Medicare program savings.

Calculating Per Capita Expenditures for Assigned Beneficiaries

Beneficiary expenditures are weighted by the fraction of the year the beneficiary is enrolled in Medicare, so that beneficiaries who were not enrolled for the entire year (i.e., because the beneficiary

is a new Medicare enrollee or died during the year) count less in the per capita expenditures measure than beneficiaries who were enrolled in Medicare for the entire year.

Risk Adjustment

In the PGP demonstration, a concurrent risk score is assigned to each assigned beneficiary. There are three steps used to calculate the concurrent risk score.

- Determine the diagnostic categories for each beneficiary. These are based on the diagnoses recorded on the beneficiary's Medicare claims during the year. Each diagnosis is cross-walked to a Hierarchical Condition Category (HCC).

- Calculate the risk score for each beneficiary in the PGP. Each HCC corresponds to a payment weight. These payment weights, along with the payment weights for the beneficiary's demographic and enrollment characteristics, are summed to determine the beneficiary's predicted expenditures. The beneficiary risk score is defined as the beneficiary's predicted expenditures divided by national mean expenditures.

- Calculate the weighted mean risk score for the PGP. This is the average risk score for beneficiaries assigned to the PGP, weighted by the fraction of the year that the beneficiary is enrolled in Medicare.

Risk Adjusted Per Capita Expenditures

The average risk score across all beneficiaries assigned to the PGP for a performance year is compared to the average risk score across all beneficiaries assigned to the PGP during the base year to create a risk ratio. The risk ratio is used to adjust base year per capita expenditures to account for the change in Medicare expenditures that is expected due to changes in the health status (risk score) of the PGP's beneficiaries. Risk adjusted per capita expenditures are defined as base year per capita expenditures multiplied times the risk ratio.

Calculating Per-Capita Expenditures for Beneficiaries Assigned to the PGP

Comparison Group Specification

The comparison group in the PGP demonstration is used to predict what the change in expenditures for PGP beneficiaries would have been in the absence of the demonstration. Growth in expenditures is likely to be influenced by local factors such as changes in wages and other input costs, diffusion of new technologies, and variations in practice style. As a result, the comparison group for a participating PGP consists of fee-for-service beneficiaries residing in the PGP's market area that are not assigned to the PGP. The market area is defined as counties in which 1 percent or more of the beneficiaries assigned to the PGP reside. The comparison group is intended to be an accurate and independent peer group for beneficiaries assigned to the PGP. Note that county of residence can be identified from Medicare enrollment files.

The assignment criteria for the comparison group are very similar to those used for assigning beneficiaries to PGPs, with the only difference being that PGP beneficiaries must have one or more Evaluation and Management services at any physician practice other than the PGP.

Given the fluctuation in Medicare expenditures for this population, the designers of the PGP demonstration recommended that the comparison group for each PGP consist of 15,000 – 20,000 beneficiaries.

Calculating Total Medicare Expenditures

As for beneficiaries assigned to a PGP, Medicare expenditures for comparison group members are calculated using Inpatient, Skilled Nursing home (SNF), Outpatient, Physician/Supplier Part B, Durable Medical Equipment (DME) and Home Health Agency (HHA) claims. Claims are calculated for each performance year.

Annualizing Medicare Expenditures

As for PGP enrollees, a measure of annualized expenditures is created for comparison group members based on the portion of the year that the comparison group beneficiary is enrolled in Medicare. These are calculated separately for each county in the PGP's service area.

Calculating Weighted Average of County Per Capita Expenditures for Comparison Group

Each county's per capita expenditures are weighted by the number of PGP assigned beneficiaries that are assigned to the county. This ensures that counties are represented equally in the PGP and comparison group expenditures. Because expenditure growth rates may vary across counties, expenditures are weighted by the number of PGP beneficiaries.

Risk Score Calculation

The method of calculating risk score for the PGP's comparison group is similar to the method used to calculate mean risk score for PGP assigned beneficiaries. The one difference is that, similar to the method used to calculate comparison group per capita expenditures, comparison group risk scores are weighted by the number of PGP assigned beneficiaries.

Risk Adjusted Per Capita Expenditures and Growth Rate

The comparison group expenditure growth rate is computed using weighed averages of county adjusted per capita expenditures. Risk ratios are calculated for the comparison group using the same methodology as for PGP assigned beneficiaries and used to adjust the observed base year per capita expenditures for changes in the health status of comparison group members. In the base year, risk-adjusted per capita expenditures are defined as the base year per capita expenditures times the risk ratio. The risk-adjusted expenditure growth rate is defined as the percentage change in expenditures relative to risk-adjusted base per capita expenditures.

PGP Performance Payment Calculations

Calculating Annual Medicare Savings

The first step in calculating annual Medicare savings is to calculate the total Medicare expenditures for the PGP. This is defined as the per capita expenditures for beneficiaries assigned to the PGP multiplied times the number of person years assigned to the PGP.

The next step is to determine the expenditure target for the PGP. This is determined by multiplying the risk-adjusted per capita base year expenditures by the risk-adjusted expenditure growth rate for the comparison group. Total target expenditures are calculated by multiplying the per-capita target by the number of person years assigned to the PGP in the performance year.

Annual Medicare savings are defined as the difference between actual and target expenditures.

Annual Bonus Computation, Final Settlement, and Medicare Program Savings

Annual Medicare savings are either distributed as a performance payment to the PGP or retained by Medicare as program savings.

Savings threshold: Annual Medicare savings are only counted above two percent of the PGP's target expenditures. This is to account for possible random fluctuations from year to year. If Medicare savings are below this two percent threshold, then no performance payments are made to the PGP.

Net Medicare savings (Loss): Net Medicare savings are the portion of total annual Medicare savings above the two percent threshold, less any accrued Medicare losses from previous years of the demonstration. If annual savings are between zero and two percent, then net Medicare savings are zero. If there are negative Medicare savings (i.e., Medicare losses) of more than two percent, then net Medicare loss is equal to the portion of annual Medicare savings below –2 percent (the two percent threshold for random fluctuation is applied in both directions).

Accrued loss carried forward: If there is a net Medicare loss (i.e., Medicare expenditures for demonstration providers increase at higher rates than expenditures for the comparison group), then this accrued Medicare loss is carried forward from the prior demonstration year. For example, if there were losses in the first year of the demonstration, these losses would be deducted from Medicare savings in year 2 before any bonus payment is made. This amount is subtracted from net Medicare savings in future years.

Calculate the PGP bonus pool and Medicare program savings: The sharing rate is the proportion of estimated Medicare savings that is paid to providers as opposed to retained by Medicare as program savings. In the Physician Group Practice model, 80 percent of estimated savings go to the bonus pool for potential distribution to providers and 20 percent is retained as Medicare program savings. Note that, in the PGP model, Medicare retains more than 20 percent of the estimated Medicare savings if the PGP does not achieve all of its quality of care targets.

Allocate the bonus pool between the cost bonus and the maximum quality bonus: The PGP bonus pool is split between the cost bonus (50- 70 percent depending on the demonstration year) and the maximum quality bonus (30-50 percent).

Calculate the actual quality bonus: The Actual Quality Bonus is the product of the maximum quality bonus and the percentage of quality targets met by the PGP. Medicare retains any difference between the actual and maximum quality bonus.

Calculate the preliminary earned bonus: The preliminary earned bonus is the sum of the cost bonus and the actual quality bonus.

Calculate the bonus cap amount: A PGP's annual bonus payment cannot exceed 5 percent of its target expenditures for that year. Medicare retains any amount above the bonus cap.

Calculate the earned bonus: The earned bonus is the amount of the preliminary earned bonus that is less than or equal to the bonus cap.

Calculate the earned bonus withheld until final settlement: A portion of the earned bonus is withheld from the PGP to protect Medicare from any future losses that the PGP incurs. The withheld amount is 25 percent of the earned bonus. A justification for withholding is that it is administratively more feasible to withhold a portion of the earned bonus than to attempt to recover payments from participating PGPs.

Calculate the bonus paid at annual settlement: The bonus amount paid to the PGP is equal to 75 percent of the earned bonus.

Final settlement: There are three steps for the final settlement period.

- Calculate accrued loss: If there is an accrued loss at the end of the final year (year 3) of the demonstration, 80 percent is carried forward to final settlement and the other 20 percent is a debit against Medicare program savings.

- Calculate sum of bonuses withheld in all performance years: This is the sum of the 25 percent of the earned bonus that is withheld in each performance year.

- Calculate the final settlement: This is equal to the sum of bonuses withheld less the accrued loss carried forward to the final settlement. If positive, the final settlement payment is made to the PGP. If it is negative, then there is no final settlement payment to the PGP.

Note that if a participating PGP withdraws from the demonstration before its completion, the PGP forfeits all withheld bonus payments. Final settlement is scheduled to occur approximately one year after the end of the demonstration.

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