**Supplemental Table 1. Variable operationalization**

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| --- | --- | --- |
| **Variable** | **Definition** | **Source** |
| **Dependent variables** |
| Consumer Assessment of Healthcare Providers and Systems (CAHPS) Hospice survey |
|  Emotional and  spiritual support | Percentage of caregiver respondents that give the most positive response – “right amount” – to these items:* While your family member was in hospice care, how much emotional support did you get from the hospice team?
* In the weeks after your family member died, how much emotional support did you get from the hospice team?
* Support for religious or spiritual beliefs includes talking, praying, quiet time, or other ways of meeting your religious or spiritual needs. While your family member was in hospice care, how much support for your religious and spiritual beliefs did you get from the hospice team?
 | Hospice Compare |
|  Treating patient with  respect | Percentage of caregiver respondents that give the most positive response – “always” – to these items:* While your family member was in hospice care, how often did the hospice team treat your family member with dignity and respect?
* While your family member was in hospice care, how often did you feel that the hospice team really cared about your family member?
 | Hospice Compare |
|  Help for pain and  symptoms | Percentage of caregiver respondents that give the most positive response – “always” – to these items:* Did your family member get as much help with pain as he or she needed?
* How often did your family member get the help he or she needed for trouble breathing?
* How often did your family member get the help he or she needed for trouble with constipation?
* How often did your family member receive the help he or she needed from the hospice team for feelings of anxiety or sadness?
 | Hospice Compare |
|  Communication with  family | Percentage of caregiver respondents that give the most positive response – “always” – to these items:* How often did the hospice team keep you informed about when they would arrive to care for your family member?
* How often did the hospice team explain things in a way that was easy to understand?
* How often did the hospice team listen carefully to you when you talked with them about problems with your family member’s hospice care?
* How often did the hospice team keep you informed about your family member’s condition?
* How often did the hospice team listen carefully to you?
* How often did anyone from the hospice team give you confusing or contradictory information about your family member’s condition or care?
 | Hospice Compare |
|  Providing timely help | Percentage of caregiver respondents that give the most positive response – “always” – to these items:* When you or your family member asked for help from the hospice team, how often did you get help as soon as you needed it?
* How often did you get the help you needed from the hospice team during evenings, weekends, or holidays?
 | Hospice Compare |
|  Training family to  care for patient | Percentage of caregiver respondents that give the most positive response – “yes, definitely” – to these items:* Did the hospice team give you the training you needed about what side effects to watch for from pain medication?
* Did the hospice team give you the training you needed about if and when to give more pain medicine to your family member?
* Did the hospice team give you the training you needed about how to help your family member if he or she had trouble breathing?
* Did the hospice team give you the training you needed about what to do if your family member became restless or agitated?
* Side effects of pain medicine include things like sleepiness. Did any member of the hospice team discuss side effects of pain medicine with your or your family member?
 | Hospice Compare |
|  Rating of this hospice | Percentage of caregiver respondents that give the answer 9 or 10 to these items:* Using any number from 0 to 10, where 0 is the worst hospice care possible and 10 is the best hospice care possible, what number would you use to rate your family member’s hospice care?
 | Hospice Compare |
|  Willing to recommend  this hospice | Percentage of caregiver respondents that give the most positive response – “yes, definitely” – to these items:* Would you recommend this hospice to your friends and family?
 | Hospice Compare |
| **Independent variables** |
| **Facility-level characteristics** |
| Composite process measure | Percentage of patients for whom the hospice performed all seven care processes, as applicable* Beliefs/values addressed (if desired by the patient)
* Treatment preferences
* Pain screening
* Pain assessment
* Dyspnea treatment
* Dyspnea screening
* Patients treated with an opioid who are given a bowel regimen
 | Hospice Compare |
| Size | Total annual unduplicated service days | Cost report |
| Level of care | Percentages of patients received different levels of care. Each level ranges from 0 to 100.* Continuous home care day (patient is not in an inpatient facility, and receives continuous care during a period of crisis in order to maintain the individual at home)
* Routine home care day (patient is at home and not receiving continuous home care day)
* Inpatient respite care day (patient receives care in an approved inpatient facility to provide respite for the individual’s family or other persons caring for the individual at home)
* General inpatient care day (patient receives care in a hospice facility, hospital, or skilled nursing facility for pain control or acute or chronic symptom management that cannot be managed in other settings)
 | Cost report |
| Ownership status | Facilities are categorized into for-profit and not-for-profit based on their ownership status | Cost report |
| Chain affiliation | Facilities are categorized into chain affiliated and non-chain affiliated hospices | Cost report |
| Organizational longevity | Time the facility has been operational, in years | Cost report |
| Financial performance | Total margin, calculated as (total revenue – total expense)/total revenue | Cost report |
| Payer mix | Percentages of patient days whose primary payer was Medicare, Medicaid, or other pay | Cost report |
| Location | Using facility’s zip code information, different location types were assigned to each facility* Metropolitan
* Micropolitan
* Small town
* Rural area
 | RUCA |
| **Community-level characteristics** |
| Competition | Herfindahl-Hirschman Index is calculated by squaring the market share of each facility in the county and then summing the resulting numbers. The measure ranges from 0 to 10000 where the lower number indicates fiercer competition. Total patient days was used to calculate the facility market share. | Authors’ work |
| People 65 and over | Percentage of population that is 65 and over | ACS |
| Per capita income | Per capita personal income ($) is calculated as total the personal income of the residents of an area divided by the population of the area.  | ACS |
| Minority population | Percentage of population who are non-White in the area | ACS |
| Education level | Percentage of population age 25-64 that did have a school diploma or equivalent and higher education | ACS |

Note: ACS – American Community Survey, RUCA – Rural-urban commuting area

**Supplemental Table 2. Relationship between CAHPS scores and hospice facility- and community-level characteristics for 2017-2019 (N=6,224 hospice-year observations)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | Emotional and spiritual support | Treating patient with respect | Help for pain and symptoms | Communication with family | Providing timely help | Training family to care for patient | Rating of this hospice | Willing to recommend this hospice |
| **Facility-level characteristics** |
| Composite process measure | 0.012\*\* | 0.008\* | 0.007 | 0.015\*\* | 0.002 | 0.010 | 0.010 | 0.011 |
| Total hospice days | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 |
| Level of care |  |  |  |  |  |  |  |  |
|  Routine home care | ref | ref | ref | ref | ref | ref | ref | ref |
|  Continuous home care | 0.019 | 0.021 | 0.023 | 0.015 | 0.012 | -0.014 | 0.022 | 0.019 |
|  Inpatient respite care | 0.015 | -0.055 | -0.018 | 0.015 | 0.064 | 0.119 | 0.221\*\* | 0.216\*\*  |
|  General inpatient care | -0.012 | -0.021 | -0.026 | -0.008 | 0.043 | -0.081\*\* | 0.027 | 0.043 |
| Ownership status |  |  |  |  |  |  |  |  |
|  Not-for-profit  | ref | ref | ref | ref | ref | ref | ref | ref |
|  For-profit | -1.147\*\*\* | -1.124\*\*\* | -1.535\*\*\* | -1.679\*\*\* | -1.572\*\*\* | -1.430\*\*\* | -2.039\*\*\* | -2.547\*\*\* |
| Chain affiliation |  |  |  |  |  |  |  |  |
|  No | ref | ref | ref | ref | ref | ref | ref | ref |
|  Yes | -0.241\* | -0.562\*\*\* | -1.204\*\*\* | -0.767\*\*\* | -1.689\*\*\* | -0.828\*\*\* | -1.395\*\*\* | -1.528\*\*\* |
| Organizational longevity (years) | 0.025\*\*\* | 0.006 | 0.019 | 0.024\* | 0.049\*\*\* | 0.064\*\*\* | 0.073\*\*\* | 0.118\*\*\* |
| Financial performance | -0.005\* | -0.003 | -0.008\* | -0.007\* | -0.014\*\*\* | -0.009\* | -0.008\* | -0.007 |
| Payer mix |  |  |  |  |  |  |  |  |
|  Other pay | ref | ref | ref | ref | ref | ref | ref | ref |
|  Medicare | 0.057\*\*\* | 0.030\*\* | 0.025 | 0.025\* | 0.065\*\*\* | 0.031 | 0.050\*\* | 0.061\*\*\* |
|  Medicaid | 0.039\*\* | -0.003 | -0.027 | -0.019 | 0.019 | -0.003 | -0.039 | -0.01 |
| **Community-level characteristics** |
| Location |  |  |  |  |  |  |  |  |
|  Metropolitan | ref | ref | ref | ref | ref | ref | ref | ref |
|  Micropolitan | -0.105 | 0.179 | 0.723\* | 0.287 | 1.147\*\* | 1.389\*\*\* | 0.216 | 0.839\*  |
|  Small town | -0.073 | 0.879\*\* | 1.907\*\*\* | 1.474\*\*\* | 1.922\*\*\* | 1.954\*\*\* | 1.289\* | 1.541\*\*  |
|  Rural area | -0.157 | 0.618 | 1.109 | 1.076 | 1.676 | 1.587 | 0.596 | 0.670 |
| Competition | -0.039\*\*\* | -0.049\*\*\* | -0.061\*\*\* | -0.056\*\*\* | -0.062\*\*\* | -0.082\*\*\* | -0.062\*\*\* | -0.088\*\*\* |
| People 65 and over | -0.014 | 0.01 | 0.015 | 0.015 | 0.026 | 0.024 | 0.034 | 0.010 |
| Per capita income | -0.001\*\* | -0.001\*\*\* | -0.001\*\*\* | -0.001\*\*\* | -0.001\*\*\* | -0.001\*\*\* | -0.001\*\*\* | -0.001\*\*\* |
| Minority population | -0.051\*\*\* | -0.042\*\*\* | -0.057\*\*\* | -0.055\*\*\* | -0.079\*\*\* | -0.054\*\*\* | -0.069\*\*\* | -0.081\*\*\* |
| Education level | 0.010 | 0.009 | 0.016 | 0.016 | 0.022 | 0.009 | -0.006 | -0.004 |

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001