# Draft Measure Specifications: Transitions from Hospice Care, Followed by Death or Acute Care

## Project Title:

Development of the *Transitions from Hospice Care, Followed by Death or Acute Care* Measure for the Hospice Quality Reporting Program

## Date:

March 2018

## Project Overview:

The Centers for Medicare & Medicaid Services (CMS) has contracted with RTI International to develop quality measures for the Hospice Quality Reporting Program (HQRP). The purpose of this project is to supplement the existing HQRP measure set, which includes quality measures based on the Hospice Item Set (HIS) and the Hospice Consumer Assessment of Healthcare Providers and Systems (CAHPS®), with measures that address additional identified gaps in hospice quality measurement. The measure currently under development, *Transitions from Hospice Care, Followed by Death or Acute Care*, uses Medicare fee for service (FFS) claims data to assess potentially concerning patterns of care after hospice live discharge. The contract name is Hospice Quality Reporting Program Measure Development, Maintenance, and Support. The contract number is HHSM-500-2013-13015I.

## Measure Name:

Transitions from Hospice Care, Followed by Death or Acute Care

## Background:

Transitions of care are broadly defined as patient movement across healthcare settings, including between providers of care and to and from home.[1] The Institute of Medicine has described care transitions as particularly vulnerable events for patients. If transitions are poorly coordinated and managed, they can cause poor health care outcomes for patients and lead to wasteful resource use.[2] Measuring transitions among hospice patients and

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[1] The Joint Commission. "Hot Topics in Health Care: Transitions of Care". Available from: https://www.jointcommission.org/assets/1/18/Hot_Topics_Transitions_of_Care.pdf

[2] "Improving Care Transitions, " Health Affairs Health Policy Brief, September 13, 2012. DOI: 10.1377/hpb20120913.327236

assessing outcomes following transitions from hospice care can therefore provide valuable information about hospices' quality of care.

Transitions from hospice care can occur during a patient's hospice stay or after a patient is discharged alive from hospice. Care transitions at the end of life are burdensome to patients, families, and the health care system at large because they are associated with adverse health outcomes,[3, 4] lower patient and family satisfaction,[5] higher health care costs,[6, 7] and fragmentation of care delivery. One national study found that over 10% of all hospice decedents experienced a care transition in the last six months of life, including to hospitals, skilled nursing facilities, home health programs, or home without hospice services.[8]

Live discharges from hospice care themselves are considered a type of care transition. Though some patients can be discharged alive from hospice because their clinical status improves or stabilizes, live discharges among patients who are still considered terminally ill can be potentially concerning. A live discharge can lead to a patient dying without comprehensive symptom management and psychosocial support for the patient and family. The national rate of live discharge from hospice has declined in recent years, yet concerns about live discharge persist.  The Medicare Payment Advisory Commission (MedPAC) found in their 2018 report that in 2016, 25% of providers had live discharge rates greater than 31% and 10% of providers had rates greater than 53%. The 2016 rates of live discharge among hospices in the 75th and 90th percentile are higher than they were in three preceding years.[9,10]  MedPAC suggests that although some level of live discharges from hospice may be appropriate, providers with substantially higher rates of live discharge than their peers may have potential quality issues, such as inability to meet patient and caregiver needs. The report also expressed support for outcome quality measures, and specifically for a measure that would capture the live discharge rate among hospices and burdensome transitions.

[3] Aldridge, M. D. P., MBA; et al. (2016). "The Impact of Reported Hospice Preferred Practices on Hospital Utilization at the End of Life " Medical Care 54(7): 657-663.

[4] Phongtankuel, V., et al. (2015). "Why Do Home Hospice Patients Return to the Hospital? A Study of Hospice Provider Perspectives." Journal of Palliative Medicine 19(1): 51-56

[5] Dolin, R. et al. (2017). "Factors Driving Live Discharge From Hospice: Provider Perspectives". Journal of Pain and Symptom Management.

[6] Carlson, M. D. A., et al. (2009). Hospice characteristics and the disenrollment of patients with cancer. Health Services Research. 44: 2004+.

[7] MacKenzie, Meredith A., and Alexandra Hanlon. "Health-Care Utilization After Hospice Enrollment in Patients With Heart Failure and Cancer." American Journal of Hospice and Palliative Medicine® (2017): 1049909116688209

[8] Wang, S.-Y., et al. (2016). "Transitions Between Healthcare Settings of Hospice Enrollees at the End of Life." Journal of the American Geriatrics Society 64(2): 314-322.

[9] MedPAC, Report to the Congress: Medicare Payment Policy. March 2018. Available from: http://medpac.gov/docs/default-source/reports/mar18_medpac_entirereport_sec.pdf?sfvrsn=0

[10] MedPAC, Report to the Congress: Medicare Payment Policy. March 2017. Available from: http://www.medpac.gov/docs/defaultsource/reports/mar17_medpac_ch12.pdf?sfvrsn=0

Examining subsequent care transitions and other events that occur after a live discharge from hospice can also reveal potential quality of care issues. Most patients express a wish to die at home and outside of the hospital, and patients discharged alive from hospice are more likely to die in a hospital than patients who receive hospice care up until death.[11,12] A national study of live discharges found that among those who were discharged alive, nearly a quarter are admitted to the hospital, and a third of those hospitalized following live discharge die within a month of hospice discharge.[13] Many patients reenroll in hospice following their live discharge, creating greater burden on the patient, caregivers, and health system regardless of the patient's outcome.[14] Live discharges from hospice are expected, for example, in cases where survival improves or patient and family preferences change. However, live discharges from hospice followed shortly by acute care utilization or death represent potentially avoidable and undesirable outcomes, and may indicate potential quality concerns.

The issue of care transitions is considered critical by both the public and by hospice stakeholders and policy experts. "Avoiding unnecessary hospital/ED admissions and readmissions" was classified as a "Highly Prioritized Measurement Opportunity for Hospice Care" in NQF's Performance Measurement Coordination Strategy for Hospice and Palliative Care in 2012.[15]  The issue has also recently entered the public sphere; both *NPR* and *USA Today* recently published pieces discussing live discharge from hospice and the potentially negative consequences for patients of such discharges.[16,17] The *New York Times* and *Kaiser Health News* also ran pieces highlighting caregiver's fear of abandonment during their greatest time of need in the last days of life.[18, 19]

As part of the measure development process, we sought input on the Transitions from Hospice Care, Followed by Death or Acute Care measure concept and specifications from a

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[11] IOM (Institute of Medicine). 2014. Dying in America: Improving quality and honoring individual preferences near the end of life. Washington, D. C. National Academies Press.

[12] Pathak, E. B., et al. (2014). "From hospice to hospital: short-term follow-up study of hospice patient outcomes in a US acute care hospital surveillance system." BMJ Open 4(7).

[13] Teno, J. M., et al. (2015). "Characteristics of Hospice Programs with Problematic Live Discharges." Journal of Pain and Symptom Management 50(4): 548-552.

[14] Aldridge, M. D., et al. (2014). "National hospice survey results: For-profit status, community engagement, and service." JAMA Internal Medicine 174(4): 500-506.

[15] Map Partnership, "Performance Measurement Coordination Strategy for Hospice and Palliative Care" (National Quality Forum, 2012)

[16] Frank Gluck and Melanie Payne, "Taking Too Long to Die: Some 'Terminal' Patients Lose Medicare Hospice Benefits," *USA Today*, 2017, http://www.news-press.com/story/news/2017/07/28/too-long-die-some-terminal-patients-lose-medicare-hospice-benefits/435340001/

[17] Ira Jaffe, "Nearly 1 In 5 Hospice Patients Discharged While Still Alive," *Morning Edition* (NPR, August 11, 2017), http://www.npr.org/sections/health-shots/2017/08/11/542607941/nearly-1-in-5-hospice-patients-discharged-while-still-alive.

[18] Aleccia, J and Bailey, M "No One is Coming: Hospice Patients Abandoned at Death's Door," *Kaiser Health News* (October 26 2017), https://khn.org/news/no-one-is-coming-hospice-patients-abandoned-at-deaths-door/

[19] Brown, Karen. "This Was Not the Good Death We Were Promised." *The New York Times* (January 6, 2017). https://www.nytimes.com/2018/01/06/opinion/sunday/hospice-good-death.html

range of key stakeholders. These included hospice caregivers, hospice clinicians, federal experts, and a technical expert panel (TEP). Caregivers supported the measure concept and expressed that the measure would provide valuable information in evaluating and choosing a hospice. The TEP, which consisted of hospice clinical and measure development methodology experts, also supported the measure concept and provided substantive input about the measure's specifications. Other stakeholders provided ongoing clinical and technical direction and expertise throughout the process.

## Descriptive Information:

### Measure Type

- Outcome

### Population

- Medicare FFS hospice patients

### Brief Measure Description

*Transitions from Hospice Care, Followed by Death or Acute Care* will estimate the risk-adjusted rate of transitions from hospice care, followed by death within 30 days or acute care use within 7 days. Specifically, the measure reflects the rate of live discharges from hospice that are followed by death within 30 days or a hospitalization/emergency room visit/observation stay within 7 days of hospice discharge. The measure is risk adjusted to "level the playing field" to allow comparison based on patients with similar characteristics between hospices.

The purpose of this measure is to capture hospice live discharges that are potentially inappropriate or followed by undesirable outcomes. It is important to recognize that live discharges from hospice and post-discharge care transitions are not considered "never-events." Live discharge from hospice can be appropriate, and the circumstances that lead to these events can be complex and are influenced by a range of factors including patient and family preference. Therefore, the goal of this risk adjusted measure is to identify hospices that have notably higher rates of live discharges followed shortly by patient death or acute care utilization, when compared to their peers.

### Crosscutting Areas

Reducing unnecessary care transitions for hospice patients by promoting effective communication and coordination of care.

## Measure Specifications:

The measure does not have a simple form for the numerator and denominator because the risk adjustment is incorporated into the measure calculation rather than applied after the observed rate is calculated. The statistical method used to construct the risk adjusted

measure numerator and denominator and the risk adjustment modeling are described below.

The purpose of risk adjustment is to account for risk factor differences across hospices, when comparing quality of care between them. In other words, risk adjustment is used to "level the playing field' to allow comparison based on patients with similar characteristics between hospices. Risk adjustment is particularly important in outcome measures as a patient's outcome may be determined not only by the quality of care he/she received but also by patient characteristics, such as age, gender, diagnosis, comorbidities, and social factors that are outside of providers' control. In absence of risk adjustment, a provider who takes care of certain types of patients may appear to have worse quality of care if these patients are more predisposed to poorer outcomes regardless of the health care received, compared to another provider who takes care of fewer of such patients.

## Numerator Statement and Details

### Measure Outcome (Unadjusted Numerator)

Number of live discharges that are followed by death within 30 days or a hospitalization/ emergency room visit/observation stay within 7 days of hospice discharge.

### Adjusted Numerator

The numerator is a risk adjusted estimate of hospice stays that would be predicted to have live discharges that are followed by death within 30 days or a hospitalization/emergency room visit/observation stay within 7 days of hospice discharge. This estimate starts with the observed number of live discharges from hospice that are followed by death or acute care and is risk adjusted for patient characteristics (listed in the Statistical Risk Model and Variables section of this document, below) and a statistical estimate of the hospice effect beyond case mix. The hospice effect captures variation in the measure outcome across hospices, accounting for differences in patient composition. The hospice effect helps isolate the differences in measure performance that are due to hospice behavior and characteristics, thereby producing a more accurate assessment of quality of care.

The construction of the risk adjusted numerator uses a statistical model estimated on the national data for all included hospice stays. It is applied to the hospice stays included in the measure and includes the estimated effect of each specific hospice. The prediction equation is based on a logistic statistical model with a two-level hierarchical structure. The patient-stays in the model have an indicator of the discharging hospice; the effect of the hospice is measured as a positive or negative shift in the intercept term of the equation. The hospice effects are modeled as belonging to a normal (Gaussian) distribution centered at 0, and are estimated along with the effects of patient characteristics in the model.

### Denominator Statement and Details

*Eligible Stays (Unadjusted Denominator)*

The eligible stays for this measure are discharged hospice stays among all Medicare FFS patients not excluded for the reasons listed below:

1. Patients not continuously enrolled in Part A Medicare FFS in the 12 months prior to the hospice admission date, during the hospice stay, or at least 7 days following the hospice discharge date.

2. Patients enrolled in Medicare Advantage in the 12 months prior to the hospice admission date, during the hospice stay, or in the 7 days following the hospice discharge date.

   Patients that fall under these two exclusion criteria will have incomplete data for prior utilization variables that are used in risk adjusting this measure. Additionally, these patients will have incomplete data for acute care utilization in the 7 days following hospice live discharge. For patients who are discharged expired from hospice care, the exclusion criteria related to Medicare Part A or Medicare Advantage enrollment status in the 7 days following the hospice discharge date do not apply.

3. Patients who are under 18 years old at hospice admission.

*Adjusted Denominator*

The denominator for this measure is computed the same way as the numerator, but the hospice effect is set at the national average. For the eligible stays at each hospice, the measure denominator is the risk adjusted expected number of stays with transitions from hospice that are followed by death within 30 days or a hospitalization/emergency room visit/observation stay within 7 days. This estimate includes risk adjustment for patient characteristics with the hospice effect removed. The "expected" number of live discharges from hospice that are followed by death or acute care is the predicted number of live discharges from hospice that are followed by death or acute care if the same patients were treated in the "average" hospice.

### Risk Adjustment Type

- Statistical risk model

### Statistical Risk Model

The statistical risk model is a hierarchical logistic regression model, which predicts the probability of stays ending in live discharges from hospice care, followed by death or acute care. Risk adjusters are predictor variables in the model. Patient characteristics related to each stay, and a marker for the specific hospice will be included in the equation. The equation will be hierarchical in that both individual patient characteristics, as well as clustering of patients into hospices, will be accounted for.

The model estimates both the average predictive effect of patient characteristics across all hospices, and the degree to which each hospice has an effect on the outcome that differs from that of the average hospice. The hospice effect can be assumed to be randomly distributed around the average (according to a normal distribution). When computing the hospice effect, hierarchical modeling accounts for the known predictors of the outcome, on average, such as patient characteristics, the observed hospice rate for this outcome, and the number of hospice stays eligible for the measure. The estimated hospice effect will primarily be determined by the hospice's own data if the number of stays is relatively large, as the estimate would be relatively precise. The estimated hospice effect will be adjusted toward the average if the number of stays is small, as small samples yield an estimate of lower precision.

We used the following model:

Let $Y_{ij}$, denote the outcome (equal to 1 if patient *i* is discharged alive from hospice care and died within 30 days of hospice discharge or has any acute care use within 7 days) for patient *i* at hospice *j*; $Z_{ij}$ denotes a set of risk factors. We assume the outcome is related linearly to the covariates via a logit function with dispersion:

$$\text{logit}(\text{Prob}(Y_{ij} = 1)) = \alpha_j + \beta * Z_{ij} + \varepsilon_{ij} \qquad (1)$$
$$\alpha_j = \mu + \omega_j \, ; \, \omega_j \sim N(0, \tau^2)$$

where $Z_{ij} = (Z_1, Z_2, ... Z_k)$ is a set of *k* patient-level covariates. $\alpha j$ represents the hospice specific intercept; $\mu$ is the adjusted average outcome over all hospice providers; and $\tau^2$ is the between hospice variance component and $\varepsilon \sim N(0, \sigma^2)$ is the error term. The hierarchical logistic regression model is estimated using SAS software (PROC GLIMMIX: SAS/STAT User's Guide, SAS Institute Inc.)

The estimated equation will be used twice in the measure. The sum of the probabilities of transitions from hospice care, followed by death or acute care of all patients in the measure, including both the effects of patient characteristics and the hospice, will be the "predicted number" of transitions from hospice care, followed by death or acute care after adjusting for case mix. The same equation will be used without the hospice effect to compute the "expected number" for the same patients at a hospice whose quality is at the national average level. The ratio of the predicted-to-expected number of transitions from hospice care, followed by death or acute care, will be the measure of the degree to which the transitions are higher or lower than what would otherwise be expected. This ratio is called the standardized risk ratio, which will then be multiplied by the overall observed rate of the measure outcome in the target population (all hospice stays included in the measure) to obtain the risk adjusted rate of transitions from hospice care followed by death or acute care, for each hospice.

### Risk Adjustment Variables

Patient characteristics may be related to two components of this measure: 1) live discharge, and 2) patient outcomes post the hospice live discharge. First, for live discharges, patient and family preference is an important factor that is out of providers'

control and can affect the measure outcome. There are demonstrated differences across patients in their care preferences, in regard to general health care utilization and end-of-life care. Some patients may be more likely to prefer curative and higher-intensity care as opposed to palliative care at the end of life. For example, such differences are evident across different racial and ethnic groups. Although data on patient care preferences, particularly at the end of hospice care, is not available, some patient characteristics associated with differences in end-of-life care preferences have been examined and will be used in this project. Additional available information can also be used as a proxy assessment of patient care preferences. One example is the pattern of care utilization prior to the current hospice stay that is being measured.

Second, patients' clinical conditions may impact post-live discharge outcomes. The TEP members stated that negative health outcomes after hospice live discharge cannot be entirely attributed to poor care quality on the part of the discharging hospice, given that hospice patients remain fragile in the months following discharge, even for those who were stabilized and were appropriately discharged for no longer being terminally ill. Hospice patients with certain types of characteristics may be predisposed toward poorer outcomes following live discharges than others.

For these reasons, it is necessary to examine the appropriate patient-level risk factors that are outside of hospice providers' control, which may affect the targeted outcome of this measure.

Preliminary risk adjustment variables included in this measure are the following:

- Age
- Gender
- Original reason for Medicare entitlement (age, disability or ESRD)
- Race/ethnicity
- Hospice principal diagnosis (ICD-9 diagnosis codes are used for claims prior to October 2015 and ICD-10 diagnosis codes are used for claims during or after October 2015. The model presented in this document groups principal diagnosis based on the Clinical Classification Software method. We are testing alternative grouping methods, including broader groupings at the body-system level.)
- Setting of care at end of the hospice stay
- Length of hospice stay (categorical)
- Prior healthcare utilization in the year prior to hospice admission:
    – Prior hospitalization
    – Prior ED visits and observational stays
    – Prior hospice utilization

The data used in the risk model are available through the data sources listed below; no new data collection is required.

### Type of Score

- Rate/proportion

### Interpretation of Score

- Lower scores indicate better quality of care

### Calculation Algorithm and Measure Logic

The following steps describe the calculation algorithm/measure logic:

*Step one:* Identify patients meeting the criteria for the target population.

*Step two:* Identify patients meeting the numerator criteria, i.e., live discharges from hospice that are followed by death within 30 days or a hospitalization/emergency room visit/observation stay within 7 days of hospice discharge.

*Step three:* Identify presence or absence of risk adjustment variables for each patient.

*Step four:* Calculate the predicted and expected number of transitions from hospice care, followed by death or acute care for each hospice using the hierarchical logistic regression model.

The predicted number of transitions from hospice care, followed by death or acute care, is calculated as the sum of the predicted probability of having such transition for each patient included in the measure from the hospice, including the hospice-specific effect. The model-specific standardized risk ratio of transitions for each hospice provider is calculated as follows.

To calculate the predicted number of transitions $\text{pred}_j$ for stays at hospice $\text{provider}_j$, we used

$$\text{pred}_j = \Sigma\text{logit}^{-1}(\mu + \omega_i + \beta * Z_{ij}) \tag{2}$$

where the sum is over all stays in $\text{provider}_j$, and $\omega_i$ is the random intercept.

To calculate the expected number $\text{exp}_j$, we used

$$\text{exp}_j = \Sigma\text{logit}^{-1}(\mu + \beta * Z_{ij}) \tag{3}$$

Then, as a measure of excess or reduced transitions among stays at hospice $\text{provider}_j$, calculate the provider-wide standardized risk ratio, $\text{SRR}_j$, as

$$\text{SRR}_j = \text{pred}_j/\text{exp}_j \tag{4}$$

*Step five:* Calculate the standardized risk ratio for each hospice as the ratio of the predicted to expected number of transitions from hospice care, followed by death or acute care. The

value obtained from equation (4) above, the SRR$_j$, is the hospice provider-wide standardized risk ratio for provider$_j$.

_Step six:_ Calculate the risk-adjusted rate of transitions (RSRT$_j$) from hospice care, followed by death or acute care for each hospice, by multiplying the SRR$_j$ (calculated in Step five) by the overall national observed rate of transitions from hospice care, followed by death or acute care for all hospice stays, $\bar{Y}$.

$$RSRT_j = SRR_j * \bar{Y} \qquad\qquad (5)$$

NOTE: Because the statistic described in Step six is a complex function of parameter estimates, re-sampling and simulation techniques (e.g., bootstrapping) may be necessary to derive a confidence interval estimate for the final risk adjusted rate, to characterize the uncertainty of the estimate.

### Missing Data

Observations with missing data for any of the covariates in the risk adjustment model will be excluded from the sample; however, given the data source is claims data, issues with missing data are minimal.

### Data Sources

The measurement period for this measure is one year. This measure uses the data from the Medicare eligibility database (EDB), hospice claims, inpatient claims, and outpatient claims data. The EDB file provides information on dates of birth and death, patient demographics, periods of hospice enrollment, and periods in the FFS program. The data elements from the Medicare FFS claims are those basic to the operation of the Medicare payment systems and include date of admission, date of discharge, diagnoses, procedures, and levels of hospice care. The inpatient and outpatient claims data files are the source for beneficiary-level hospital and emergency room use and observation stay information. The measure is calculated using administrative claims data. There will be no additional data collection or submission burden for hospice providers.

### Level of Analysis

- Hospice

### Care Setting

- Hospice

### Feasibility

This measure uses data from Medicare claims, which are already collected by CMS for payment purposes. Claims data are considered accurate and reliable, as they are used for payment and subject to audit. Claims data are used to calculate quality measures used and publicly reported in other CMS quality reporting programs, including for post-acute care. The data needed to calculate this measure is readily available and requires no additional

data submission beyond what is already collected on claims in the normal course of business. This measure poses no additional data collection burden to hospice providers.

## Usability and Use

CMS is developing this measure for future public reporting on Hospice Compare. This measure will provide valuable information regarding hospice quality of care to consumers and allow hospice providers to track and improve their performance in this measure area.

Potential unintended consequences of this measure include encouraging providers to avoid discharging patients who are no longer eligible for the hospice benefit. This measure may also impact hospices' willingness to enroll patients with certain diagnoses or who are residing in certain care settings because they may have a higher chance of having the measured outcome. The risk adjustment for this measure is designed to account for patient characteristics to minimize the unintended consequences.

## Related and Competing Measures

Related measures include:

- NQF #0213: Proportion of patients who died from cancer admitted to the ICU in the last 30 days of life

- NQF #0215: Proportion of patients who died from cancer not admitted to hospice

- NQF #0216: Proportion of patients who died from cancer admitted to hospice for less than 3 days

None of these measures directly compete with the *Transitions from Hospice Care, Followed by Death or Acute Care* measure. NQF #0213 and NQF#0215 are not specific to hospice patients. NQF#0216 is aimed at measuring late hospice enrollment, instead of hospice quality associated with late hospice discharge.