Table A2. Study characteristics

| **Author (Year)** | **Intervention** | **Design** | **Provider Locations (n)** | **Study enrollment (n)** | **Controls included for multivariate analyses** | **Assessment of Methodological Quality** |
| --- | --- | --- | --- | --- | --- | --- |
| Abt Associates (1997) | Medicare Cataract Surgery Alternate Payment Demonstration | Observational | 4 | Total: 5,343 Intervention: 4,565 | None | Poor: small sample, non-representative/ self-selected sites, contrived comparison group, overall poor control for secular trends/confounders |
| Afendulis  (2011) | Medicare SNF PPS | Observational | NR | 507,350 | Patient characteristics: age, gender, and race; 30 risk-adjustment variables (Elixhauser et al., 1998); total prior year Medicare inpatient spending. Health care market at baseline (by 3-digit Zip Code): percent of SNF beds integrated with a hospital; percent hospital beds by ownership status, facility size, teaching status, and system membership; percent SNF beds by ownership status and facility size; number SNF beds per population aged 66 or older; Herfindahl-Hirschman indices of hospital and SNF competition. Area-level measures of the generosity of Medicare reimbursement for both hospital and SNF services. | Fair |
| Anderson (2005) | Medicare Home Health (HH) Prospective Payment System (PPS) | Observational | 1 | Total: 144 Intervention:76 | None | Poor: Large differences between pre & post groups |
| Brizioli (1996) | Italy inpatient prospective payment | Descriptive | 4 | Total: 1,987 Intervention: 1,056 | None | Poor: descriptive, no apparent control for secular trends, small sample and short study period (one year before and after change) |

| Table A2. Study characteristics (continued) | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Author (Year)** | **Intervention** | **Design** | **Provider Locations (n)** | **Study enrollment (n)** | **Controls included for multivariate analyses** | **Assessment of Methodological Quality** |
| Buntin (2009) | Balanced Budget Refinement Act of 1999 (in aggregate; implements PPS for HH, Skilled Nursing Facility [SNF], and Inpatient Rehabilitation Facility [IRF]) | Observational | NR | Total: 4,717,315 Intervention: NR | Time trend, policy implementation variables, demographics (age, gender, Medicaid coverage, race, residence (MSA), urban/rural status, comorbidities and complications); discharging hospital characteristics (case average daily census, teaching status, ownership, Medicare patient percentage, case mix index, low-income percentage). | Fair |
| Casale (2007) | Geisinger ProvenCare | Observational | 3 hospitals | Total: 254 Intervention: 117 | None | Fair |
| Cheh  (2001) | Medicare HH PPS Demonstration | Trial randomized at agency level | 91 agencies (48 treatment, 43 control) | Approx. 114,000 | Patient data (patient health and functioning), agency data, market-area data | Fair |
| Chen (2000) | Taiwan inpatient PPS (TPPS) | Descriptive | 1 | Total: 199 Intervention: 99 | None | Fair |
| Chen (2002) | Medicaid SNF PPS | Observational | 4,635 | Total: NR Intervention: NR | Output (patient days by payer); wages, quality of care and quality of life measures; case-mix (based on ADL data); ownership type; geographic and market characteristics, staffing | Poor: descriptive, pre-post with no control for secular trends or confounds |
| Coburn (1993) | Maine Medicaid nursing home PPS | Observational | 103-139 per year (762 facility-years) | Total: NR Intervention: NR | Nursing home size (# beds), ownership (non-profit/for-profit & chain/non-chain), facility type (ICF only or multi-level), occupancy rate, Medicaid share of total inpatient days, case-mix (3 measures), nursing intensity (in hours per patient day), quality of care (3 measures), bed supply (per 1000 pop =>age 65 in market area) | Fair |
| Collins (2007) | Medicare SNF PPS | Descriptive | 1 hospital-based HHA in the Scranton/Wilkes-Barre area of PA | Total: 39 Intervention: 25 | None | Poor: Small n, four year gap between pre/post, no attempt to address changes over time, or confounders, ambiguous quality metrics. |
| Cromwell (1998) | Medicare Participating Heart Bypass Center Demonstration | Observational | 7 | Varies by analysis. 10,572 in intervention and 64,178 for control group in some main analyses | Generally: Changes in case mix. | Fair |
| Davitt (2008) | Medicare HH PPS | Observational | 22 medical directors for survey component; 24,852 (year-HH agency obs, universe active in each of three periods) | Total: NR Intervention: NR | None | Poor: Small non-representative sample for qualitative interviews, no controls in quantitative analyses. |
| DeJong (2005) | Medicare IRF PPS | Observational | 3 | Total: 539 Intervention: 304 | Univariate for relevant outcomes | Fair |
| Dobrez (2010) | Medicare IRF PPS | Observational | 132 | Total: 98,151 Intervention: 44,634 | Patient chars (age, gender, admission motor and cognitive function on FIM); facility chars (census region indicators, urban/rural, ownership, free standing vs unit), quarterly time trend | Fair |
| Eaton (2005) | Medicare HH PPS | Observational | NR | Total: 555 Intervention: NR | Univariate: Comorbidities directly related to tissue and wound healing; Diagnoses: diabetes, circulatory deficiencies, nutritional deficiencies, paralysis of any type, muscle-related chronic illness, and immune deficiencies; home environment/caregiver support; home sanitation | Poor: Tracked outcomes for a single cohort of patients across two consecutive time periods. |
| Ellis (1996) | NH Medicaid IPPS | Observational | 28 hospitals | Total: 13,704 Intervention: 3,204 | Demographic variables (patient’s sex, age group [classified into four categories], race [coded using a dummy for nonwhite]and the average per capita income in the patient’s town in 1990 as a proxy for the patient’s own average income), provider dummies, and time dependent variables | Fair |
| Farrar (2009) | England NHS Payment by Results | Observational | 297 (England: 248, Scotland:49) | Total: NR Intervention: NR | Fixed effects for HRGs and hospital trusts,and interaction for each combination of HRGs and trusts | Fair |
| FitzGerald (2006) | Medicare HH PPS | Observational | NR | Total: 2,800,000 Intervention: 10,000 | Time trend, policy indicators, **patient** covariates (age, gender, race, SES, state aid, reason for Medicare, comorbidities, surgical characteristics); **institutional** covariates/SNF (teaching status, profit status, relative size, day of discharge, urban/rural); **home health** covariates (profit status, age of agency, CON flag); **regional** covariates (beds, providers per capita, mco penetration, CMS region, postacute care supply, Medicare managed care market penetration) | Fair |
| FitzGerald (2009) | Medicare HH PPS | Observational | NR | Total: 2,800,000 Intervention: NR | Patient: age, gender, race, SES, receipt of state aid, reason for Medicare entitlement, Charlson comorbidity index, surgical characteristics. Institution: teach status, proft status, day of discharge, relative size, rural/urban. HH: profit status, agency age, operating under CON or simple business licensure. Region: zip code % population age 65+, county managed care penetration rate, CMS region indicator; Monthly time trend. | Fair |
| Frymark (2005) | Medicare IRF PPS | Observational | 96 | Total: 13,863 Intervention: 2,631 | FCM scores, details about patient demographics, diagnosis, service delivery and amount, frequency and intensity of services, FIM scores at admission, FIM scores at discharge, and the patient’s discharge disposition | Fair |
| Gillen (2007) | Medicare IRF PPS | Observational | 1 | Total: 945 Intervention: 409 | None | Poor: Single hospital, 8.5 years between pre/post, obvious differences in baseline chars. |
| Grabowski (2011) | Medicare SNF PPS | Observational | 17,554 | Total: 496,049 Intervention: 292,669 | Person-level covariates: Age, sex, race, marital status, education, Medicare Part B coverage, ADL score, fall, fracture, hip fracture, stroke, hypertension, cancer, COPD, depression, resists care. Facility-level covariates: hospital-based facility, chain member facility, profit status, government facility, number of beds. Time trend. | Good: Robust DDD identification strategy; comprehensive data; careful accounting of payment level changes accompanying PPS, robust sensitivity analyses, good controls for confounding. |
| Hasegawa (2011) | Japan outpatient hemodialysis bundling | Observational | 53 | Total: 3,206 Intervention: 1,622 | None, but potential confounders discussed (e.g., dose trends, case mix changes) | Fair |
| Hutt (2001) | Medicare SNF PPS Demonstration | Observational | 35 facilities in 3 states | Total: 2,067 Intervention: NR | Case mix and other nonspecified patient factors (state, clinical and demographic risk factors) | Fair |
| Johnson  (1994) | Michigan arthroscopic surgery bundling pilot | Descriptive | 1 | 111 | None | Poor: Descriptive study with small, selected sample of patients and providers. |
| Konetzka (2004) | Medicare SNF PPS | Observational | 18,134 | Total: Intervention: NR | State fixed effects, time (year) fixed effects, facility characteristics such as ownership(for-profit, government, chain, hospital-based), size (# of beds, % private pay), level of care and resident case mix; availability of ventilator care, physical therapy, and occupational therapy; skilled services provided; % of residents with depression, psychiatric diagnoses, and dementia; county economic and demographic factors such as the level of competition, income, and population density. | Fair |
| Konetzka (2006a) | Medicare SNF PPS | Observational | 1,406 | Total: 262743 Intervention: NR | Resident-level severity controls (age, gender, a group of diagnoses, dependence in Activities of Daily Living [ADLs] and a validated measure of cognitive functioning called the Cognitive Performance Score; Facility fixed effects; Time fixed effects | Fair |
| Konetzka (2006b) | Medicare SNF PPS | Observational | 1,704 | Total: 395,264 Intervention: NR | Patient: age, gender, comorbidity, ADLs, Cognitive Performance Score, Medicare payer status (at the individual level). Facility fixed effects. | Fair |
| Kulesher (2006) | BBA changes broadly, including Medicare HH PPS and SNF PPS | Descriptive | NR | Total: NR Intervention: NR | None | Poor: A collection of various univariate analyses. Does not control for obvious confounders. |
| Lapane (2004) | Medicare SNF PPS | Observational | 524 | Total: 8,149 Intervention: 5,209 | Individual characteristics: (age, race/ethnicity; comorbidities; number, CVD, stroke, HTN, DM); measures of physical, social and cognitive functioning (ADL, CPS); SNF characteristics: (ownership, chain membership, number of beds, payer mix) | Poor: Adequate controlling for patient and SNF characteristics, but no attempt to address changes in prescription rates over time. |
| Lapane (2006) | Medicare SNF PPS | Observational | 1,226 | Total: 10,331 Intervention: 5,243 | Gender, age, physical condition and cognitive impairment levels, comorbidities, SNF beds, ownership, occupancy rates, Medicare and Medicaid share, staffing, service availability indicators | Fair |
| Lin (2005a) | Medicare HH PPS | Observational | 69 of 83 rural PA HHA’s in survey; 10 rural HHA’s in data analysis | Total: 12,720 Intervention: 6,995 | None | Poor: Use of survey data, many details missing, no discussion of potential confounders, graphs and text are inconsistent. |
| Lin (2005b) | Medicare HH PPS | Observational | Structured interviews: n=68; microdata analysis: 10 rural HHAs in northwest PA for detailed analysis and all designated ‘rural’ HHA’s in PA for “macro-level” analysis | Total: NR Intervention: NR | None | Fair |
| McCue (2006) | Medicare IRF PPS | Descriptive | 146, 120 transitioning to PPS in 2002, 26 which stayed with cost-based | Total: NR Intervention: NR | None | Poor: Inadequate follow-up post intervention (1 fiscal year); descriptive with significant differences between control and intervention groups in pre period. |
| Menke (1998) | Department of Veterans’ Affairs Resource Allocation Methodology (RAM) | Observational | 172 | Total: NR Intervention: NR | Patient: age, gender, race, married, military cohort, service-connected disability, discharge destination, comorbidities. Hospital: teaching status, beds, urban/rural, region. Market: beds, MDs, HMO members. | Fair |
| Murray (2005) | Medicare SNF PPS | Observational | 940 | Total: 68,575 Intervention: 61,569 | 109 variables including demographics, insurance status, frequency of family contacts, mental health and dementia measures, communication ability, vision, level of daily activities, functional status, continence, pressure ulcers, pain, BMI, comorbidities, body control and contracture, medical stability. | Fair |
| Murtaugh (2003) | Medicare HH PPS | Descriptive | NR | Total: (1997-2001): 144,725 (2000-2001): 50357 Intervention: 24453 | None | Poor: Descriptive: short duration/only covers first year of PPS; poorly controlled for secular trends/confounding variables. |
| Nayar (2008) | Medicare LTACH PPS | Observational | 212 | Total: NR Intervention: NR | Hospital chars (ownership, payer mix, beds, teaching indicators, discharges); market chars (population, income, concentration), time trend | Fair |
| Paddock (2007) | Medicare IRF PPS | Observational |  | Total: 809,544 Intervention: 446,002 | Patient characteristics (age, gender, race, number of acute care stays in 6 mos prior to IRF, complications and comorbidities), facility and geographic chars for referring acute care hospital (average daily census, case-mix index, Medicaid util rate, low-income patient proportion, beds, wage index, urban/rural status, state or census region), Medicare share | Fair |
| Perelman (2007) | Belgian inpatient non-medical PPS | Observational | 125 | Total: 11,633,227 Intervention: NR | Age group, diagnosis related groups, death and transfer rates, low and high SES percentages, time trend, cost sharing percent for hospitals for excessive days | Fair |
| Qu (2011) | Medicare IRF PPS | Observational | 12 | Total: 3,406 Intervention: 296 | Trend in LOS, patient age, level of neurologic impairment, admission motor FIM score | Fair |
| Rosenthal (1999) | Case Rate for managed behavioral health care | Observational | 26 in experimental group (unspecified number of controls) | 21,673 | Patient characteristics identifying severity of illness; provider characteristics including dollar amount of case rate, share of revenue from fee-for-service, use of intense utilization review, staffing model, compensation model | Fair |
| Rosenthal (2000) | Case Rate for managed behavioral health care | Observational | 26 in experimental group (unspecified number of controls) | 49,463 episodes | Patient characteristics: age, gender, primary beneficiary, diagnosis, episode utilization, prior chemical dependency utilization, prior inpatient utilization. Provider characteristics: staffing model, provider size, compensation model, use of utilization review, proportion of revenue received via FFS contracts | Fair |
| Schlenker (2005) | Medicare HH PPS | Observational | NR | Total: 164,810 Intervention: 28,806 | 37 risk factors used in CMS outcome reports | Fair |
| Shah (2007) | Medicare IRF PPS | Observational | 4 (all affiliated with a midwestern network of inpatient and outpatient rehabilitation centers and have distinct case-mix characteristics) | Total: 8,082 Intervention: 4,806 | Respondent type (patient vs. proxy), age, gender, functional gain (based on FIM), and discharge destination | Poor: The patient sample is large, but they’re taken from a small number of related provider institutions. In that sense, it’s probably not representative. |
| Sood (2008) | Medicare IRF PPS | Observational | 1,145 | Total: 430,539 Intervention: NR | Demographics (age, gender, race, MSA, rural/urban); health status (comorbid condition #, complication #, any comorbid indicator, any complication indicator); condition-specific factors (various indicators and severity factors). IV to disentangle avg from marginal payment effects. | Good: Solid theoretical foundation, strong instrumental variables identification strategy to disentangle effect of marginal versus average reimbursement on costs. |
| Stromberg (1997) | Sweden inpatient PPS | Descriptive | 5 | Total: 2,331 Intervention: 1,271 | None | Poor: Descriptive without discussion of potential confounders. |
| Tsai (2005) | Taiwan’s Bureau of National Health Insurance’s case payment system | Observational |  | Total: 23,638 Intervention: 13,073 | Hospital type (size), sex, comorbidy/complications indicators, secondary procedures. | Fair |
| Vos (2010) | Netherlands inpatient prospective payment | Observational | 96 hospitals surveyed, 62 responded | Total: Intervention: NR | None | Poor: Cross-sectional survey, no adjustment for confounders, the intervention is poorly specified, self-reported data, and the relationship between the items measured through the survey and the intervention itself isn’t clear. |
| Wen (2008) | Taiwan hospital case payment | Observational | 3 | Total: 22,327 Intervention: 14,928 | age, number of diagnoses, gender, hospital indicators, procedure indicators | Fair |
| White (2003) | Medicare SNF PPS | Descriptive | 9,748 | Total: 3,490,000 Intervention: NR | Market competition, ownership status, Medicare resident fraction, state dummies | Poor: Descriptive: pre-post analysis, no controls or discussion of potential confounders. |
| White (2005) | Medicare SNF PPS | Observational | all Medicare hospitals and nursing facilities | Total: 41,000,000 Intervention: 6,444,800 | None | Fair |
| Wodchis (2004a) | Medicare SNF PPS | Observational | SNF’s in Michigan and Ohio | Total: 106,126 Intervention: 39,140 | Patient: admission age, gender, admission from hospital, admission from SNF, diagnoses, use of indwelling catheter, tube feeding, and oxygen therapy. Facility: occupancy rate, % of facility residents who were Medicare; % who were Medicaid, profit status, hospital-based. Market: competition. Time trend. | Fair |
| Wodchis (2004b) | Medicare SNF PPS | Observational | NR | Total: 99,952 Intervention: 43,805 | Resident controls (diagnoses, functional comorbidity, age, gender, discharge expected within 90 days, staff prognosis, ADL/CPS score) | Fair |
| Yip (2002) | Medicare SNF PPS | Observational | 3 | Total: 214 Intervention: 94 | Demographic characteristics (age and sex), risk factors (primary diagnosis [orthopedic, stroke, and other diagnoses such as shingles, pneumonia, cellulitus, chronic renal failure, gastric ulcer], number of comorbidities, mental summary and hospital length of stay, setting, and payment mechanism. | Poor: Small sample. |
| Zhang (2008) | Medicare SNF PPS | Observational | 8,361 | Total: NR Intervention: NR | Resident acuity, nursing home deficiency citations, CMS regions, hospital wage index, CPI, organizational factors (RN/resident day, RN/total nursing personnel, ownership, chain membership, % Medicare and Medicaid residents, size, occupancy rate), market factors (competition, average Medicaid reimbursement rate) | Fair |
| Zinn (2008) | Medicare SNF PPS | Observational | 9,817 | Total: NR Intervention: NR | Facility fixed effects. Facility interactions: profit status, chain affiliation, bed size. Area factors: Medicaid rate (state), Herfindahl index (county), avg. no. of empty nursing home beds (county), ratio of RNs to hospital beds (county), ratio of LPNs to hospital beds (county), % MCO penetration (county), per capita income (county), area wage index (county). Facility acuity index. Year dummies. | Fair |