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Skilled Nursing Facility Quality Reporting Program

Specifications for Percent of Residents or Patients with Pressure Ulcers That are New or Worsened (NQF #0678)

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SKILLED NURSING FACILITY QUALITY REPORTING PROGRAM:
SPECIFICATIONS FOR PERCENT OF RESIDENTS OR PATIENTS WITH PRESSURE
ULCERS THAT ARE NEW OR WORSENERD (NQF #0678)

RTI International

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SECTION 1

CROSS-SETTING MEASURES DEVELOPMENT WORK: AN INTRODUCTION

The Improving Medicare Post-Acute Care Transformation Act (IMPACT Act), enacted October 6, 2014, directs the Secretary of Health and Human Services to “specify quality measures on which Post-Acute Care (PAC) providers are required under the applicable reporting provisions to submit standardized patient assessment data” in several domains, including incidence of major falls, skin integrity, and function. The IMPACT Act requires the implementation of quality measures to address these measure domains in Home Health Agencies (HHAs), Skilled Nursing Facilities (SNFs), Long-Term Care Hospitals (LTCHs), and Inpatient Rehabilitation Facilities (IRFs).

The IMPACT Act also requires, to the extent possible, the submission of such quality measure data through the use of a PAC assessment instrument and the modification of such instrument as necessary to enable such use. For SNFs, this requirement refers to the collection of such data by means of the Minimum Data Set (MDS) 3.0.

For more information on the statutory history of the SNF QRP, please refer to the FY 2015 SNF PPS final rule. More information on the IMPACT Act is available at <https://www.govtrack.us/congress/bills/113/hr4994>.

In this document, we present specifications for the following quality measure adopted for the SNF QRP:

Outcome Measure: Percent of Residents or Patients with Pressure Ulcers That Are New or Worsened (NQF #0678, Measure Steward: CMS);

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SECTION 2
CROSS-SETTING PRESSURE ULCER MEASURE: PERCENT OF RESIDENTS
OR PATIENTS WITH PRESSURE ULCERS THAT ARE NEW OR WORSENERD
(NQF #0678)

2.1 Quality Measure Description

This quality measure reports the percent of patients/residents with Stage 2–4 pressure ulcers that are new or worsened since admission. The measure is calculated using data from the MDS 3.0 assessment instrument for SNF residents, the LTCH CARE Data Set for LTCH patients, and the IRF-PAI for IRF patients. Data are collected separately in each of the three settings using standardized items that have been harmonized across the MDS 3.0, LTCH CARE Data Set, and IRF-PAI. For residents in a SNF, the measure is calculated by examining all assessments during a resident’s Medicare Part A stay for reports of Stage 2–4 pressure ulcers that were not present or were at a lesser stage since admission. For patients in LTCHs and IRFs, this measure reports the percent of patient stays with reports of Stage 2–4 pressure ulcers that were not present or were at a lesser stage on admission.

Of note, data collection and measure calculation for this measure are conducted separately for each of the three provider settings and will not be combined across settings.

For SNF residents, this measure is restricted to Medicare Part A residents. In IRFs, this measure is limited to Medicare (Part A and Part C) patients. In LTCHs, this measure includes all patients.

2.2 Purpose/Rationale for Quality Measure

This quality measure is adopted as a cross-setting quality measure to meet the requirements of the IMPACT Act of 2014 addressing the domain of skin integrity and changes in skin integrity. Data reporting for this measure would affect the payment determination for the FY 2018 and subsequent years for the SNF, LTCH, and IRF. This measure has previously been successfully implemented in SNF/NHs, LTCHs and IRFs. It has been implemented in the CMS Nursing Home Quality Initiative using the MDS since 2011, and is currently publicly reported on CMS’ Nursing Home Compare at: <http://www.medicare.gov/nursinghomecompare/search.html>. In addition, the measure was adopted for the LTCH QRP in the FY 2012 IPPS/LTCH PPS final rule (76 FR 51753 through 51756) for the FY 2014 and subsequent years payment determination, and for IRF QRP in the FY 2012 IRF PPS final rule (76 FR 47876 through 47878) for the FY 2014 and subsequent years payment determination. The data for this measure have been collected and submitted by LTCHs and IRFs (using the LTCH CARE Data Set and IRF-PAI, respectively) since October 1, 2012.

This measure is intended to encourage SNFs, LTCHs, and IRFs to prevent pressure ulcer development or worsening, and to closely monitor and appropriately treat existing pressure ulcers.

Pressure ulcers are recognized as a serious medical condition. Considerable evidence exists regarding the seriousness of pressure ulcers, and the relationship between pressure ulcers

and pain, decreased quality of life, and increased mortality in aging populations.^{1,2,3,4} Pressure ulcers interfere with activities of daily living and functional gains made during rehabilitation, predispose patients to osteomyelitis and septicemia, and are strongly associated with longer hospital stays, longer IRF stays, and mortality.^{5,6,7} Additionally, patients with acute care hospitalizations related to pressure ulcers are more likely to be discharged to long-term care facilities (e.g., a nursing facility, an intermediate care facility, or a nursing home) than hospitalizations for all other conditions.^{8,9}

Pressure ulcers typically result from prolonged periods of uninterrupted pressure on the skin, soft tissue, muscle, or bone.^{10, 11,12} Elderly individuals in SNFs/NHs, LTCHs, and IRFs

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- ¹ Casey, G.: Pressure ulcers reflect quality of nursing care. Nurs N Z. 19(10):20–24, 2013.
 - ² Gorzoni, M.L., and Pires, S.L.: Deaths in nursing homes. Rev Assoc Med Bras. 57(3): 327–331, 2011.
 - ³ Thomas, J.M., Cooney, Jr., L.M., and Fried, T.R.: Systematic review: health-related characteristics of elderly hospitalized adults and nursing home residents associated with short-term mortality. J Am Geriatr Soc. 61(6):902–911, 2013.
 - ⁴ White-Chu, E.F., Flock, P., Struck, B., et al.: Pressure ulcers in long-term care. Clin Geriatr Med. 27(2): 241–258, 2011.
 - ⁵ Bates-Jensen, B.M.: Quality indicators for prevention and management of pressure ulcers in vulnerable elders. Ann Int Med. 135 (8 Part 2): 744–51, 2001.
 - ⁶ Park-Lee, E., Caffrey, C.: Pressure ulcers among nursing home residents: United States, 2004 (NCHS Data Brief No. 14). Hyattsville, MD: National Center for Health Statistics. Available from <http://www.cdc.gov/nchs/data/databriefs/db14.htm>, 2009.
 - ⁷ Wang, H., Niewczyk, P., Divita, M., et al.: Impact of pressure ulcers on outcomes in inpatient rehabilitation facilities.” Am J Phys Med Rehabil. 93(3): 207–216, 2014.
 - ⁸ Hurd, D., Moore, T., Radley, D., et al.: Pressure ulcer prevalence and incidence across post-acute care settings. Home Health Quality Measures & Data Analysis Project, Report of Findings, prepared for CMS/OCSQ, Baltimore, MD, under Contract No. 500-2005-000181 TO 0002, 2010.
 - ⁹ Institute for Healthcare Improvement (IHI): Relieve the pressure and reduce harm. May 21, 2007. Available from <http://www.ihl.org/IHI/Topics/PatientSafety/SafetyGeneral/ImprovementStories/FSRelievethePressureandReduceHarm.htm>, 2007.
 - ¹⁰ Russo, C.A., Steiner, C., and Spector, W.: Hospitalizations related to pressure ulcers among adults 18 years and older, 2006. (Healthcare Cost and Utilization Project Statistical Brief No. 64). December. Available from <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb64.pdf>, 2008.
 - ¹¹ Reddy, M.: Pressure ulcers. Clin Evid.(Online), 2011.
 - ¹² Advancing Excellence in America’s Nursing Homes (AEANH). (n.d.). Explore our goals. Available from <https://www.nhqualitycampaign.org/goals.aspx>.

have a wide range of impairments or medical conditions that increase their risk of developing pressure ulcers, including but not limited to, impaired mobility or sensation, malnutrition or under-nutrition, obesity, stroke, diabetes, dementia, cognitive impairments, circulatory diseases, and dehydration. The use of wheelchairs and medical devices (e.g., hearing aid, feeding tubes, tracheostomies, percutaneous endoscopic gastrostomy tubes), a history of pressure ulcers, or presence of a pressure ulcer at admission are additional factors that increase pressure ulcer risk in elderly patients.^{11,13,14,15,16,17,18,19,20}

Pressure ulcers are high-cost adverse events across the spectrum of health care settings, from acute hospitals to home health.^{11,20,21} Pressure ulcer incidence rates vary considerably by clinical setting, ranging from 0.4% to 38% in acute care, 2.2% to 23.9% in SNFs and NHs, and 0% to 17% in home care.¹² No national survey of pressure ulcer incidence or prevalence has been conducted in LTCHs or IRFs. However, a study evaluating 2009 Medicare FFS claims data from post-acute care facilities found 15,995 secondary diagnosis claims of Stage 3 or 4 pressure ulcers in LTCHs 2,342 secondary diagnosis claims of Stage 3 or 4 pressure ulcers in IRFs; and 9,939 secondary diagnosis claims of Stage 3 or Stage 4 pressure ulcers in SNFs.²² Additionally,

¹³ Agency for Healthcare Research and Quality (AHRQ): Agency news and notes: pressure ulcers are increasing among hospital patients. Available from <http://archive.ahrq.gov/news/newsletters/research-activities/jan09/0109RA22.html>, January 2009.

¹⁴ Cai, S., Rahman, M., and Intrator, O.: Obesity and pressure ulcers among nursing home residents. *Med Care*. 51(6): 478–486, 2013

¹⁵ DeJong, G., Hseih, C.H., Brown, P., et al.: Factors associated with pressure ulcer risk in spinal cord injury rehabilitation. *Am J Phys Med Rehabil*. May 29, 2014. [Epub ahead of print]

¹⁶ MacLean DS. Preventing & managing pressure sores. *Caring for the Ages*. March 2003;4(3):34-7.

¹⁷ Michel, J.M., Willebois, S., Ribnik, P., et al.: As of 2012, what are the key predictive risk factors for pressure ulcers? Developing French guidelines for clinical practice. *Ann Phys Rehabil Med*. 55(7): 454-465, 2012.

¹⁸ National Pressure Ulcer Advisory Panel (NPUAP) Board of Directors; Cuddigan, J., Berlowitz, D. R., Ayello, E. A. (Eds): Pressure ulcers in America: prevalence, incidence, and implications for the future. An executive summary of the National Pressure Ulcer Advisory Panel Monograph. *Adv Skin Wound Care*, 14(4):208–15, 2001.

¹⁹ Teno, J.M., Gozalo, P., Mitchell, S.L., et al.: Feeding tubes and the prevention or healing of pressure ulcers. *Arch Intern Med*. 172(9): 697–701, 2012.

²⁰ Centers for Medicare & Medicaid Services (CMS): Medicare program; changes to the hospital inpatient prospective payment system and fiscal year 2008 rates. *Fed Reg*. 72(162):47205., 2007

²¹ Kandilov, A.M.G., Coomer, N.M., and Dalton, K.: The impact of hospital-acquired conditions on Medicare program payments. *MMRR*. 4(4): E1–E23, 2014.

²² Bernard, S.L., Dalton, K., Lenfestey, N.F., et al.: Study to support a CMS report to Congress: Assess feasibility of extending the hospital-acquired conditions—present on admission IPPS payment policy to non-IPPS payment environments. Prepared for Centers for Medicare & Medicaid Services. Available from: <http://innovation.cms.gov/Files/x/HospAcquiredConditionsRTC.pdf>, 2011.

analysis of LTCH CARE Data Set (for admissions and discharges between October 1, 2012 through March 31, 2014) and IRF-PAI data (for IRF-PAI assessments between October 1, 2012 through March 31, 2014) conducted by CMS's measure development contractor, RTI International, suggests median risk-adjusted incidence of new or worsened pressure ulcers ranging from 1.88% to 2.01% and 0.73% to 1.02% per 12-month measure calculation period in LTCHs and IRFs, respectively.

As reported in the Federal Register, in 2006 the average cost for a hospital stay related to pressure ulcers was \$40,381.²⁰ The Advancing Excellence in America's Nursing Homes Campaign reported that it can cost as much as \$19,000 to treat a single Stage 4 pressure ulcer.¹² Using data from 2009 and 2010, severe (Stage 3 and Stage 4) pressure ulcers acquired during a hospital stay were estimated to have increased CMS payments across 90-day episodes of care by at least \$18.8 million a year.²¹

2.3 Denominator

Specific denominator definitions for each setting are provided below.

SNF Denominator: The denominator is the number of complete resident Medicare Part A stays which is defined by a 5-day PPS assessment and a discharge assessment, which may be a stand-alone Part A PPS discharge, or a Part A PPS discharge combined with an OBRA discharge, except those who meet the exclusion criteria.

LTCH Denominator: The denominator is the number of patient stays with both an admission and discharge LTCH CARE Data Set assessment, except those who meet the exclusion criteria.

IRF Denominator: The denominator is the number of Medicare* (Part A and Part C) patient stays with an IRF-PAI assessment, except those who meet the exclusion criteria.

*IRF-PAI data are submitted for Medicare patients (Part A and Part C) only.

2.3.1 Denominator Exclusions

Specific denominator exclusions for each setting are provided below.

SNF Denominator Exclusions:

1. Resident stay is excluded if data on new or worsened Stage 2, 3, and 4 pressure ulcers are missing at discharge; i.e., (M0300B1 = [-] or M0300B2 = [-]) and (M0300C1 = [-] or M0300C2 = [-]) and (M0300D1 = [-] or (M0300D2 = [-]).
2. Resident stay is excluded if the resident died during the SNF stay.
3. Residents are excluded if there is no initial assessment available to derive data for risk adjustment (covariates).

LTCH Denominator Exclusions:

1. Patient stay is excluded if data on new or worsened Stage 2, 3, and 4 pressure ulcers are missing on the planned or unplanned discharge assessment; i.e., M0800A = [-] and M0800B = [-] and M0800C = [-].
2. Patient stay is excluded if the patient died during the LTCH stay; i.e., A0250 = [12].
3. Patient stay is excluded if there is no admission assessment available to derive data for risk adjustment (covariates).

IRF Denominator Exclusions:

1. Patient stay is excluded if data on new or worsened Stage 2, 3, and 4 pressure ulcers is missing at discharge; i.e., M0800A = [-] and M0800B = [-] and M0800C = [-].
2. Patient stay is excluded if the patient died during the IRF stay; i.e., Item 44C = [0].

2.4 Numerator

Specific numerator definitions for each setting are provided below.

SNF Numerator: The numerator is the number of complete resident Medicare Part A stays for which the discharge assessment indicates one or more new or worsened Stage 2-4 pressure ulcers compared to admission.

1. Stage 2 (M0300B1) - (M0300B2) > 0, OR
2. Stage 3 (M0300C1) - (M0300C2) > 0, OR
3. Stage 4 (M0300D1) - (M0300D2) > 0

LTCH Numerator: The numerator is the number of stays for which the discharge assessment indicates one or more new or worsened Stage 2-4 pressure ulcers compared to admission.

1. Stage 2 (M0800A) > 0, OR
2. Stage 3 (M0800B) > 0, OR
3. Stage 4 (M0800C) > 0

IRF Numerator: The numerator is the number of stays for which the IRF-PAI indicates one or more Stage 2-4 pressure ulcer(s) that are new or worsened at discharge compared to admission.

1. Stage 2 (M0800A) > 0, OR
2. Stage 3 (M0800B) > 0, OR
3. Stage 4 (M0800C) > 0.

2.5 Measure Time Window

Time windows vary across setting due to considerable variation in facility sizes across the three settings. Specific measure time window descriptions for each setting are provided below.

SNF Time Window: The measure will be calculated quarterly using a rolling 12 months of data. For public reporting, the quality measure score reported for each quarter is calculated using a rolling 12 months of data inclusive of the reporting quarter and the 3 quarters prior. All SNF stays, except those that meet the exclusion criteria, during the 12 months are included in the denominator and are eligible for inclusion in the numerator. For residents with multiple stays during the 12-month time window, each stay is eligible for inclusion in the measure.

LTCH Time Window: The measure will be calculated quarterly using a rolling 12 months of data. For public reporting, the quality measure score reported for each quarter is calculated using a rolling 12 months of data inclusive of the reporting quarter and the 3 quarters prior. All LTCH stays, except those that meet the exclusion criteria, during the 12 months are included in the denominator and are eligible for inclusion in the numerator. For patients with multiple stays during the 12-month time window, each stay is eligible for inclusion in the measure.

IRF Time Window: The measure will be calculated quarterly using rolling 12 months of data. All IRF records, except those that meet the exclusion criteria, during the 12 months will be included in the denominator and are eligible for inclusion in the numerator. For patients with multiple records during the 12-month time window, each record is eligible for inclusion in the measure.

2.6 Risk Adjustment Covariates

Specific covariate definitions for each setting are provided below.

2.6.1 SNF Risk Adjustment Covariates

For each resident covariate values are assigned, either '0' for covariate condition not present or '1' for covariate condition present, as reported on the PPS 5-Day assessment.

1. Indicator of requiring limited or more assistance in bed mobility self-performance dependence on the PPS 5-Day assessment:

Covariate = [1] (yes) if G0110A1 = [2, 3, 4, 7, 8] (2 – Limited assistance, 3 – Extensive assistance, 4 – Total dependence, 7 – activity occurred only once or twice, 8 – Activity did not occur)

Covariate = [0] (no) if G0110A1 = [0, 1, -] (0 – Independent, 1 – Supervision, '-' – no response)

2. Indicator of bowel incontinence at least occasionally on the PPS 5-Day assessment:

Covariate = [1] (yes) if H0400 = [1, 2, 3] (1 – Occasionally incontinent, 2 – Frequently incontinent, 3 – Always incontinent)

Covariate = [0] (no) if H0400 = [0, 9, -, ^] (0 – Always continent, 9 – Not rated, ‘-’ – No response available, ‘^’ – Valid skip)

3. Have diabetes or peripheral vascular disease on PPS 5-Day assessment:

Covariate = [1] (yes) if any of the following are true:

1. Active peripheral vascular disease (PVD) or peripheral arterial disease (PAD) in the last 7 days (I0900 = [1] (checked))
2. Active diabetes mellitus (DM) in the last 7 days (I2900 = [1] (checked))

Covariate = [0] (no) if I0900 = [0, -, ‘-’] AND I2900 = [0, -]

4. Indicator of Low Body Mass Index (BMI), based on Height (K0200A) and Weight (K0200B) on the PPS 5-Day assessment:

Covariate = [1] (yes) if BMI \geq [12.0] AND \leq [19.0]

Covariate = [0] (no) if BMI $>$ [19.0]

Covariate = [0] (no) if K0200A = [-] OR K0200B = [-] OR BMI $<$ [12.0], (‘-’ =No response available)

Where: BMI = (weight * 703 / height²) = ((K0200B) * 703) / (K0200A²) and the resulting value is rounded to one decimal.

2.6.2 LTCH Risk Adjustment Covariates

For each patient stay covariate values are assigned, either ‘0’ for covariate condition not present or ‘1’ for covariate condition present, as reported on the initial assessment.

1. Indicator of supervision/touching assistance or more for the functional mobility item Lying to Sitting on Side of Bed on the admission assessment:

Covariate = [1] (yes) if GG0160C²² = [01, 02, 03, 04, 07, 09, 88] ([01] = Dependent, [02] =Substantial/maximal assistance, [03] =Partial/moderate assistance, [04] =Supervision or touching assistance, [07] = Patient refused, [09] = Not applicable, [88] = (activity) not attempted due to medical condition or safety concerns)

Covariate = [0] (no) if GG0160C³⁵ = [05, 06, -, ^] ([05] =Setup or clean-up assistance, [06] = Independent, [-]=No response available, [^] =Valid skip)

2. Indicator of bowel incontinence at least occasionally on the admission assessment:

Covariate = [1] (yes) if H0400 = [1, 2, 3] ([1] = Occasionally incontinent, [2] = Frequently incontinent, [3] = Always incontinent)

Covariate = [0] (no) if H0400 = [0, 9, -, ^] ([0] = Always continent, [9] = Not rated, [-]= No response available, [^] = Valid skip)

3. Have diabetes or peripheral vascular disease on admission assessment:

Covariate = [1] (yes) if any of the following are true:

1. I0900 = [1] (checked)

2. I2900 = [1] (checked)

Covariate = [0] (no) if I0900 = [0, -] AND I2900 = [0, -]

4. Indicator of Low Body Mass Index, based on Height (K0200A) and Weight (K0200B) on the admission assessment:

Covariate = [1] (yes) if $BMI \geq [12.0]$ AND $\leq [19.0]$

Covariate = [0] (no) if $BMI > [19.0]$

Covariate = [0] (no) if K0200A = [-] OR K0200B = [-] OR $BMI < [12.0]$, ('-' = No response available)

Where: $BMI = (\text{weight} * 703 / \text{height}^2) = ((K0200B) * 703) / (K0200A^2)$ and the resulting value is rounded to one decimal.

2.6.3 IRF Risk Adjustment Covariates

For each patient stay covariate values are assigned, either '0' for covariate condition not present or '1' for covariate condition present, as reported on the initial assessment

1. Indicator of requiring minimal or more assistance for the FIM® Item (39I) Transfers: Bed, Chair, and Wheelchair on admission:

Covariate = [1] (yes) if 39I FIM Levels = [0, 1, 2, 3, 4] ([0]= Activity does not occur, [1] = Total Assistance (Subject less than 25%), [2]=Maximal Assistance (Subject = 25% or more), [3] = Moderate Assistance (Subject = 50% or more), [4] = Minimal Assistance (Subject = 75% or more))

Covariate = [0] (no) if 39I FIM Levels = [5,6,7, -, ^] ([5] = Supervision (Subject = 100%), [6] = Modified Independence (Device), [7] = Complete Independence (Timely, Safely), [-] = No response available, [^] = Valid skip)

2. Indicator of bowel incontinence at least occasionally on admission:

Covariate = [1] (yes) if Item 32 = [1,2,3,4,5] ([1] = Five or more accidents in the past 7 days, [2] = Four accidents in the past 7 days, [3] = Three accidents in the past 7 days, [4] = Two accidents in the past 7 days, [5] = One accident in the past 7 days)

Covariate = [0] (no) if Item 32 = [6, 7, -, ^] ([6] = No accidents; uses device such as a ostomy, [7] = No accidents, [-]=No response available, [^] = Valid skip)

3. Have peripheral vascular disease or peripheral arterial disease or diabetes:

Covariate = [1] (yes) if any of the following are true:

1. I0900 = [1] (checked)
2. I2900 = [1] (checked) Covariate = [0] (no) if I0900 = [0, -] AND I2900A = [0, -] Indicator of Low Body Mass Index, based on Height (25A) and Weight (26A) on the assessment:

Covariate = [1] (yes) if BMI \geq [12.0] AND \leq [19.0]

Covariate = [0] (no) if BMI > [19.0]

Covariate = [0] (no) if 25A = [-] OR 26A = [-] OR BMI < [12.0] ([-] = No response available)

Where: BMI = (weight * 703 / height²) = ((26A) * 703) / (25A)² and the resulting value is rounded to one decimal.

2.7 Quality Measure Calculation Algorithm

The following steps are used to calculate the measure:

A. Calculate the facility observed score (steps 1 through 3)

Step 1. Calculate the denominator count:

In the SNF setting, calculate the total number of complete Medicare Part A stays ending in the measure time window, who do not meet the exclusion criteria.

In the LTCH setting, calculate the total number of stays with both an admission and discharge LTCH CARE Data Set assessment in the measure time window, who do not meet the exclusion criteria.

In the IRF setting, calculate the total number of stays with an IRF-PAI assessment in the measure time window, who do not meet the exclusion criteria.

Step 2. Calculate the numerator count:

In the SNF setting, calculate the total number residents Medicare Part A stays in the denominator with discharge assessment that indicates one or more new or worsened pressure ulcers.

In the LTCH setting, calculate the total number of patient stays whose discharge assessment indicates one or more new or worsened pressure ulcers compared to the admission assessment.

In the IRF setting, calculate the total number of patient stays whose IRF-PAI assessment indicates one or more new or worsened pressure ulcers at discharge compared to admission.

Step 3. Calculate the facility's observed score:

Divide the facility's numerator count by its denominator count to obtain the facility's observed score; that is, divide the result of step 2 by the result of step 1.

B. Calculate the expected score for each patient/resident (steps 4 and 5)

Step 4. Determine presence or absence of the pressure ulcer covariates for each patient/resident:

Assign covariate values, either '0' for covariate condition not present or '1' for covariate condition present, for each patient/resident for each of the four covariates as reported on the PPS 5-Day assessment for the SNF setting or the admission assessment for the LTCH and IRF settings, as described in the section above.

Step 5. Calculate the expected score for each patient/resident with the following formula:

$$\text{Patient/resident-level expected QM score} = 1 / [1 + e^{-X}] \quad (1)$$

Where e is the base of natural logarithms and X is a linear combination of the constant and the logistic regression coefficients times the covariate scores (from Formula [2], below).

$$\text{QM triggered (yes=1, no=0)} = B0 + B1*COVA + B2*COVB + \dots BN*COVN \quad (2)$$

Where $B0$ is the logistic regression constant, $B1$ is the logistic regression coefficient for the first covariate (where applicable), $COVA$ is the patient-/resident-level score for the first covariate, $B2$ is the logistic regression coefficient for the second covariate, and $COVB$ is the patient/resident level score for the second covariate (where applicable), etc. The regression constant and regression coefficients* are numbers obtained through statistical logistic regression analysis.

* Regression coefficients and constants are calculated separately for each facility type (SNF, LTCH, and IRF) and are updated each reporting period.

C. Calculate the facility expected score (step 6)

Step 6. Once an expected QM score has been calculated for all residents for the SNF setting or all patient stays for the LTCH and IRF settings, calculate the mean facility-level expected QM score by averaging all resident/patient-level expected scores.

D. Calculate national mean QM score (steps 7 through 9)

Step 7. Calculate the denominator count:

Calculate the total number of patient stays/resident retained after exclusions and sum to derive denominator count.

Step 8. Calculate the numerator count:

Calculate the total number of patient stays/residents that triggered the QM and sum to derive numerator count.

Step 9. Calculate national mean observed QM score:

Divide the numerator count by its denominator count to obtain the national mean observed score; that is, divide the result of step 8 by the result of step 7.

E. Calculate the facility-level adjusted score (step 10)

Step 10. Calculate the facility-level adjusted score based on the:

facility-level observed QM score (step 3),

facility-level average expected QM score (step 6), and

*national mean observed QM score (step 9).

**The national mean observed QM score is updated separately for each facility type (SNF, LTCH, and IRF) for each reporting period.*

The calculation of the adjusted score uses the following equation:

$$Adj = 1/[1 + e^{-y}] \quad (3)$$

where

Adj is the facility-level adjusted QM score, and

$y = (\text{Ln}(\text{Obs}/(1-\text{Obs})) - \text{Ln}(\text{Exp}/(1-\text{Exp})) + \text{Ln}(\text{Nat}/(1-\text{Nat})))$

Obs is the facility-level observed QM rate,

Exp is the facility-level expected QM rate,

Nat is the national observed QM rate,

Ln indicates a natural logarithm, and

e is the base of natural logarithm.