# How to use professional fee ratio estimates with hospital discharge data

The professional fee ratio (PFR) reference estimates presented in the Supplemental Digital Content (SDC) files (SDC Table 3 and SDC Table 4) were designed to be directly applied to facility-only cost estimates from hospital discharge datasets.

**Which clinical classification should I use among available PFR estimates?**

PFR estimates should be selected and applied to hospital discharge data based on the clinical topic, available data, and analyst discretion.

The PFR estimates in the SDC Files offer an opportunity to apply PFR for commercially-insured or Medicaid hospital admissions or treat-and-release emergency department (ED) visits by:

* Annual overall (inpatient and ED): Table 3
* Major Diagnostic Category (MDC) (inpatient and ED): SDC Table 3 and SDC Table 4
* Diagnostic Related Group (DRG) (inpatient only): SDC Table 3
* Primary International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM) diagnosis, three-digit (inpatient and ED): SDC Table 3 and SDC Table 4
* Healthcare Cost and Utilization Project Clinical Classifications Software (HCUP-CCS) (inpatient only): SDC Table 3

PFR estimates by DRG and HCUP-CCS are preferred to primary ICD-9 code diagnosis, as such aggregated classifications efficiently account for clinical variations in patient experiences that are not captured by a primary ICD-9 diagnosis alone. In the situation that a clinical condition of interest is defined by primary ICD-9 diagnoses, it is recommended analysts identify patients for inclusion based on ICD-9 diagnoses and apply PFR based on patients’ accompanying DRG or HCUP-CCS, if available.

**What is the difference between model estimates by clinical classification reported in Table 1. Table 2, SDC Table 1, and SDC Table 2 versus SDC Table 3 and SDC Table 4?**

Model estimates in Table 1, Table 2, SDC Table 1, and SDC Table 2 for DRG and MDC refer to the association of those individual clinical classifications with PFR relative to other clinical classifications, and are not intended for direct application to hospital discharge data. For example, in SDC Table 1: controlling for listed factors, DRG 6 (LIVER TRANSPLANT W/O MCC) is associated with a lower PFR (i.e., a negative coefficient) per inpatient admission compared to reference category DRG 1 (HEART TRANSPLANT OR IMPLANT OF HEART ASSIST SYSTEM W MCC).

SDC Table 3 and SDC Table 4 report adjusted mean PRF estimates (controlling for all factors listed in SDC Table 1 and SDC Table 2, respectively, and generated by applying StataCorps 13 *margins* program to ordinary least square model estimates) by year, clinical classification, and insurance type for direct application to hospital discharge data as described below.

**How can I calculate total hospitalization cost using hospital discharge data and PFR estimates?**

Note that PFR should be multiplied by cost data, not charge data, from hospital discharge datasets; cost-to-charge ratios should be applied to facility-only charge data prior to using PFR estimates. The total cost of a hospital-based episode could be calculated using PFR as:

*Facility charge* \* *Cost-to-charge ratio* \* *Professional fee ratio (including probabilistic methods that make use of measures of dispersion—SE or 95% CI—when possible)*

Examples:

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| **Hospital discharge analysis data consists of** | **PFR options:**  Mean (Standard Error)  [95% Confidence Interval] |
| 1. All admissions, 2004. Insurance payer is known (i.e., commercial or Medicaid) but clinical classifications for the admissions are unknown. | * Use 2004 annual overall PFR, separate for commercially-insured and Medicaid admissions.   + Where to find it: Table 3, admissions, 2004 – Commercial = 1.342 (0.000) [1.341,1.343], Medicaid = 1.211 (0.002) [1.207,1.214] |
| 1. All admissions, 2005, for DRG=418. Insurance payer is known (i.e., commercial or Medicaid). | * Use 2005 DRG-specific PFR for DRG 418, separate for commercially-insured and Medicaid admissions.   + Where to find it: SDC Table 3 admissions – Commercial = 1.122 (0.003) [1.117,1.127], Medicaid = 1.083 (0.004) [1.076, 1.090] |
| 1. All admissions, 2006, for patients with injuries. Primary ICD-9-CM codes are known but missing for many observations, DRG is unknown. Insurance payer is known (i.e., commercial or Medicaid). | In order of preference:   * Use 2006 ICD-9-CM code-specific PFR, separate for commercially-insured and Medicaid admissions.   + Where to find it: SDC Table 3 admissions – Multiple PFR depending on primary ICD-9-CM codes. * Use 2006 MDC=21 code for *Injuries, Poison, and Toxic Effect of Drugs* separate for commercially-insured and Medicaid admissions.   + Where to find it: SDC Table 3, admissions – Commercial = 1.208 (0.003) [1.201, 1.214], Medicaid = 1.142 (0.002) [1.138, 1.147] * Use 2006 annual overall PFR, separate for commercially-insured and Medicaid admissions.   + Where to find it: Table 3, admissions – Commercial = 1.336 (0.000) [1.335,1.337], Medicaid = 1.196 (0.000) [1.195,1.197] |