

# Nursing Home Quality Incentive Program Methodology

October 30, 2020

## PROGRAM DESCRIPTION

Under the \$2 billion quality incentive payment (QIP) program, eligible facilities will have their performance measured on two outcomes. First, facilities will be judged on their performance on the COVID infection measure. Performance on the infection measure for each facility will be compared to a baseline rate of COVID infection in the county in which a facility is located. Second, facilities with COVID infections will be further judged on their performance on COVID mortality. The mortality measure will quantify how facilities with COVID infections perform relative to an expected level of mortality, given their number of infections and the demographic characteristics of their residents. Facilities with mortality rates substantially exceeding expectations will be deemed ineligible from receiving performance payments in a given month.

## INCENTIVE PAYMENT SCHEDULE

Currently, the incentive payment program is scheduled to be divided into four individual performance periods, each lasting roughly one month. Each of the performance periods would be allocated a total incentive payment pool that varies with the overall level of facility performance in each performance period. These four individual performance periods would be followed by an aggregate performance period that would measure performance across the entire four-month period from September to December. The table below is a tentative schedule of these payments, including timelines for the issuing of payment and completion of audits.

Performance Period	Tentative Payment Date	Tentative Audit Date
September 2020	October 2020	November 2020
October 2020	November 2020	December 2020
November 2020	December 2020	January 2021
December 2020	January 2021	February 2021
Aggregate	February 2021	March 2021

## PROGRAM ELIGIBILITY AND RESTRICTIONS

Eligibility for the QIP program will be determined separately for each of the four month-long performance periods. The aggregate performance period will only include facilities that meet the eligibility requirements for the combined performance time period, in order to fairly assess their performance against peer facilities. The eligibility criteria and restrictions are designed to ensure payments are directed to providers that properly report the necessary program data and are actively certified as a nursing facility.

### Facility Enrollment and Certification

Eligible facilities are required to have an active, non-terminated certification, including the Certification and Survey Provider Enhanced Reports (CASPER) and Provider of Services (POS) files. Additionally, facilities that have a revoked enrollment in Provider Enrollment, Chain, and Ownership System (PECOS) are considered ineligible. These certification and enrollment checks will be performed at the end of each performance period, using the most recent available data.

### NHSN Data Reporting

Under the QIP program, payment calculations rely heavily on self-reported data submitted by facilities to the NHSN COVID module for long-term care facilities. Facilities that fail to properly report data, therefore,

cannot have their performance properly assessed for the performance period(s) in which there are discrepancies. The following NHSN data quality checks are performed for each facility in each performance period:

- Facilities must submit data that passes NHSN data quality checks for each week in the performance data period, and the six weeks preceding the performance period.
- Facilities must report positive, non-missing values for the count of occupied beds in each week of the performance period.
- Facilities that report the unavailability of COVID testing for residents in the performance period are excluded.
- Facilities must report non-missing values for infected patients in each reporting week.
- In a small number of cases, facilities must respond to direct outreach to clarify their mortality data for a given performance period.

### Infection Gateway Criterion

Facilities are further excluded from consideration from a performance period if they fail to meet the COVID infection gateway criterion. The infection gateway criterion specifically excludes facilities that are found to have an infection rate exceeding the estimated infection rate in their county during the performance period. County infection rates are measured using daily COVID community profile reports (CPRs) disseminated under the HHS Protect data program. CPRs contain information on the rate of COVID infections for all residents in each county.

### Mortality Gateway Criterion

Facilities are further excluded from consideration from a performance period if they fail to meet the COVID mortality gateway criterion. The mortality gateway criterion is intended to exclude facilities that perform below benchmark levels on the rate of mortality among residents that contracted COVID in the facility. Facilities that have a mortality rate at or above 10% in a given performance period will be considered ineligible for that period.

### QIP Data Reporting

The schedule below provides a precise range of dates that will define the range of data considered for each of the reporting periods. While the performance periods are mostly limited to four-week blocks, the alignment of NHSN reporting weeks results in October containing 5 weeks of data. For reference, the performance period refers to the four-week period during which infection rates and death counts are totaled up. However, in order to accurately measure mortality rates, we look at the count of infections in an infection exposure window that covers the performance period and the 6 preceding weeks.

Performance Period	Performance Period Date Range	Weeks in Performance Period
September 2020	August 31 – September 27	4
October 2020	September 28 – November 1	5
November 2020	November 2 – November 29	4
December 2020	November 30 – December 27	4
Aggregate	August 31 – December 27	17

## INFECTION PERFORMANCE SCORE CALCULATION

For all facilities that meet the eligibility criteria outlined above, they will receive a score summarizing their performance on preventing COVID infections in a given performance period. The steps below summarize the methodology for using NHSN and CPR data to calculate this score:

1. Measure the number of in-facility infections reported in performance period  $p$  for facility  $i$  in county  $c$  as sum of reported facility infections in each week  $w$  of the performance period:

$$I_{ipc} = \sum_{w=1}^n I_{icw}$$

2. Measure the number of resident weeks (excluding residents admitted with COVID) reported in performance period  $p$  for facility  $i$  in county  $c$  as the sum of total occupied beds minus the number of reported COVID admissions in each week  $w$  of the performance period:

$$RW_{ipc} = \sum_{w=1}^n (OB_{icw} - AI_{icw})$$

3. Measure the infection rate in performance period  $p$  for facility  $i$  in county  $c$  as the ratio of infections to resident weeks measured in steps 1 and 2:

$$IR_{ipc} = \frac{I_{ipc}}{RW_{ipc}}$$

4. Measure the infection rate in performance period  $p$  for county  $c$  as the sum of reported infections in each week  $w$  of the performance period divided by the number of county resident-weeks:

$$IR_{pc} = \sum_{w=1}^n \frac{I_{cw}}{n * P_c}$$

5. Measure the *expected* number of in-facility infections in performance period  $p$  for facility  $i$  located in county  $c$ , assuming an infection rate equal to the community infection rate in county  $c$ :

$$\hat{I}_{ipc} = IR_c * RW_{ic}$$

6. Finally, measure the infection performance score in performance period  $p$  for facility  $i$  in county  $c$  as the difference between estimated and observed infections:

$$IP_{ipc} = \hat{I}_{ipc} - I_{ipc}$$

This final step provides an estimate of the degree to which a facility's observed count of infections exceeds or falls short of the expected number of infections, given the infection rate in their county and the total number of resident weeks accrued in the performance period. This difference represents each facility's score in a given performance period. As a final note, the infection gateway criterion described previously amounts to a requirement that a facility have a positive value for its infection performance score.

## MORTALITY MEASURE DESCRIPTION

The mortality performance score is meant to judge performance on mortality among residents who contract COVID in a facility. In order to be eligible to receive a score on mortality performance, facilities must meet the eligibility criteria and have at least one in-facility infection in the expanded infection period, which covers the performance period and the 6 weeks preceding it. For eligible facilities, mortality

performance is assessed similarly to the infection performance measure: each facility is assigned a final score that measures the difference between observed and expected deaths.

### Mortality Regression Model

For each performance period, we use the set of eligible facilities that pass the infection gateway criterion to build a regression model that estimates the number of deaths resulting from in-facility COVID infections. This estimate of mortality is based on a variety of facility-level characteristics that are measured in each performance period. These facility-level characteristics include the distribution of in-facility infections across each week of the infection exposure window, as well as basic demographic characteristics that summarize each facility's resident population during the infection exposure window. These demographic characteristics include the percentage of residents that fit into different age, gender, and patient types (i.e. long-term residents versus Medicare-covered stays). The appendix of this document contains a full list of risk adjustment variables and the data sources used to construct them.

These data points are combined into a Poisson regression model, which estimates the relationship between these dependent, facility-level characteristics and the number of observed deaths in a given performance period in the following equation:

$$\widehat{D}_{ip} = E_{iq} * e^{\beta_0 + \sum_{k=1}^n \beta_k * x_{ik}}$$

$\widehat{D}_{ip}$  = Expected deaths for facility  $i$  in period  $p$ , given facility characteristics  $k$

$E_{iq}$  = Number of observed in – facility infections for facility  $i$  in infection exposure window  $q$

$\beta_0$  = Constant term

$x_k$  = Set of facility – level characteristics, such as distribution of infections and demographics

### Mortality Performance Score Calculation

After running the regression as specified above, the model coefficient estimates are used to return the predicted number of deaths for each facility, which is then incorporated into the mortality performance score. For a given facility  $i$  in performance period  $p$ , having characteristics  $k$ , their mortality score would be:

$$DP_{ip} = \widehat{D}_{ip} - D_{ip}$$

In other words, the mortality score represents the number of deaths predicted by the Poisson regression model minus the observed deaths in the period.

## DETERMINING PERFORMANCE PERIOD PAYMENT BUDGET

After measuring performance scores for eligible facilities, there are two steps taken to determine the total budget of performance payments made in a given performance period. First, a benchmark dollar value is selected, the dollar value per unit of mortality performance. This benchmark value is intended to remain static over the duration of the program. Second, this benchmark dollar value is then multiplied by the aggregate performance on the infection measure across all eligible facilities. The formulas below detail this calculation.

$$B_p = BI * AIP_p$$

$B_p$  = Total performance payment budget in period  $p$

$BI$  = Benchmark dollar value per infection prevented

$AIP_p$  = Aggregate infection measure performance in period  $p$

## CALCULATING FACILITY PAYMENT FOR INFECTION PERFORMANCE

After determining the total pool of performance payments in a given performance period, facility performance payments for the infection measure can be readily calculated. Each facility's performance payment for the infection measure is calculated by multiplying their infection performance score (described in step 6 of the section "Infection Performance Score Calculation") by the benchmark infection payment rate, which represents the dollar value per unit of infection performance. The formulas below detail this calculation.

$$PI_{ip} = BI * IP_{ipc}$$

$PI_{ip}$  = Payment for infection performance for facility  $i$  in period  $p$

$BI$  = The benchmark payment rate per unit of infection performance

$IP_{ipc}$  = Infection performance score for facility  $i$  in period  $p$  and county  $c$

## CALCULATING PAYMENT FOR MORTALITY PERFORMANCE

The calculation of mortality performance payments, unlike the calculation of payments for infection performance, depends on several different parameters and requires a number of distinct calculations. The sections below detail a series of intermediate steps that are taken in order to calculate facility payments for the mortality performance.

### Calculating Total Available Pool of Mortality Performance Payments

The total dollar value of available mortality performance payments is capped at 20% of the total pool of performance payments calculated previously. The use of a fractional payment cap on mortality performance reflects that performance on the mortality measure is secondary to the infection measure. Ensuring that a large majority of payments go to performance on preventing the spread of in-facility COVID infections thus aligns the payment methodology with the stated program goals of the QIP. Second, performance on the mortality measure depends significantly on the quality of care received in hospitals and other acute care facilities and thus will not completely reflect the quality of nursing facilities, positively or negatively. The formulas below detail the calculation of the mortality performance payment pool.

$$MP_p = B_p * 0.20$$

$MP_p$  = Total available pool of mortality performance payments in period  $p$

$B_p$  = Total performance payment budget in period  $p$

### Calculating Mortality Benchmark Payment Rate

Similar to the infection performance payment calculation, the mortality performance payments involve the calculation of a benchmark payment rate, which provides a dollar value per unit of mortality performance. This calculation relies on two separate pieces of information: the aggregate positive mortality performance and the total available pool of mortality performance payments. First, the aggregate positive mortality performance is determined using the Poisson regression approach, which is outlined in the "Mortality Regression Model" section. This approach yields a mortality performance score for all facilities that are eligible for mortality performance assessment. This value is then aggregated across all facilities with positive mortality performance to arrive at an estimate of the aggregate positive mortality performance. We then divide this aggregate value by the total available pool of mortality performance payments, which was described in the previous section, to arrive at the benchmark dollar value per unit of mortality performance. Unlike the infection benchmark payment rate, the mortality benchmark payment rate varies by performance period. The formulas below detail these calculations.

$$BM_p = \frac{MP_p}{AMP_p}$$

$BM_p$  = The benchmark payment rate per unit of mortality performance in period  $p$

$AMP_p$  = Aggregate positive mortality measure performance in period  $p$

$MP_p$  = Total available pool of mortality performance payments in period  $p$

### Calculating Facility Payment for Mortality Measure Performance

With the above steps completed, each facility can receive an initial calculation of their mortality performance payment. Unlike the infection performance measure, it is possible for facilities to receive negative scores, and thus negative payments, for their mortality performance. In these cases, a negative mortality performance payment is weighed against the infection performance payment. The following steps outline the calculation of mortality performance payment for an individual facility:

1. Calculate the unadjusted mortality performance payment for facility  $i$  in period  $p$  by multiplying their mortality performance score by the mortality benchmark payment rate:

$$UNADJ PM_{ip} = DP_{ip} * BM_p$$

2. For facility  $i$  in period  $p$  with a negative mortality performance score, calculate mortality performance payment as the greater of minus 20% of their infection performance payment or the unadjusted mortality performance payment in step 1:

$$PM_{ip} = \max(UNADJ PM_{ip}, -0.20 * PI_{ip})$$

3. For facility  $i$  in period  $p$  with a positive mortality performance score, calculate mortality performance payment as the lesser of positive 20% of their infection performance payment or the unadjusted mortality performance payment in step 1:

$$PM_{ip} = \min(UNADJ PM_{ip}, 0.20 * PI_{ip})$$

As the equations in steps 2 and 3 illustrate, the maximum effect, positive or negative, that mortality performance can have on a facility's payment is set to plus or minus 20% of their infection performance payment. This ensures that the facility-level impact of performance on the mortality measure never exceeds 20% of the weight of the infection measure.

### Adjustments for Facilities with Missing Data

Since the mortality performance calculations rely on properly reported data across several data sources, we exclude or adjust performance scores for providers that are missing data. First, providers that do not have any valid MDS assessments will be excluded from the mortality regression model and will receive the minimum possible mortality performance score. Second, providers that require outreach to clarify their mortality data, but either fail to respond or respond with data that contradicts their NHSN-reported data, will have their mortality rate imputed. This imputation will assume that all reported deaths in NHSN were the result of in-facility COVID infections. After making this adjustment, any of these providers that still pass the mortality gateway will be further excluded from the mortality model, and will receive the minimum possible mortality performance score.

## CALCULATING TOTAL FACILITY PAYMENT AMOUNTS

### Calculating Preliminary Facility Performance Payments

Each facility receives an initial estimate of their total performance payments, based on the sum of their infection and mortality payment amounts. The formula below details this calculation for facility  $i$  in period  $p$ .

$$PRELIM P_{ip} = PI_{ip} + PM_{ip}$$

*PRELIM P<sub>ip</sub>* = Preliminary performance payment facility *i* in period *p*

*PI<sub>ip</sub>* = Payment for infection performance for facility *i* in period *p*

*PM<sub>ip</sub>* = Payment for mortality performance for facility *i* in period *p*

### Applying Budget Neutrality Adjustment

After calculating the preliminary performance payment for all eligible facilities, these payments are finalized by applying the budget neutrality adjustment. One consequence of the methodology for determining mortality performance as a capped adjustment to infection performance is that the aggregate mortality performance payments may be non-zero. If a given performance period has aggregate mortality performance payments greater than zero, this will result in total preliminary facility payments exceeding the total budget of performance payments for that performance period. Conversely, if a given performance period has aggregate mortality performance payments less than zero, this will result in total preliminary facility payments falling below the total budget of performance payments in that performance period. In both cases, an adjustment is needed to deflate or inflate preliminary facility payments, respectively, to ensure the total amount of funds distributed equals the total amount of funds budgeted. The steps below detail the methodology for performing this budget neutrality adjustment to arrive at the final facility incentive payments.

1. Calculate the total preliminary incentive payments across all *n* facilities in performance period *p*:

$$TOTAL\ PRELIM\ P_p = \sum_{i=1}^n PRELIM\ P_{ip}$$

2. Calculate the budget neutrality adjustment factor in period *p* by dividing total preliminary incentive payments by the total budget of performance payments identified in the section “Determining Performance Period Payment Budget”:

$$BNF_p = \frac{TOTAL\ PRELIM\ P_p}{B_p}$$

3. Calculate the final performance payment for facility *i* in performance period *p* by dividing their preliminary performance payment by the budget neutrality adjustment factor identified in step 2:

$$P_{ip} = \frac{PRELIM\ P_{ip}}{BNF_p}$$

## APPENDIX

### List of Risk Adjustment Variables in Mortality Regression Model

Variable Name	Variable Description	Source
% Infections Week 1	Percentage of total in-facility infections that fall in week 1 of exposure window	NHSN
% Infections Week 2	Percentage of total in-facility infections that fall in week 2 of exposure window	NHSN
% Infections Week 3	Percentage of total in-facility infections that fall in week 3 of exposure window	NHSN
% Infections Week 4	Percentage of total in-facility infections that fall in week 4 of exposure window	NHSN
% Infections Week 5	Percentage of total in-facility infections that fall in week 5 of exposure window	NHSN
% Infections Week 6	Percentage of total in-facility infections that fall in week 6 of exposure window	NHSN
% Infections Week 7	Percentage of total in-facility infections that fall in week 7 of exposure window	NHSN
% Infections Week 8	Percentage of total in-facility infections that fall in week 8 of exposure window	NHSN
% Infections Week 9	Percentage of total in-facility infections that fall in week 9 of exposure window	NHSN
% Infections Week 10	Percentage of total in-facility infections that fall in week 10 of exposure window	NHSN
% Residents <65	Percentage of resident population in exposure window aged less than 65	MDS
% Residents 65-74	Percentage of resident population in exposure window aged 65-74	MDS
% Residents 75-84	Percentage of resident population in exposure window aged 75-84	MDS
% Residents >= 85	Percentage of resident population in exposure window aged 85 or higher	MDS
% Male	Male percentage of resident population in exposure window	MDS
% Female	Female percentage of resident population in exposure window	MDS
% Medicare	Percentage of resident population in exposure window with active Medicare stay	MDS
% Long-Term	Percentage of resident population in exposure window not in Medicare stay	MDS

### Risk Adjustment Variables Data Sources

As the above table details, the risk adjustment variables included in the mortality regression model will come from NHSN and MDS data. In the case of the NHSN risk adjustment variables, as their naming convention indicates, they will cover NHSN reporting weeks included in the infection exposure window associated with each performance period. Separately, the MDS risk adjustment variables will be constructed using MDS all assessments with a target date in the infection exposure window and the preceding 120 days. This wider assessment window reflects the expected frequency of assessments for long-term residents of nursing facilities, and is consistent with assessment time windows for other CMS quality measures that use MDS assessment data. MDS assessments are then ordered temporally for all residents, and a resident will be included in the risk adjustment calculations if their final assessment meets one of two criteria: either their final assessment has a target date within the infection exposure window or their final assessment has a target date in the 120 preceding days but also indicates they are a continuing resident. A resident will be considered a Medicare patient if their final assessment indicates they are in a Medicare-covered stay. Otherwise they will be considered to be a long-term resident of the facility.