**Hospital Patients with Severe Wounds: Early Evidence on the Impact of Medicare Payment Changes on Treatment Patterns and Outcomes**

**APPENDIX**

**Table A1. Number of LTCHs Based on New LTCH Payment System Start Date**

|  |  |
| --- | --- |
| **New LTCH Payment Criteria Start Date** | **Number of LTCHs** |
| October-December 2015 | 44 |
| January 2016 | 74 |
| February 2016 | 15 |
| March 2016 | 17 |
| April 2016 | 17 |
| May 2016 | 11 |
| June 2016 | 28 |
| After June 2016 | 226 |
| Total Number of LTCHs | 432 |

Source: Authors’ analysis of CMS LTCH Impact Files.

**Table A2. Pre- and Post-Criteria Periods for Treatment Group Cohorts**

|  |  |  |  |
| --- | --- | --- | --- |
| **Treatment Group Cohort** | **Criteria Start Date** | **Pre-Criteria Period** | **Post-Criteria Period** |
| 1 | Jan. 2016 | Oct.2015-Nov. 2015 | Jan. 2016-Feb. 2016 |
| 2 | Feb. 2016 | Nov. 2015-Dec. 2015 | Feb. 2016-Mar. 2016 |
| 3 | Mar. 2016 | Dec. 2015-Jan. 2016 | Mar. 2016-Apr. 2016 |
| 4 | Apr. 2016 | Jan. 2016-Feb. 2016 | Apr. 2016-May 2016 |
| 5 | May 2016 | Feb. 2016-Mar. 2016 | May 2016-June 2016 |
| 6 | June 2016 | Mar. 2016-Apr. 2016 | June 2016-July 2016 |

**Table A3. Estimation Results for Alternative High LTCH Propensity Populations**

|  |  |  |
| --- | --- | --- |
| **Outcomes** | **Top 30% (N=6,212)** | **Top 20% (N=4,233)** |
| **Pre-Criteria Level** | **Differential Change After New Criteria**  | **p-value** | **Pre-Criteria Level** | **Differential Change After New Criteria**  | **p-value** |
| **Discharge Destination After STACH Stay** |  |  |  |  |  |  |
|  LTCH | **0.1712** | **-0.0701** | **0.028** | 0.2049 | -0.0600 | 0.133 |
|  Other STACH | 0.0188 | -0.0025 | 0.806 | 0.0167 | 0.0033 | 0.783 |
|  IRF | 0.0294 | 0.0025 | 0.837 | 0.0267 | 0.0038 | 0.832 |
|  SNF | 0.3804 | 0.0265 | 0.561 | 0.3774 | 0.0438 | 0.448 |
|  HHA | 0.1857 | 0.0389 | 0.303 | 0.1756 | 0.0287 | 0.543 |
|  Hospice | 0.0723 | -0.0029 | 0.898 | 0.0690 | 0.0042 | 0.889 |
|  Home | 0.1035 | -0.0099 | 0.759 | 0.0883 | -0.0275 | 0.486 |
| **Rate of APR-DRG Severity of Illness 4** |  |  |  |  |  |  |
|  At LTCH | 0.3810 | -0.0414 | 0.813 | 0.4107 | -0.1178 | 0.505 |
|  At IRF | 0.2892 | -1.1481 | 0.580 | 0.3137 | N/A | N/A  |
|  At SNF | 0.3467 | 0.1026 | 0.192 | 0.3920 | 0.0321 | 0.700 |
|  At HHA | 0.3282 | -0.0149 | 0.900 | 0.3601 | 0.0341 | 0.862 |
|  At Hospice | 0.5502 | 0.3234 | 0.552 | 0.6667 | 0.1745 | 0.850 |
|  At Home | 0.2705 | -0.1805 | 0.552 | 0.2899 | -0.1233 | 0.856 |
| **Length of Stay STACH** | **8.9408** | **-0.9497** | **0.092** | 9.5022 | -0.5425 | 0.449 |
| **60-day mortality** | 0.2891 | -0.0290 | 0.446 | 0.3033 | 0.0037 | 0.938 |
| **60-day readmission rate** | 0.3285 | 0.0548 | 0.197 | **0.3183** | **0.1158** | **0.022** |
| **Sepsis rate in STACH** | **0.3509** | **-0.0380** | **0.093** | 0.3709 | -0.0185 | 0.539 |
| **Sepsis rate after discharge from STACH** | 0.1745 | 0.0395 | 0.199 | **0.1803** | **0.0751** | **0.058** |
| **Medicare spending** | 39,342.09 | -620.60 | 0.819 | 41,728.63 | 859.78 | 0.795 |

Source: Authors’ analysis of 2015-Q1 2017 Medicare claims data.

**ICD-9 Codes to Identify Severe Wound Cases in Fiscal Year 2015**

We used ICD-9 codes for the purpose of identifying STACHs that transferred at least three severe wound cases to LTCHs in Fiscal Year 2015. We developed the list of ICD-9 codes by translating the ICD-10 codes used in CMS’ severe wound definition using General Equivalence Mapping. Table A4 below presents the ICD-9 codes for severe wounds.

**Table A4. ICD-9 Diagnosis Codes Used in Identifying Severe Wound Cases in Fiscal Year 2015**

|  |  |
| --- | --- |
| **Condition** | **ICD-9 Diagnosis Codes** |
| Stage 3 Wound | 70723 |
| Stage 4 Wound | 70724 |
| Unstageable Wound | 70725; 9413\*; 9423\*; 9433\*; 9443\*; 9453\* |
| Non-Healing Surgical Wound | 9983\*; 9985\* |
| Fistula, including Osteomyelitis | 9986; 37561; 38381; 8640; 56981; 6191; 5100; 5227; 5274; 5374; 7198\* |

As a validation exercise for the list of ICD-9 codes, we calculated the frequency of severe wound cases in 2015 Q2 (based on ICD-9 coding) and the frequency of severe wound cases in 2016 Q2 (based on ICD-10 coding). We found the frequencies in the two quarters to be similar, validating the ICD-9 mapping of ICD-10 codes in CMS’ severe wound definition. Our findings are presented in Table A5 below.

**Table A5. Frequency of Severe Wound Cases in 2015 Q2 and 2016 Q2**

|  |  |  |
| --- | --- | --- |
|   | **ICD-9 in 2015 Q2** | **ICD-10 in 2016 Q2** |
|   | **Number of STACH Cases** | **Percentage of All STACH Cases** | **Number of STACH Cases** | **Percentage of All STACH Cases** |
| Stage 3 Wound | 15,636 | 0.62% | 16,571 | 0.68% |
| Stage 4 Wound | 14,885 | 0.59% | 14,916 | 0.61% |
| Unstageable Wound | 9,502 | 0.38% | 11,146 | 0.46% |
| Non-Healing Surgical Wound | 22,951 | 0.92% | 26,654 | 1.09% |
| Fistula, including Osteomyelitis |  7,366 | 0.29%  | 7,725 | 0.32% |

Source: Authors’ analysis of Medicare claims data.

**Study Cohort Construction**

The figure below illustrate our study cohort construction process.

**Figure A1. Study Cohort Construction**

Limit to Medicare beneficiaries who were discharged from the selected STACHs between October 1, 2015 and July 31, 2016.

Limit to Medicare beneficiaries treated for severe wounds in the STACHs.

Limit to Medicare beneficiaries with less than 3 days in an intensive care unit during their STACH stay.

Limit to Medicare beneficiaries who were continuously enrolled in Medicare FFS between LTCH admission and 180 days after LTCH discharge.

Exclude Medicare beneficiaries if they were discharged against medical advice, or admitted to a STACH for medical treatment of cancer, primary psychiatric disease or rehabilitation care discharged alive.

Limit to STACHs who had the majority of their LTCH severe wound transfers going to a single LTCH.

Limit to short-term acute care hospitals (STACHs) that transferred at least 3 severe wound cases to long-term acute care (LTCH) in Fiscal Year 2015.