Methods
Calculating Readmissions for HCUPnet

This document provides details on the methods used to calculate readmissions for HCUPnet. The definition of readmissions used for this analysis follows the methods developed for measuring all-payer readmissions for the Partnership for Patients.[1]

Definition of Readmissions

A **readmission** is a subsequent hospital admission in the same or a different hospital within 30 days following an original admission (or index stay). The discharge date for the index stay must occur between January and November to allow a 30-day follow-up period for all index stays. This approach captures an index stay with a discharge date in November and a readmission in December.

The **30-day readmission rate** is defined as:

That is, when a patient is discharged from the hospital (the index stay), they are followed for 30 days in the data. If any readmission to the same or a different hospital occurs during this 30-day time period, the index stay is counted as having a readmission. No more than one readmission is counted within the 30-day period since the outcome measure assessed here is "percentage of admissions with a readmission." When there was more than one readmission in the 30-day period, the data reported reflect the characteristics and costs of the first readmission.

Index Stays

Every qualifying hospital stay is counted as a separate index admission, which is the starting point for follow-up to check for readmissions. Thus a single patient can be counted multiple times and can have multiple index stays during the course of the January to November observation period.

Index stays do not require a prior "clean period" with no hospitalizations; that is, a hospital stay may be both a readmission for a prior stay and the index admission for a subsequent readmission.

Admissions were not considered index admissions if they could not be followed for 30 days for any of the following reasons:

1. Admissions in which the patient died in the hospital,
2. Admissions missing information on length of stay, or
3. Admissions discharged in December.

Index stays for patients younger than 1 year (age=0) were excluded because patient identifiers are inconsistently reported for these patients.

Transfers

Transfers are not counted as readmissions. Instead, the readmission analysis file includes "combined transfer records." If a patient was transferred to a different hospital on the same day or was transferred within the same hospital, the two events were combined as a single stay and the second event was not counted as a readmission.

The combined transfer record retains the diagnoses from the latter discharge and combines the length of stay and total hospital charges and costs from the two discharges. Admission source, point of origin, and discharge disposition are not used in the identification of transfers.

Nationwide Readmissions Database

The HCUP Nationwide Readmissions Database (NRD) is a calendar-year, discharge-level database constructed from the HCUP State Inpatient Databases (SID) with verified patient linkage numbers that can be used to track a person across hospitals within a State. The NRD is designed to support various types of analyses of national readmission rates. The database includes discharges for patients with and without repeat hospital visits in a year and those who have died in the hospital. Repeat stays may or may not be related. The criteria to determine the relationship between hospital admissions is left to the analyst using the NRD. The NRD was constructed as a sample of convenience consisting of 100 percent of the eligible discharges. Discharge weights for national estimates are developed using the target universe of community hospitals (excluding rehabilitation and long-term acute care hospitals) in the United States. Over time, the sampling frame for the NRD will change; thus, the number of States contributing to the NRD will vary from year to year. The NRD is intended for national estimates only; no regional, State-, or hospital-specific estimates can be produced.

National Estimates

Records were weighted to produce national estimates. Weights for national estimates were developed using post-stratification on hospital characteristics (census region, urban-rural location, teaching capabilities, bed size, and control/ownership) and patient characteristics (sex and five age groups [0, 1-17, 18-44, 45-64, and 65 years and older]).

Study Population

The study population in the NRD and readmission analysis files included discharges from community hospitals, excluding rehabilitation and long-term acute care (LTAC) hospitals.

Readmissions across State Boundaries

Readmissions can occur at any hospital within a given state in the database. Readmissions that cross state boundaries cannot be linked because state databases employ different synthetic patient identifiers.

However, discharges for patients who reside in another state are included in the analysis if they are treated at a community hospital, excluding rehabilitation and LTAC hospitals.

The investigation of states with large *inflows* of patients revealed that most of the hospitals involved are close to state borders and most of the border-crossing patients reside in adjacent states. The investigation of states with large *outflows* of patients revealed that residents are seeking treatment from hospitals in neighboring states. The inclusion of stays for nonresidents assumes that border hospitals treat patients in their community and that in some cases, the community crosses states borders. Therefore, their readmission rates should not be biased by the inflow and outflow of patients.

Summary of Inclusions/Exclusions from the NRD and Readmission Analysis Files

- Only community hospitals that are not rehabilitation or LTAC hospitals are included. This includes academic medical centers and public hospitals. Excluded are non-federal, psychiatric, substance abuse, long-term, nonacute care, and rehabilitation hospitals because not all states include such hospitals.
- Discharges younger than 1 year (age 0) are excluded because patient identifiers are inconsistently reported for these patients.
- Discharges with unverified or missing patient identifiers are excluded because they could not be tracked across hospitals and time.
- All discharges for patient linkage numbers with an apparently high volume of readmissions (20 or more visits in the year) are excluded because the patient identifiers are questionable, (i.e., there is a greater likelihood that these patient identifiers are not unique to an individual).
- All discharges for patient linkage numbers that have a discharge status of "dead" at some point in the data but return to a hospital in a subsequent admission are excluded.
- All discharges for patient linkage numbers with overlapping inpatient stays are excluded because the patient identifiers are questionable (i.e., there is a greater likelihood that these patient identifiers are not unique to an individual).
- Discharges from hospitals with more than 50 percent of their total discharges excluded for any of the above reasons because patients treated at these hospitals could not be reliably tracked over time.

Example: Calculating 30-day Readmission Rates

Consider a patient discharged alive on January 10, January 20, January 26, and March 30. Each admission is considered an index.

- January 10 is the first index admission.
- January 20 qualifies as a 30-day readmission for the January 10th index. It is also an index.
- January 26 qualifies as a 30-day readmission for the January 20th index. It is also an index.

- March 30 is an index admission, but does not qualify as a readmission because it does not fall within 30 days of another index.

The 30-day readmission rate is 50% because there are two 30-day readmissions for the four index admissions.

Example: Calculating 30-day Readmission Charge/Cost

Consider a patient discharged alive on January 10, January 20, January 26, and March 30.

- Each discharge is considered an index.
- January 20 and January 26 are readmissions.
- Average charge/cost of readmissions is the average of the non-missing total charge/cost for the two readmissions.

Reporting Categories for Readmission Estimates

The age category is assigned based on the HCUP data element AGE. Sex is determined by the HCUP data element FEMALE. Median income is from the HCUP data element ZIPINC_QRTL. The location of the patient residence is based on the HCUP data element PL_UR_CAT4 and defines urban by the Urban Influence Code (UIC) designation of large and small metropolitan areas with all other areas categorized as rural. The payer category is assigned using the primary and secondary expected payer (HCUP data elements PAY1 and PAY2). If the primary or secondary expected payer indicates Medicare, then the payer category is assigned to Medicare. This categorization includes patients who are dually-eligible for Medicare and Medicaid under Medicare. If not Medicare and the primary or secondary expected payer indicates Medicaid, then the payer category is Medicaid. If not Medicare or Medicaid and the primary or secondary expected payer indicates private insurance, then the payer category is Private. If not Medicare, Medicaid, or Private and the primary expected payer indicates self-pay or no charge, then the payer category is Uninsured. Stays for other types of payers are not reported on HCUPnet because this is a mixed payer group with small numbers. The data elements PL_UR_CAT4 and PAY2 are not available on the NRD.

The reporting category is assigned at the index stay. Therefore, readmission counts and costs are specific to the expected payer from the index stay. The concordance between the expected payer coded at the index stay and at readmission can vary by payer: 98.0 percent for Medicare, 95 percent of Medicaid, 93 percent for private, and 80 percent for the uninsured (percentages based on the 2013 NRD).

Details on Data Display for HCUPnet

HCUPnet reports national estimates of the percentage of index admissions with at least one readmission within 30 days following discharge. Because index stays are observed from January to November, national estimates are not annual estimates, i.e., the information on **numbers** of discharges and readmissions is not the total number of readmissions for the year.

The definition of readmissions does not use risk adjustment or diagnostic exclusions (e.g., cancer, trauma, maternal, neonatal, planned readmissions). Readmission rates are stratified by age, gender, expected primary payer, community income quartile for the patient's ZIP Code, and urban/rural location of the patient.

Suppression of data for small cell sizes. Data are provided only for diagnosis/procedure categories with 5,000 or more weighted index stays. Within tables displayed, if there are fewer than 500 <u>unweighted</u> total index cases in a row, the statistics for the entire row are suppressed (*). If there are fewer than 500 <u>weighted</u> cases in a cell (i.e., the specific type of readmission), the statistics for that type of readmission are suppressed (*).

Diagnosis and procedure reporting. Readmission rates are reported by various diagnostic and procedural groups based on the index admission. The type of readmission reported in the tables varies by the type of index stay:

- Principal diagnosis based on the Clinical Classification Software (CCS)
  - Readmission for the same principal diagnosis CCS
  - Readmission for any cause (no exclusions)
- Diagnosis Related Group (DRG)
  - Readmission for the same DRG
  - Readmission for any cause (no exclusions)
- Major Diagnostic Category (MDC)
  - Readmission for the same MDC
  - Readmission for any cause (no exclusions)
- All Listed major operating room procedure (CCS)
  - Readmission for any cause (no exclusions)

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[1] 2012 Annual Progress Report to Congress on the National Strategy for Quality Improvement in Health Care (National Quality Strategy). http://www.ahrq.gov/workingforquality/nqs/nqs2012annlrpt.htm(accessed November 1, 2012).