

Text, Supplemental Digital Content 2: Case Mix Factor Analysis

We developed hospital level covariates for case-mix adjustment using factor analysis on “Base-DRGs”*. For the all inpatient population, we had 32 million patient stays across 3,504 hospitals. We created a hospital level dataset with indicators for each of 319 Base-DRGs to reflect whether the hospital has any cases of this type. We then performed a basket analysis to identify groups of Base-DRGs that tend to occur together in a hospital. We did this by first generating the correlation matrix of observed Base-DRG indicators, using principal components analysis to select the number of factors, and then factor analysis. We identified 10 factors, each representing a grouping of Base-DRG codes that tend to occur together in a hospital. At the patient level, we used an indicator for the factor into which the patient falls and used these indicators as patient effects in the multilevel modeling. At the hospital level, we calculated the percent of cases in each Base-DRG factor and used these as hospital fixed effects in the multilevel modeling. We did this for all inpatient, surgical, and non-surgical populations

*Example of the Base -DRG generation for DRG codes 656, 657, 658

656 KIDNEY & URETER PROCEDURES FOR NEOPLASM W/MCC**

657 KIDNEY & URETER PROCEDURES FOR NEOPLASM W/CC**

658 KIDNEY & URETER PROCEDURES FOR NEOPLASM W/O CC/MCC**

are represented by Base-DRG 658: KIDNEY & URETER PROCEDURES FOR NEOPLASM
**w/CC (with complication or comorbidity); w/MCC (with major complication or comorbidity);
without CC or MCC

Table X All Inpatient Base-DRG Factors

f1: general

f2: lower procedures, hip & joint, mastectomy, skin graft, other

f3: transplant/ implant

f4: HF, pneumonia, kidney & UTI infections, collaps, renal failure

f5: major cardiovascular or other procedure

f6: coronary bypass/ cardiac/ cath & stent

f7: trauma/ chest pain

f8: major joint/ hip/ knee

f9: burns

f10: fusion

N = 32,029,307 All Medpar patient stays 2009 - 2014 at 3,504 hospitals

Table X Surgical Base-DRG Factors

f1: general

f2: general + eye/ ear/ nose/ mouth/ other

f3: pneumonia/ HF/ major failure/ infection/ G.I. obstruction

f4: transplant

f5: coronary bypass/ cardiothoracic procedure/ cath

f6: cardiovascular/ cath

f7: major joint/ limb/ extremity

f8: major bowel/ cholecystectomy

f9: drug abuse/ neuroses/ behavioral

f10: burns

f11: fusion

f12: prostatectomy/ urinary

N = 18,956,717 Surgical patient stays 2009 - 2014 at 3,503 hospitals

Table X Non-surgical Base-DRG Factors

f1: disorders, disease, general/ complications, fracture, sprain, strain and dislocation

f2: chemo, spinal disorders, HIV, ear, nose, mouth & throat malignancy, eye, dialysis, burns

f3: pneumonia, HF, kidney & UTI infections, general, pulmonary/ GI obstruction, renal failure, diabetes

f4: chest pain/ syncope & collapse

f5: neuroses & disorders

f6: AMI, discharged alive

f7: rehab

N= 13,072,590 Non-surgical patient stays 2009 - 2014 at 3,504 hospitals