

The ultimate guide to writing manuscripts

version 11/15/16

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1. Model papers

The following are models of policy-relevant papers that have been published in clinical journals:

- Hospital engagement in value-based reforms and performance in the Hospital Readmission Reduction Program
- Dimick's bariatric surgery coverage decision article:
<http://jamanetwork.com/journals/jama/fullarticle/1656253>
- Chad's MA insurance expansion article:
<https://www.ncbi.nlm.nih.gov/pubmed/24988945>
- Implications of the Definition of an Episode of Care Used in the Comprehensive Care for Joint Replacement Model:
<http://jamanetwork.com/journals/jamasurgery/fullarticle/2556172>
- McWilliams, ACO NEJM: <http://www.nejm.org/doi/full/10.1056/NEJMsa1600142>
- Jha, The Long-Term Effect of Premier Pay for Performance on Patient Outcomes: The Long-Term Effect of Premier Pay for Performance on Patient Outcomes
- Nyweide, JAMA Association of Pioneer Accountable Care Organizations vs Traditional Medicare Fee for Service With Spending, Utilization, and Patient Experience: <http://jamanetwork.com/journals/jama/fullarticle/2290608>
- Adrion, Out-of-Pocket Spending for Hospitalizations Among Nonelderly Adults: <http://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2530418>
- Ellimottil Medicare's New Bundled Payment For Joint Replacement May Penalize Hospitals That Treat Medically Complex Patients:
<http://content.healthaffairs.org/content/35/9/1651.abstract?=&right>
- Layton, "Higher Incentive Payments in Medicare Advantage's Pay-for-Performance Program Did Not Improve Quality But Did Increase Plan Offerings": <http://onlinelibrary.wiley.com/doi/10.1111/1475-6773.12409/epdf>

2. Generating a structure for the paper

Assuming that you've got a solid idea for a paper, the next step is figuring out the basic structure for the paper. The most straightforward way to do this is to draft the abstract. Do this before performing any analysis or considering results displays. The abstract includes:

- Background / importance
- Objective
- Design, Setting, and Patients
- Main outcome measures
- Results
 - these won't be known, but you can leave placeholders for parameter estimates: E.g. Hospital Value-Based Purchasing was associated with an X change in mortality (95% CI:...), a Y change in clinical process performance (95% CI:...), and a Z change in patient experience (95% CI:...).
- Conclusions and relevance
 - again, these won't be known in advance, but you can leave a placeholder

ABSTRACTS (INSTRUCTIONS)

Abstract body structure

Title – use a short, catchy title. Aim for a title that conveys the main message of the results

Intro – 2 sentences

1. Compound sentence with comma. First half of sentence describes the scope of the problem, then describe the tension
2. Describe what you did

Methods – 4 sentences

1. Study population
2. Key exposure variable
3. Key outcome variable
4. Analysis

Results – 4 sentences, parallel the structure of the methods

1. Study population results
- 2-3. Exposure and outcome variable results
4. Analysis results

Conclusions – 2 sentences

1. Main finding
2. Implications of findings

Figure

Focus on the principle finding

Judiciously use footnote to describe the advanced components of the model

Don't bother with a "table 1" describing study population

Other key points

Limit or eliminate abbreviations

Avoid advocacy

Avoid "further analyses are underway"

Try to avoid low "n" submissions

ABSTRACT (SAMPLE)

Background

- 1-2 sentences *Previously uninsured adults who enroll in the Medicare program at the age of 65 years may have greater morbidity, requiring more intensive and costlier care over subsequent years, than they would if they had been previously insured.*

Methods

- Sentence 1 (data) *We used longitudinal data from the nationally representative Health and Retirement Study to assess self-reported health care use and expenditures from 1992 through 2004 among 5158 adults who were privately insured or uninsured before Medicare coverage began at the age of 65 years.*
- Sentence 2 (analytic method) *We used propensity-score methods to compare healthcare use and expenditures for previously insured and uninsured beneficiaries who were similar across numerous characteristics at 59 to 60 years of age and adjusted for differences in supplemental and prescription-drug coverage after 65 years of age.*

Results

- Sentence 1 (Finding 1 which includes "n") *Among 2951 adults with hypertension, diabetes, heart disease, or stroke diagnosed before 65 years of age, previously uninsured adults who acquired Medicare coverage at the age of 65 reported significantly greater increases in the numbers of doctor visits ($P < 0.001$) and hospitalizations ($P = 0.001$) and in total medical expenditures ($P = 0.02$) than did previously insured adults.*

- Sentence 2 (Finding 2) *Significant differential increases were not evident among the 2207 adults without these conditions ($P > 0.12$ for all comparisons).*
- Sentence 3 (Finding 3) *In analyses adjusted for supplemental and prescription drug coverage, previously uninsured adults with these conditions reported more doctor visits (13% relative difference, $P = 0.04$), more hospitalizations (20% relative difference, $P = 0.04$), and higher total medical expenditures (51% relative difference, $P = 0.09$) from ages 65 to 72 years than did previously insured adults.*

Conclusions

- Sentence 1 (Summarize finding, including subfinding) *The costs of expanding health insurance coverage for uninsured adults before they reach the age of 65 years may be partially offset by subsequent reductions in health care use and spending for these adults after the age of 65, particularly if they have cardiovascular disease or diabetes before the age of 65 years.*
- Sentence 2 (Policy implication) *These data...*

Importance Starting in 2006, the Centers for Medicare & Medicaid Services (CMS) has restricted coverage of bariatric surgery to hospitals designated as centers of excellence (COE) by 2 major professional organizations.

Objective To evaluate whether the implementation of the COE component of the national coverage decision was associated with improved bariatric surgery outcomes in Medicare patients.

Design, Setting, and Patients Retrospective, longitudinal study using 2004-2009 hospital discharge data from 12 states (n=321 464 patients) of changes in outcomes in Medicare patients undergoing bariatric surgery (n=6723 before and n=15 854 after implementation of the policy). A difference-in-differences analytic approach was used to evaluate whether the national coverage decision was associated with improved outcomes in Medicare patients above and beyond existing time trends in non-Medicare patients (n=95 558 before and n=155 117 after implementation of the policy).

Main Outcome Measures Risk-adjusted rates of any complication, serious complications, and reoperation.

Results Bariatric surgery outcomes improved during the study period in both Medicare and non-Medicare patients; however, this change was already under way prior to the CMS coverage decision. After accounting for patient factors, changes in procedure type, and preexisting time trends toward improved outcomes, there were no statistically significant improvements in outcomes after (vs before) implementation of the CMS national coverage decision for any complication (8.0% after vs 7.0% before; relative risk [RR], 1.14 [95% CI, 0.95-1.33]), serious complications (3.3% vs 3.6%, respectively; RR, 0.92 [95% CI, 0.62-1.22]), and reoperation (1.0% vs 1.1%; RR, 0.90 [95% CI, 0.64-1.17]). In a direct assessment comparing outcomes at hospitals designated as COEs (n=179) vs hospitals without the COE designation (n=519), no significant differences were found for any complication (5.5% vs 6.0%, respectively; RR, 0.98 [95% CI, 0.90-1.06]), serious complications (2.2% vs 2.5%; RR, 0.92 [95% CI, 0.84-1.00]), and reoperation (0.83% vs 0.96%; RR, 1.00 [95% CI, 0.86-1.17]).

Conclusions and Relevance Among Medicare patients undergoing bariatric surgery, there was no significant difference in the rates of complications and reoperation before vs after the CMS policy of restricting coverage to COEs. Combined with prior studies showing no association of COE designation and outcomes, these results suggest that Medicare should reconsider this policy.

IMPORTANCE Patients' out-of-pocket spending for major health care expenses, such as inpatient care, may result in substantial financial distress. Limited contemporary data exist on out-of-pocket spending among nonelderly adults.

OBJECTIVES To evaluate out-of-pocket spending associated with hospitalizations and to assess how this spending varied over time and by patient characteristics, region, and type of insurance.

DESIGN, SETTING, AND PARTICIPANTS A retrospective analysis of medical claims for 7.3 million hospitalizations using 2009-2013 data from Aetna, UnitedHealthcare, and Humana insurance companies representing approximately 50 million members was performed. Out-of-pocket spending was evaluated by age, sex, type of insurance, region, and principal diagnosis or procedure for hospitalized adults aged 18 to 64 years who were enrolled in employer-sponsored and individual-market health insurance plans from January 1, 2009, to December 31, 2013. The study was conducted between July 1, 2015, and March 1, 2016.

MAIN OUTCOMES AND MEASURES Primary outcomes were total out-of-pocket spending and spending attributed to deductibles, copayments, and coinsurance for all hospitalizations. Other outcomes included out-of-pocket spending associated with 7 commonly occurring inpatient diagnoses and procedures: acute myocardial infarction, live birth, pneumonia, appendicitis, coronary artery bypass graft, total knee arthroplasty, and spinal fusion.

RESULTS From 2009 to 2013, total cost sharing per inpatient hospitalization increased by 37%, from \$738 in 2009 (95% CI, \$736-\$740) to \$1013 in 2013 (95% CI, \$1011-\$1016), after adjusting for inflation and case-mix differences. This rise was driven primarily by increases in the amount applied to deductibles, which grew by 86% from \$145 in 2009 (95% CI, \$144-\$146) to \$270 in 2013 (95% CI, \$269-\$271), and by increases in coinsurance, which grew by 33% over the study period from \$518 in 2009 (95% CI, \$516-\$520) to \$688 in 2013 (95% CI, \$686-\$690). In 2013, total cost sharing was highest for enrollees in individual market plans (\$1875 per hospitalization; 95% CI, \$1867-\$1883) and consumer-directed health plans (\$1219; 95% CI, \$1216-\$1223). Cost sharing varied substantially across regions, diagnoses, and procedures.

CONCLUSIONS AND RELEVANCE Mean out-of-pocket spending among commercially insured adults exceeded \$1000 per inpatient hospitalization in 2013. Wide variability in out-of-pocket spending merits greater attention from policymakers.

BACKGROUND

Pay for performance has become a central strategy in the drive to improve health care. We assessed the long-term effect of the Medicare Premier Hospital Quality Incentive Demonstration (HQID) on patient outcomes.

METHODS

We used Medicare data to compare outcomes between the 252 hospitals participating in the Premier HQID and 3363 control hospitals participating in public reporting alone. We examined 30-day mortality among more than 6 million patients who had acute myocardial infarction, congestive heart failure, or pneumonia or who underwent coronary-artery bypass grafting (CABG) between 2003 and 2009.

RESULTS

At baseline, the composite 30-day mortality was similar for Premier and non-Premier hospitals (12.33% and 12.40%, respectively; difference, -0.07 percentage points; 95% confidence interval [CI], -0.40 to 0.26). The rates of decline in mortality per quarter at the two types of hospitals were also similar (0.04% and 0.04%, respectively; difference, -0.01 percentage points; 95% CI, -0.02 to 0.01), and mortality remained similar after 6 years under the pay-for-performance system (11.82% for Premier hospitals and 11.74% for non-Premier hospitals; difference, 0.08 percentage points; 95% CI, -0.30 to 0.46). We found that the effects of pay for performance on mortality did not differ significantly among conditions for which outcomes were explicitly linked to incentives (acute myocardial infarction and CABG) and among conditions not linked to incentives (congestive heart failure and pneumonia) ($P=0.36$ for interaction). Among hospitals that were poor performers at baseline, mortality was similar in the two groups of hospitals at the start of the study (15.12% and 14.73%; difference, 0.39 percentage points; 95% CI, -0.36 to 1.15), with similar rates of improvement per quarter (0.10% and 0.07%; difference, -0.03 percentage points; 95% CI, -0.08 to 0.02) and similar mortality rates at the end of the study (13.37% and 13.21%; difference, 0.15 percentage points; 95% CI, -0.70 to 1.01).

CONCLUSIONS

We found no evidence that the largest hospital-based pay-for-performance program led to a decrease in 30-day mortality. Expectations of improved outcomes for programs modeled after Premier HQID should therefore remain modest.

3. Determining the Results displays

Before performing any analysis, researchers should understand their target. All the study inferences will come from the tables and figures that form the paper results. Specifying these results displays before performing the analysis provides a clear pathway to define the narrative of the paper.

General principles

- The results displays should tell the story of your paper
- The displays should be understandable without accompanying text
- Make the displays “data rich” i.e., instead of showing only means, show distributions and variance
- Descriptive statistics and main effects have to be in tables
- But, when in doubt, use figures instead of tables
- Try to have a “money” figure that shows the story of your paper
 - E.g. what would you like to be tweeted out?
- Shoot for 5 tables and figures

Guidelines for displays

Table 1. Descriptive statistics

- Includes the number of observations for patients and higher levels (e.g. hospitals)
- Includes all variables that are used in the analysis
- If level of analysis is hospital-level, show hospital-level variables
- If level of analysis is patient level, show patient-level variables
- It's best to show both levels (see Jha et al. Ellimoottil e)
- Shows central tendency and variance
- Groups of variables:
 - Outcomes
 - Demographics
 - Clinical risk
- It's preferable to compare descriptive statistics across some dimension
 - This could be between “exposure” population and for comparison population
 - Or across time

Table 1. Characteristics of Medicare and Non-Medicare Patients Before and After the Medicare National Coverage Decision for Bariatric Surgery

	No. (%) of Patients Undergoing Bariatric Surgery by National Coverage Decision Period ^a			
	Medicare		Non-Medicare	
	Predecision January 2004 to March 2006 (n = 6723)	Postdecision April 2006 to December 2009 (n = 15 854)	Predecision January 2004 to March 2006 (n = 95 558)	Postdecision April 2006 to December 2009 (n = 155 117)
Age, mean (SD), y	51.6 (11.4)	55.0 (11.7)	42.1 (10.5)	43.0 (11.0)
Female sex	5138 (76.7)	11 626 (73.5)	77 304 (82.0)	122 264 (79.4)
White race	4123 (72.9)	10 441 (74.8)	62 253 (74.3)	100 074 (71.7)
Procedure type				
Open gastric bypass	3023 (45.0)	1525 (9.6)	37 967 (39.7)	13 113 (8.5)
Laparoscopic gastric bypass	2957 (44.0)	8232 (51.9)	47 854 (50.1)	98 584 (63.6)
Laparoscopic gastric banding	424 (6.3)	5467 (34.5)	6148 (6.4)	37 323 (24.1)
Other bariatric procedure	319 (4.7)	630 (4.0)	3589 (3.8)	6097 (3.9)
Hypertension	4365 (64.9)	10 902 (68.8)	45 739 (47.9)	78 891 (50.9)
Diabetes				
Without chronic complications	2693 (40.1)	6911 (43.6)	22 824 (23.9)	41 474 (26.7)
With chronic complications	260 (3.9)	617 (3.9)	871 (0.9)	1737 (1.1)
Chronic pulmonary disease	1763 (26.2)	3772 (23.8)	16 109 (16.9)	26 377 (17.0)
Depression	1401 (20.8)	3241 (20.4)	15 519 (16.2)	27 188 (17.5)
Liver disease	681 (10.1)	1439 (9.1)	8456 (8.9)	15 373 (9.9)
Hypothyroidism	866 (12.9)	2041 (12.9)	8451 (8.8)	14 218 (9.2)
Psychoses	329 (4.9)	870 (5.5)	957 (1.0)	2021 (1.3)
Fluid and electrolyte disorders	309 (4.6)	499 (3.2)	2187 (2.3)	3017 (1.9)
Congestive heart failure	290 (4.3)	583 (3.7)	764 (0.8)	1106 (0.7)
Anemia	194 (2.9)	510 (3.2)	2338 (2.5)	4625 (3.0)
Other neurological disorders	153 (2.3)	470 (3.0)	595 (0.6)	1767 (1.1)
Renal failure	84 (1.3)	487 (3.1)	169 (0.2)	824 (0.5)
Pulmonary circulation disease	79 (1.2)	173 (1.1)	322 (0.3)	504 (0.3)
Coagulopathy	29 (0.4)	72 (0.5)	300 (0.3)	490 (0.3)
Paralysis	30 (0.5)	40 (0.3)	47 (0.1)	70 (0.1)
Peripheral vascular disease	65 (1.0)	162 (1.0)	405 (0.4)	477 (0.3)

^a Age is expressed as mean (SD) but all of the other variables in this table are expressed as number (percentage).

Table I. Adjusted Mean Cost Sharing per Inpatient Hospitalization, 2009-2013

Characteristic	Overall		2009		2013		2009-2013, ^b % Increase
	No.	Adjusted Mean, \$ ^a	No.	Adjusted Mean, \$ ^a	No.	Adjusted Mean, \$ ^a	
Overall	7 316 763	860	1 556 756	738	1 401 232	1013	37.4
Sex ^c							
Male	2 441 377	881	511 163	758	471 653	1033	36.4
Female	4 875 112	850	1 045 541	728	929 506	1003	37.8
Age, y							
18-34	2 544 459	899	521 879	774	514 322	1048	35.4
35-64	4 772 304	840	1 034 877	720	886 910	993	38.0
Individual market plan	124 276	1727	24 751	1602	25 274	1875	17.0
Group plan	7 192 487	845	1 532 005	724	1 375 958	997	37.8
CDHP ^{c,d}	1 333 601	1105	159 357	974	313 385	1219	25.2
Non-CDHP	6 073 802	817	1 372 751	712	1 067 179	957	34.5
HMO	470 942	926	103 570	802	99 754	1075	34.1
Non-HMO	6 845 821	856	1 453 186	733	1 301 478	1009	37.6

Abbreviations: CDHP, consumer-directed health plan; HMO, health maintenance organization.

^a All costs were inflation adjusted to 2013 dollars. Predicted cost sharing was calculated by estimating regression models that adjusted for the diagnosis related group weights of the hospitalizations. Adjusted mean costs were calculated from all inpatient hospitalizations, including those with \$0 cost sharing.

^b The Wilcoxon rank sum test was used to test equality of the rank distributions

of the means for 2009 and 2013. The rank distributions of the means for all categories differed significantly for 2009 vs 2013 at the $P < .001$ level.

^c Some data missing.

^d A CDHP is typically a health plan with a high deductible that is paired with a health savings account, a flexible spending account, or a health reimbursement arrangement. In the Health Care Cost Institute database, each insurer flagged the members they considered to be enrolled in a CDHP.

Table 1. Pioneer ACO and Comparison Population Characteristics, 2010-2013^a

Characteristic	2010		2011		2012		2013	
	Pioneer	Comparison	Pioneer	Comparison	Pioneer	Comparison	Pioneer	Comparison
Total beneficiaries, No.	647 371	14 611 773	654 679	13 905 122	675 712	13 203 694	806 258	12 134 154
Age, y								
<65	14.6	16.8	14.8	16.8	15.0	14.9	15.6	15.4
65-74	33.1	31.4	32.0	30.6	34.7	34.7	33.7	31.2
75-84	34.3	32.6	34.6	33.0	32.5	32.3	32.1	33.8
≥85	18.1	17.3	18.7	18.1	17.8	18.1	18.5	19.5
Women	59.2	55.5	59.0	55.5	58.9	58.8	57.1	57.2
Race/ethnicity								
White	81.2	81.8	81.0	81.7	80.8	80.9	82.0	82.0
Black	6.9	6.5	7.0	6.5	7.1	7.0	6.2	6.2
Hispanic	7.2	7.1	7.3	7.2	7.4	7.2	6.8	6.8
Asian/Pacific Islander	3.4	3.1	3.4	3.1	3.3	3.4	3.4	3.4
Other	1.3	1.5	1.3	1.5	1.4	1.5	1.6	1.7
ESRD	1.1	1.0	1.1	1.0	1.1	1.1	1.0	1.0
Medicaid dual eligible	23.8	24.3	24.2	24.6	24.1	23.4	25.6	25.3
Died in year	4.8	4.9	4.9	5.1	4.7	4.8	5.6	5.3
Patients with condition in present y								
AMI	1.0	1.0	1.0	1.0	0.9	0.9	1.0	0.9
Colorectal cancer	1.4	1.3	1.5	1.4	1.5	1.5	1.5	1.4
Hip fracture	1.0	0.9	1.0	0.9	0.9	0.9	0.9	1.0
Lung cancer	1.1	1.1	1.2	1.1	1.2	1.2	1.2	1.2
Stroke	4.6	4.1	4.6	4.1	4.4	4.5	4.3	4.2
Patients with condition during past 3 y								
AMI	2.0	1.8	2.0	1.8	1.9	1.9	1.9	1.9
Colorectal cancer	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0
Hip fracture	1.9	1.8	1.9	1.8	1.8	1.8	1.9	1.9
Lung cancer	1.0	1.0	1.1	1.0	1.1	1.1	1.1	1.1
Stroke	7.9	7.2	7.9	7.2	7.6	7.8	7.5	7.5

Abbreviations: AMI, acute myocardial infarction; ESRD, end-stage renal disease.

^a Unadjusted proportions of demographic and clinical characteristics averaged across 32 Pioneer Accountable Care Organizations (ACOs) and comparison populations by baseline and performance year. Beneficiaries in the

comparison population were counted more than once if they were in the same market as more than 1 ACO. Differences are statistically significant because of the large number of observations.

Table 1. Hospital and Patient Characteristics.*

Characteristic	Premier	Non-Premier	P Value
Hospitals			
No. of hospitals	252	3363	
Hospital size (%)			
Small	13.49	39.77	<0.001
Medium	61.11	50.13	
Large	25.40	11.09	
Teaching status (%)			
Teaching	13.49	7.11	<0.001
Nonteaching	86.51	92.89	
Location (%)			
Urban	94.84	81.56	<0.001
Rural	5.16	18.44	
Ownership (%)			
Private for-profit	1.19	17.78	<0.001
Private nonprofit	90.08	61.64	
Public	8.73	20.58	
Region (%)			
Northeast	13.10	14.99	0.001
Midwest	22.22	27.65	
South	51.19	38.75	
West	13.49	18.61	
Mean financial margin (%)	3.89	3.08	0.44
Mean Herfindahl–Hirschman index†	0.122	0.125	0.63
Mean proportion of patients receiving Medicare (%)	44.49	47.21	<0.001
Mean mortality (%)	12.88	13.41	0.22

Table 1. (Continued.)

Characteristic	Premier	Non-Premier	P Value
Patients, 2009 sample			
No. of patients	137,287	1,069,034	
Mean age (yr)	79.92±8.34	79.63±8.29	<0.001
Female sex (%)	51.49	52.52	<0.001
Race or ethnic group (%)‡			
Non-Hispanic white	85.13	85.99	<0.001
Non-Hispanic black	10.34	9.41	
Hispanic	1.79	1.75	
Other	2.75	2.86	
Coexisting conditions (%)			
Diabetes	27.48	27.86	0.004
Hypertension	54.86	55.21	0.014
Chronic kidney disease	22.09	21.76	0.005
Chronic pulmonary disease	30.76	32.11	<0.001

* Plus-minus values are means ±SD.

† This index, a commonly accepted measure of market concentration, is calculated by squaring the market share (expressed as a fraction of total market) of each firm competing in the market and then summing the resulting numbers. Markets in which the index is between 0.10 and 0.18 points are considered to be moderately concentrated, and those in which the index is in excess of 0.18 points are considered to be concentrated.

‡ Race or ethnic group was self-reported.

Table 1: Characteristics of Counties Receiving and Not Receiving Double Bonuses

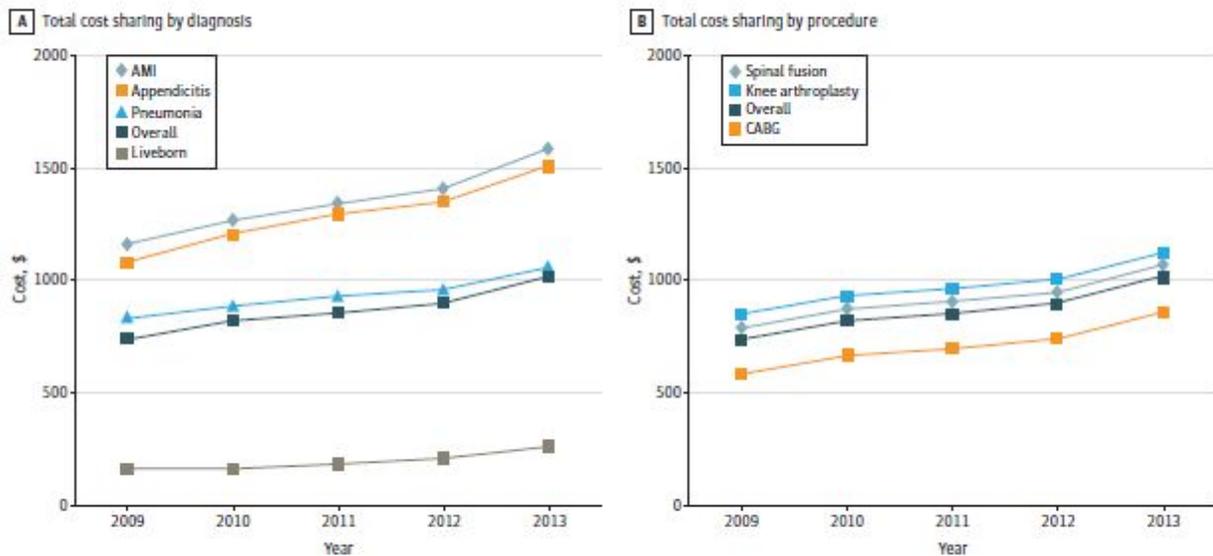
	2009			2014		
	Treatment	All Control	Matched Control	Treatment	All Control	Matched Control
<i>N</i>	197	1,125	532	197	1,125	532
Medicare Advantage enrollment	10,192	3,853	1,403	16,152	6,318	2,878
No. of plans	13.91	8.83	6.82	14.77	8.54	7.05
Average star rating	3.29	3.12	3.12	3.70	3.57	3.51
% 5-star plans	2.1	2.8	2.1	14.3	11.5	7.5
% 4-star plans	42.1	34.7	36.7	57.8	52.5	52.4
% 3-star plans	32.7	32.2	30.6	18.5	28.6	33.5
% 2-star plans	3.1	12.7	15.3	0.0	0.1	0.0
% plans without rating	20.0	17.6	15.3	9.4	7.2	6.6

Notes: The “control” group is all non-double-bonus counties with at least one HMO/PPO plan available for purchase. The treatment group is all double-bonus counties. The “matched control” group consists of those double-bonus counties that received a non-zero weight in the propensity score matching procedure. Data are shown for the analytic sample for the “average star rating” outcome.

Figure 1. Time-series data on outcomes

- Show for exposure and comparison groups
- Generally a good idea to show the bottom end of the scale (i.e., to 0)
- Show a vertical line denoting the start of the intervention period
- Show a maximum of 5-6 series
- use “small multiples” to show more data

Figure 3. Trends in Adjusted Cost Sharing by Diagnosis or Procedure, 2009-2013



All costs were inflation adjusted to 2013 dollars. Cost sharing was calculated by estimating regression models that adjusted for the diagnosis related group weights of the admissions. The overall category represents the adjusted mean cost sharing across all diagnoses or procedures. All relevant inpatient

hospitalizations were analyzed within the regression models, including those with \$0 cost sharing. AMI indicates acute myocardial infarction; CABG, coronary artery bypass graft.

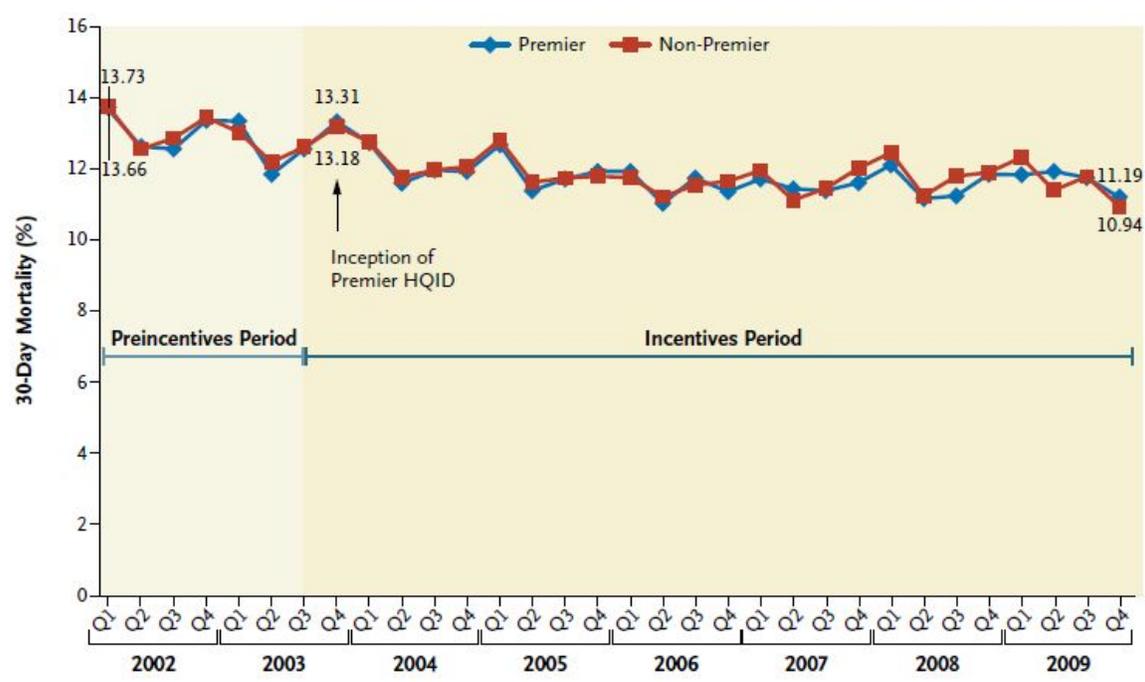


Figure 1. Mortality at 30 Days among All Hospitals, According to Pay-for-Performance Status, 2002–2009.
 The rates have been adjusted for patient and hospital characteristics and include all study conditions. HQID denotes Hospital Quality Incentives Demonstration.

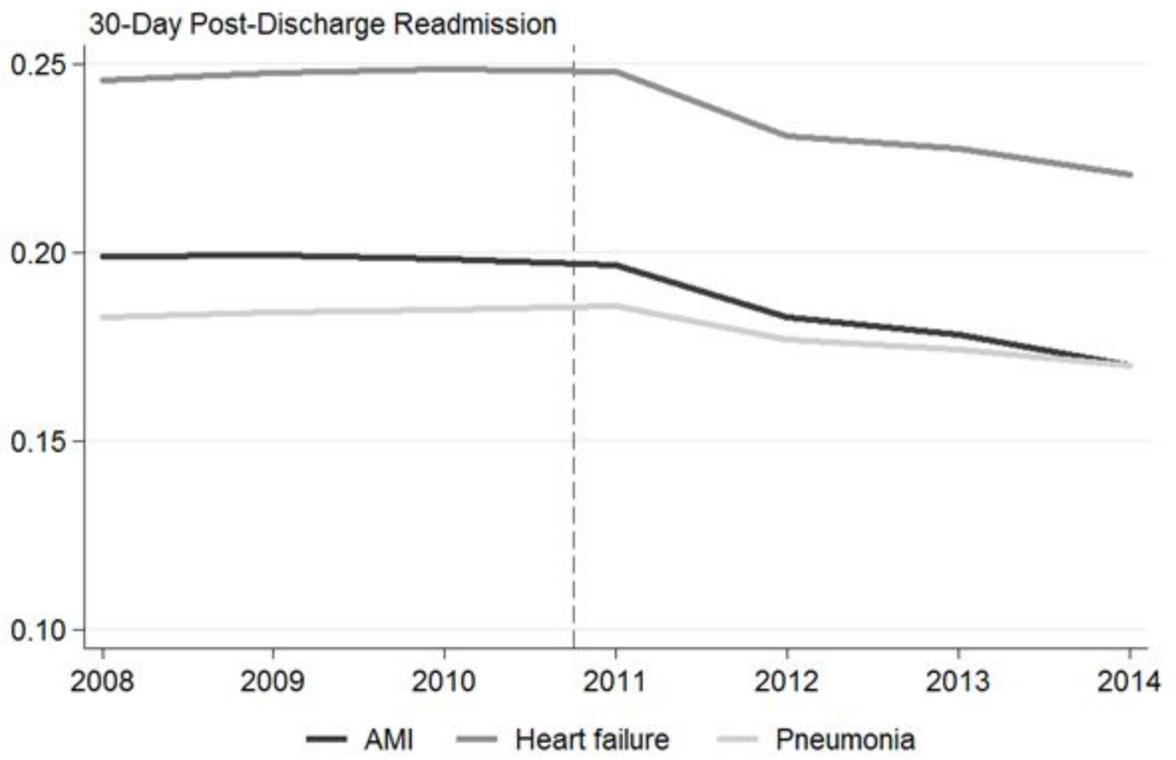
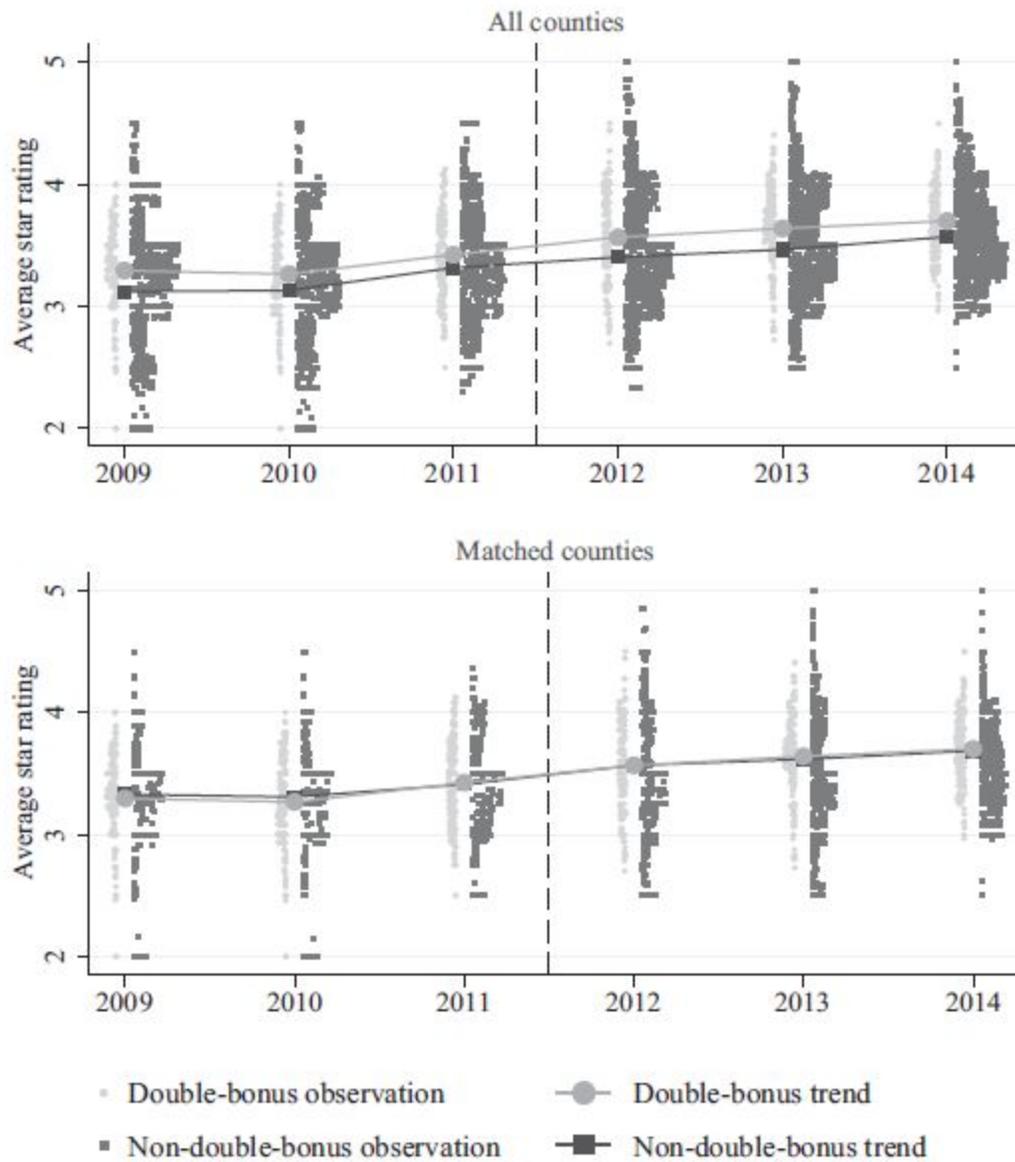
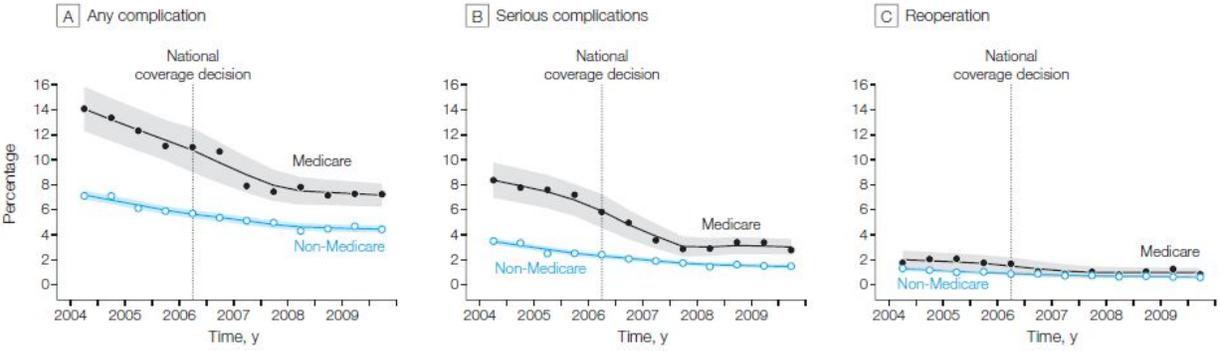


Figure 2: Quality of Care among Counties Receiving and Not Receiving Double Bonuses in the Medicare Advantage Quality Bonus Payment Demonstration



Note: The dashed line denotes the first year preceding the bonus payments in the Demonstration.

Figure. Trends in Adverse Outcomes Before and After the Implementation of the Centers for Medicare & Medicaid Services Bariatric Surgery National Coverage Decision



Each data marker represents 2 quarters within each year. The national policy restricting coverage to centers of excellence was implemented starting in the first quarter of 2006. Time trend curves were fit to these points using Lowess smoothing. The 95% confidence intervals are shown as shaded areas.

Table 2. Shows main effects of the analysis

- Best to show as adjusted means and effect size
- Good to show the “base rate” to understand whether the effect is small or large
- Can also show effect as a level change and as a % change

Table 2. Changes in Spending and Utilization Between Intervention and Comparison Groups, 2012 and 2013^a

	Conditional Means						Difference in Differences, Estimate (95% CI), \$	
	Intervention Group			Comparison Group			2012	2013
	Baseline Period (2010-2011)	Pioneer Model		Baseline Period (2010-2011)	Pioneer Model			
	Year 1 (2012)	Year 2 (2013)		Year 1 (2012)	Year 2 (2013)			
Total beneficiary months (PBPM), No.	15 086 581	7 851 613	9 349 724	329 777 442	153 449 273	140 320 504		
Medicare spending per beneficiary month								
Total Medicare expenditures	936.5	944.3	985.0	888.8	932.3	948.9	-35.62 (-40.12 to -31.12) ^b	-11.18 (-15.84 to -6.51) ^b
All inpatient hospital (Part A)	354.5	334.7	343.7	331.5	328.8	332.1	-14.40 (-17.31 to -11.49) ^b	-6.46 (-9.26 to -3.66) ^b
Physician (Part B)	224.5	237.0	240.9	210.6	230.7	229.9	-8.29 (-9.32 to -7.27) ^b	-2.69 (-3.84 to -1.54) ^b
Hospital outpatient	133.9	146.7	157.0	131.2	151.0	155.3	-5.82 (-6.76 to -4.88) ^b	-0.22 (-1.21 to 0.78)
SNF	91.7	81.5	84.8	89.4	82.2	84.8	-2.18 (-3.34 to -1.03) ^b	-0.83 (-2.07 to 0.42)
Home health	54.6	52.1	55.0	50.8	49.7	51.5	-1.06 (-1.59 to -0.54) ^b	0.46 (-0.13 to 1.04)
Hospice	29.3	32.2	32.8	29.2	33.5	32.6	-1.34 (-2.11 to -0.58) ^b	0.14 (-0.69 to 0.97)
Durable medical equipment	20.8	20.6	17.8	18.7	19.8	16.8	-1.22 (-1.43 to -1.00) ^b	-0.92 (-1.13 to -0.71) ^b
Inpatient-related utilization per 1000 beneficiary months								
Acute care inpatient days	1.5	1.3	1.4	1.4	1.4	1.3	-0.05 (-0.065 to -0.039) ^b	-0.02 (-0.029 to -0.004) ^b
Inpatient admissions through emergency department	0.23	0.22	0.21	0.21	0.21	0.20	-0.01 (-0.008 to -0.005) ^b	-0.01 (-0.007 to -0.004) ^b
Inpatient rehabilitation or long-term care facility days	0.26	0.25	0.26	0.23	0.24	0.24	0.00 (-0.025 to -0.008) ^b	-0.01 (-0.020 to -0.003) ^b
All-cause 30-d readmissions per 1000 discharges	168.2	166.5	160.0	168.7	167.3	160.5	-2.34 (-5.58 to 0.90)	3.14 (-0.10 to 6.38)
Postdischarge physician visits per 1000 discharges								
Within 7 d	420.6	536.1	553.7	405.9	508.6	523.9	11.30 (4.6 to 18.0) ^b	14.80 (8.5 to 21.0) ^b
Within 14 d	625.4	693.0	714.8	601.9	667.5	681.0	0.10 (-6.2 to 6.4)	10.70 (4.9 to 16.4) ^b
Within 30 d	790.6	830.8	845.8	765.0	807.6	820.1	-3.90 (-9.0 to 1.2)	2.80 (-1.8 to 7.4)
Physician-related utilization per 100 beneficiary months								
Primary care evaluation and management visits	32.4	30.3	30.0	27.8	28.7	28.1	-2.90 (-3.00 to -2.80) ^b	-2.63 (-2.74 to -2.53) ^b
Procedures	65.1	67.4	68.5	61.6	66.9	66.8	-3.00 (-3.43 to -2.58) ^b	-1.97 (-2.44 to -1.51) ^b
Imaging services	44.4	43.3	44.6	41.6	42.2	42.7	-1.76 (-1.93 to -1.59) ^b	-0.84 (-1.02 to -0.67) ^b
Tests	144.5	146.8	149.0	133.2	140.7	143.4	-5.24 (-5.75 to -4.72) ^b	-4.33 (-4.84 to -3.81) ^b
Outpatient, postacute, or hospice utilization per 100 beneficiary months								
Emergency department visits	3.9	4.1	4.2	3.8	4.2	4.2	-0.18 (-0.21 to -0.15) ^b	-0.12 (-0.16 to -0.09) ^b
Observation stays	0.57	0.65	0.72	0.54	0.63	0.70	0.00 (-0.01 to 0.007) ^b	0.04 (0.03 to 0.05) ^b
Skilled nursing facility days	21.0	19.4	19.5	20.8	19.8	19.9	-0.40 (-0.70 to -0.13) ^b	-0.17 (-0.46 to 0.12)
Home health visits	32.1	30.3	31.5	30.4	29.4	29.9	-0.97 (-1.40 to -0.60) ^b	-0.15 (-0.62 to 0.32)
Hospice days	17.5	18.6	19.2	17.7	19.7	19.4	-0.87 (-1.33 to -0.40) ^b	0.06 (-0.46 to 0.57)

Abbreviations: PBPM, per-beneficiary-per-month; SNF, skilled nursing facility.
^a Analysis of Medicare claims data from the Chronic Conditions Warehouse Research Identifiable Files. Difference-in-differences results of intervention and comparison group conditional means for 2012 and 2013 relative to 2010-2011 baseline average for 32 Pioneer accountable care organizations (ACOs). As averages across ACOs, the conditional means approximate the difference-in-differences results, which were from pooling individual beneficiaries across all ACOs. Negative values indicate differentially lower

spending or utilization. All results were regression-adjusted for age, sex, race, Medicaid dual eligibility status, end-stage renal disease, mortality, and indicator variables for acute myocardial infarction, hip fracture, colorectal cancer, lung cancer, and stroke and with Oaxaca-Blinder reweighting. Procedures, imaging services, and tests are categorized according to Berenson-Eggers Type of Service.

^b Significant at $P < .05$.

Table 2. Mortality at 30 Days for Study Conditions at All Participating Hospitals, According to Premier Status, 2003–2009.*

Condition and Pay-for-Performance Status	Mortality during Baseline Period [†]	Change in Mortality per Quarter	Mortality during Terminal Period [‡]
All conditions			
Premier — %	12.33	–0.04	11.82
Non-Premier — %	12.40	–0.04	11.74
Difference (95% CI) — percentage points	–0.07 (–0.40 to 0.26)	–0.01 (–0.02 to 0.01)	0.08 (–0.30 to 0.46)
Acute myocardial infarction			
Premier — %	17.32	–0.11	15.67
Non-Premier — %	17.42	–0.09	15.85
Difference (95% CI) — percentage points	–0.10 (–0.72 to 0.52)	–0.02 (–0.05 to 0.01)	–0.18 (–0.97 to 0.61)
Congestive heart failure			
Premier — %	10.68	–0.01	11.13
Non-Premier — %	10.61	–0.01	10.92
Difference (95% CI) — percentage points	0.07 (–0.31 to 0.46)	0.00 (–0.02 to 0.02)	0.22 (–0.28 to 0.71)
Pneumonia			
Premier — %	12.87	–0.07	11.71
Non-Premier — %	13.13	–0.06	11.85
Difference (95% CI) — percentage points	–0.26 (–0.70 to 0.19)	–0.01 (–0.03 to 0.02)	–0.14 (–0.67 to 0.38)
Coronary-artery bypass grafting			
Premier — %	3.91	–0.03	4.12
Non-Premier — %	3.62	–0.02	3.34
Difference (95% CI) — percentage points	0.29 (–0.12 to 0.69)	–0.01 (–0.03 to 0.02)	0.78 (0.20 to 1.36)

* Rates have been adjusted for patient and hospital characteristics. Differences in mortality were calculated as the mortality at the Premier hospitals minus the mortality at the non-Premier hospitals. None of the differences in mortality between the two hospital groups were significant except for coronary-artery bypass grafting in the terminal period ($P=0.01$). CI denotes confidence interval.

[†] The 1-year baseline period extended from the fourth quarter of 2003 through the third quarter of 2004.

[‡] The 1-year terminal period extended from the first quarter of 2009 through the fourth quarter of 2009.

Table 2. Rates of Adverse Outcomes Before and After the Implementation of the Centers for Medicare & Medicaid Services Policy Restricting Bariatric Surgery to Centers of Excellence

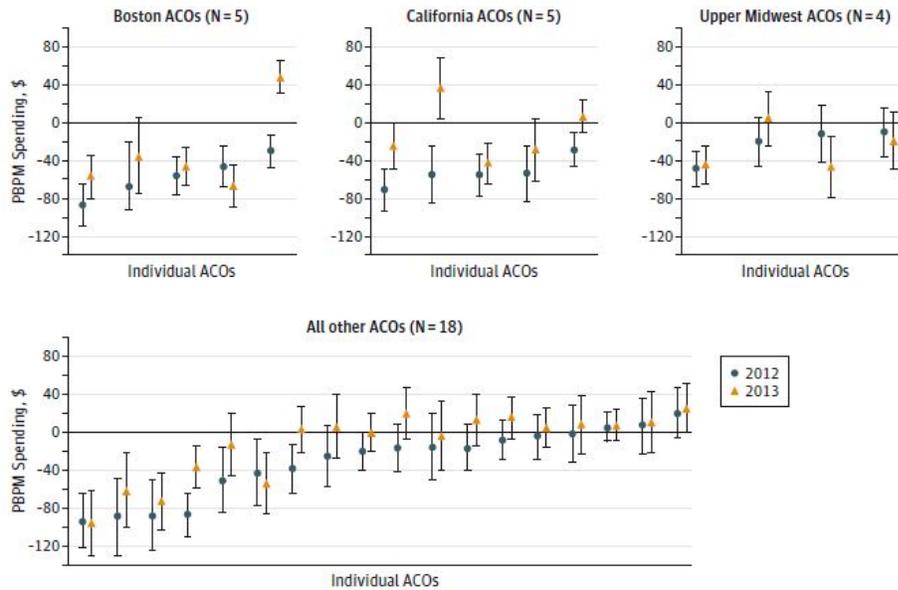
	No./Total (%) of Patients With Adverse Outcome After Bariatric Surgery by National Coverage Decision Period		Relative Risk (95% CI) of Adverse Outcome ^a		
			Simple Before vs After Comparison		Independent Effect of the Policy ^b
	Predecision January 2004 to March 2006	Postdecision April 2006 to December 2009	Adjusted for Patient Factors Only	Adjusted for Patient Factors and Procedure Type	
All bariatric surgery types					
Any complication					
Medicare	829/6723 (12.3)	1252/15 854 (7.9)	0.67 (0.60-0.74)	0.89 (0.77-1.00)	1.14 (0.95-1.33)
Non-Medicare	6203/95 558 (6.5)	7467/155 117 (4.8)	0.79 (0.75-0.84)	0.92 (0.84-0.99)	1 [Reference]
Serious complications					
Medicare	501/6723 (7.5)	539/15 854 (3.4)	0.48 (0.42-0.55)	0.64 (0.44-0.83)	0.92 (0.62-1.22)
Non-Medicare	2786/95 558 (2.9)	2675/155 117 (1.7)	0.66 (0.61-0.70)	0.81 (0.70-0.92)	1 [Reference]
Reoperation					
Medicare	127/6723 (1.9)	162/15 854 (1.0)	0.58 (0.46-0.73)	0.85 (0.58-1.12)	0.90 (0.64-1.17)
Non-Medicare	1067/95 558 (1.1)	1123/155 117 (0.7)	0.66 (0.59-0.75)	0.87 (0.71-1.03)	1 [Reference]
Gastric bypass surgery					
Any complication					
Medicare	773/5980 (12.9)	1004/9757 (10.3)	0.79 (0.72-0.88)	0.88 (0.75-1.00)	1.19 (1.01-1.38)
Non-Medicare	5918/85 821 (6.9)	6483/111 697 (5.8)	0.89 (0.85-0.93)	0.91 (0.83-0.99)	1 [Reference]
Serious complications					
Medicare	457/5980 (7.6)	448/9757 (4.6)	0.59 (0.51-0.68)	0.66 (0.46-0.87)	0.98 (0.69-1.28)
Non-Medicare	2647/85 821 (3.1)	2383/111 697 (2.1)	0.76 (0.72-0.80)	0.81 (0.70-0.92)	1 [Reference]
Reoperation					
Medicare	115/5980 (1.9)	126/9757 (1.3)	0.69 (0.54-0.88)	0.89 (0.61-1.17)	0.90 (0.62-1.18)
Non-Medicare	997/85 821 (1.2)	965/111 697 (0.9)	0.74 (0.66-0.84)	0.91 (0.75-1.06)	1 [Reference]

^aThe logistic regression models also control for patient characteristics, changes in procedure type, and any differences in preimplementation trends in outcomes between Medicare and non-Medicare patients.

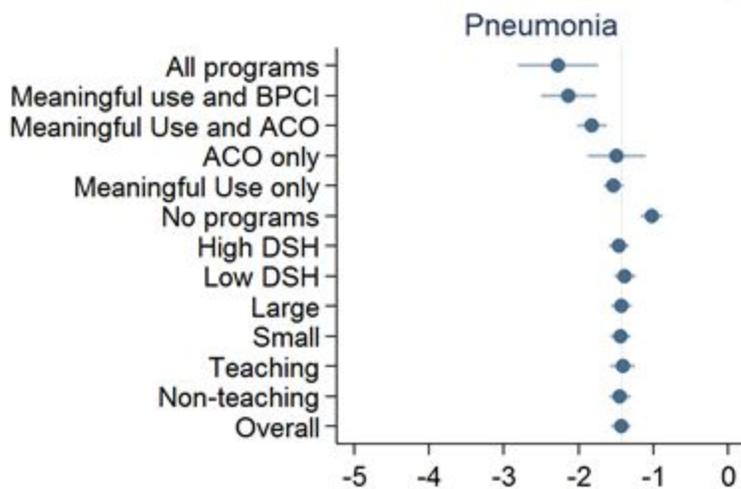
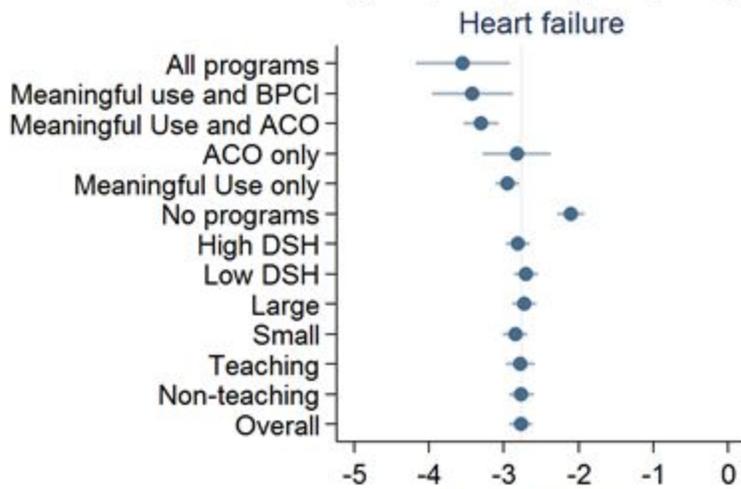
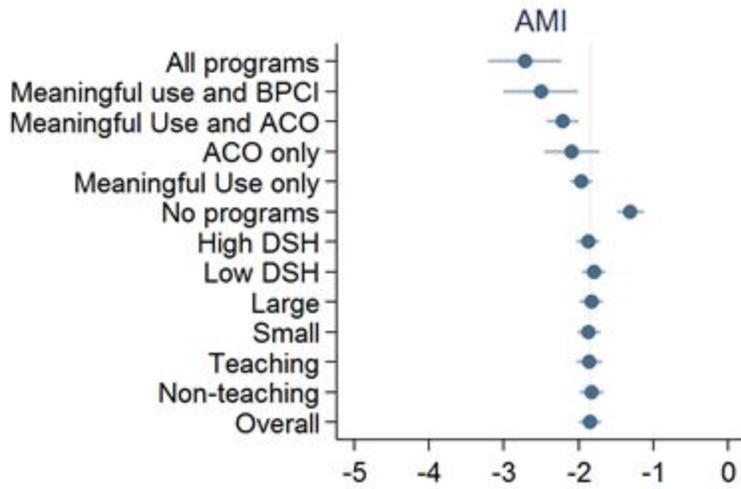
^bThe independent effect of the Centers for Medicare & Medicaid Services coverage decision is derived from a difference-in-differences model that represents improvement in outcomes before and after the policy change in Medicare patients compared with non-Medicare patients (the control group was not exposed to the policy).

Next Table/Figure. Show heterogeneity / variation in effects across relevant factors

Figure 1. Changes in Pioneer ACO Per-Beneficiary-Per-Month Total Spending by Geographic Area, 2012 and 2013



Data markers represent the differential change in conditional means of total accountable care organization (ACO) per-beneficiary-per-month (PBPM) spending relative to comparison populations by geographic areas common to more than 1 ACO for 2012 and 2013. Negative values indicate differentially lower spending. Error bars indicate 95% confidence intervals, with those crossing \$0 not statistically significant. ACOs. All results were regression-adjusted for age, sex, race, Medicaid dual eligibility status, end-stage renal disease, mortality, and indicator variables for acute myocardial infarction, hip fracture, colorectal cancer, lung cancer, and stroke and with Oaxaca-Blinder reweighting. ACOs arrayed by those with smallest increases in spending in 2012.



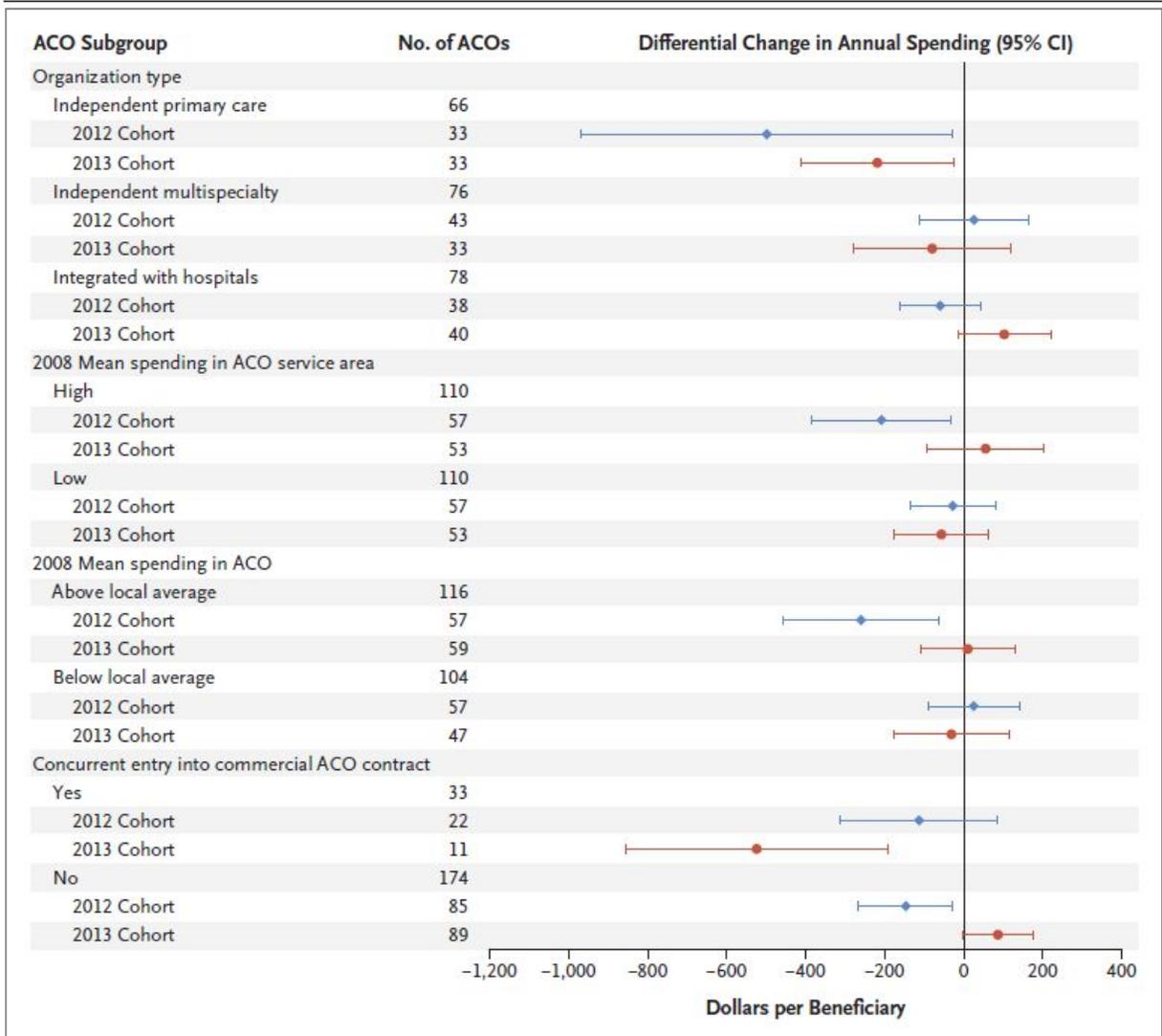


Figure 1. Differential Changes in Total Medicare Spending in 2013 According to Accountable Care Organization (ACO) Subgroup.

Differential changes (i.e., between-group differences in the change from the pre-ACO contract period) in total Medicare spending per beneficiary in 2013 are displayed according to ACO subgroup, with negative estimates indicating estimated savings. Subgroup estimates are provided separately for the 2012 (blue) and 2013 (red) cohorts of Medicare Shared Savings Program (MSSP) ACOs. Estimated savings in the 2012 cohort were greater for ACOs in high-spending areas than for those in low-spending areas, but the subgroup difference was not significant ($P=0.09$) and not interpretable because precontract spending growth in high-spending areas was already significantly slower in the ACO group than in the control group. All the 2008 ACO spending values were either above or below the local average. Of 220 MSSP ACOs, 33 (15%) entered a total of 45 commercial ACO contracts in 2012 or 2013 without having entered a commercial ACO contract before 2012.

Table 3. Mortality at 30 Days for Study Conditions at Hospitals with Poor Performance at Baseline, According to Premier Status, 2003–2009.*

Condition and Pay-for-Performance Status	Mortality during Baseline Period [†]	Change in Mortality per Quarter	Mortality during Terminal Period [‡]
All conditions			
Premier — %	15.12	−0.10	13.37
Non-Premier — %	14.73	−0.07	13.21
Difference (95% CI) — percentage points	0.39 (−0.36 to 1.15)	−0.03 (−0.08 to 0.02)	0.15 (−0.70 to 1.01)
Acute myocardial infarction			
Premier — %	19.75	−0.19	16.66
Non-Premier — %	20.50	−0.14	17.74
Difference (95% CI) — percentage points	−0.75 (−2.73 to 1.24)	−0.05 (−0.16 to 0.07)	−1.08 (−3.08 to 0.92)
Congestive heart failure			
Premier — %	12.53	−0.05	12.04
Non-Premier — %	12.25	−0.04	12.11
Difference (95% CI) — percentage points	0.27 (−0.72 to 1.27)	−0.02 (−0.08 to 0.04)	−0.07 (−1.49 to 1.36)
Pneumonia			
Premier — %	15.11	−0.16	12.32
Non-Premier — %	15.45	−0.10	13.09
Difference (95% CI) — percentage points	−0.34 (−1.25 to 0.56)	−0.06 (−0.11 to 0.00)	−0.77 (−1.82 to 0.28)
Coronary-artery bypass graft surgery			
Premier — %	4.82	−0.05	4.88
Non-Premier — %	4.70	−0.03	3.97
Difference (95% CI) — percentage points	0.11 (−0.72 to 0.95)	−0.01 (−0.07 to 0.05)	0.91 (−0.91 to 2.73)

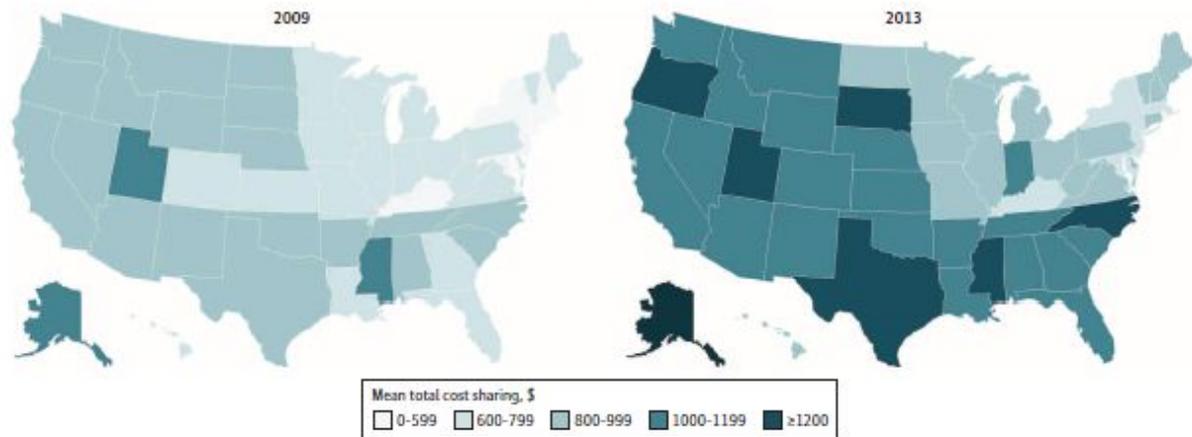
* Rates have been adjusted for patient and hospital characteristics. Differences in mortality were calculated as the mortality at the Premier hospitals minus the mortality at the non-Premier hospitals. None of the differences in mortality between the two hospital groups were significant except for the change in mortality per quarter for pneumonia (P=0.04).

[†] The 1-year baseline period extended from the fourth quarter of 2003 through the third quarter of 2004.

[‡] The 1-year terminal period extended from the first quarter of 2009 through the fourth quarter of 2009.

Next Table/Figure. Shows impact of effects across units / exposed region. Often good to show as a map

Figure 2. State Variation in Adjusted Mean Cost Sharing per Inpatient Hospitalization, 2009 and 2013



All costs were inflation adjusted to 2013 dollars. Cost sharing was calculated by estimating regression models that adjusted for the diagnosis related group

weights of the admissions. All inpatient hospitalizations were analyzed within the regression models, including those with \$0 cost sharing.

EXHIBIT 1

Variation in patients' medical complexity and changes in expected reconciliation payments across hospitals in Michigan after risk adjustment is added to the CJR program

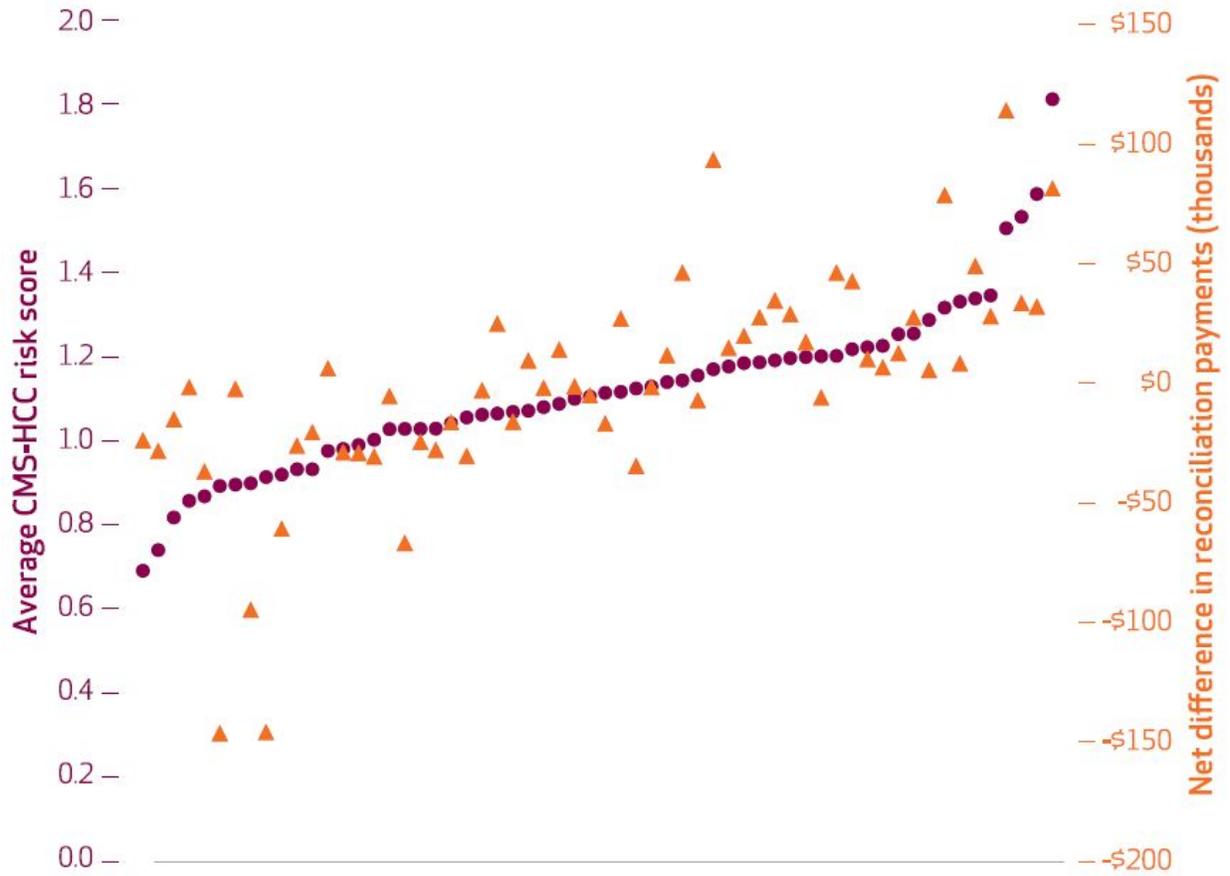
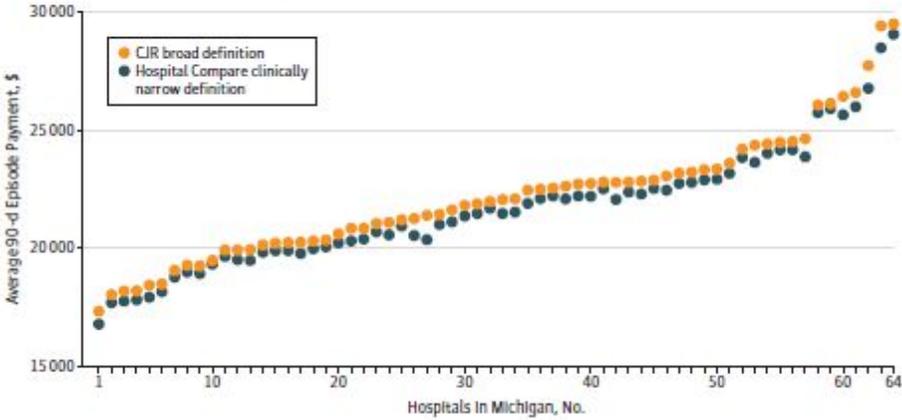


Figure 2. Average 90-Day Episode Payments for All Hospitals in Michigan Using the Broad (CJR) and the Clinically Narrow (Hospital Compare) Definitions of an Episode of Care



CJR refers to the Comprehensive Care for Joint Replacement model, and Hospital Compare refers to the 90-day total hip arthroplasty and/or total knee arthroplasty payment measure.

Appendix

Appendix should include details of methods and supplemental results that don't fit in the paper.

This often includes:

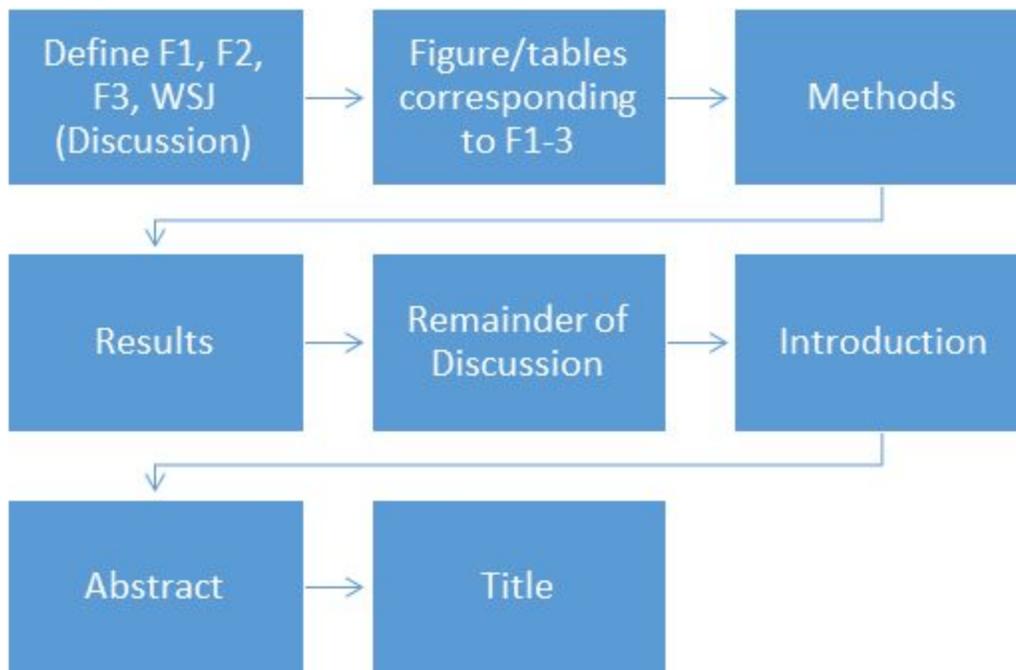
- ICD9 codes
- Schematics showing:
 - consort diagram for study selection
 - conceptual model
 - how the data are organized
- Sensitivity analysis / validity checks
- effects for additional outcomes
- effects using different identification strategies
- Placebo tests
- Validity checks

Conducting the analysis

- Analysis checklist
 - Define each of the following features
 - Population
 - Inclusion criteria
 - Exclusion criteria
 - Outcomes
 - Exposure
 - Risk adjustment / controls
 - Price standardization
 - Verify the validity of each of the following features
 - Debugging the code: how would you know if something was calculating correctly or incorrectly?
 - <http://sirrice.github.io/files/papers/cleaning-hilda16.pdf>
 - Find published literature that shares the same means/variance of the features
 - What is the strategy used to attribute cases to higher units
 - Design / analysis
 - Specify identification strategy (i.e., how interpretation will be causal). This generally requires exogenous variation of some kind
 - What is the modeling strategy: Why should you deviate from linear regression? Is there a limited dependent variable? Are you dealing with longitudinal data?
 - What is the strategy for variance estimates
 - For main effects (Table 2), write down the estimating equation
 - verify that the estimating equation is the same thing that you estimate in your statistical software

5. Preparing the manuscript

Conceptual model



NOTE: START BY DEFINING FINDING #1-#3. (LABELED F1, F2,F3) IN THIS GUIDE

Introduction

Paragraph 1 – “THE SIGNIFICANCE”

Sentence 1: Broad statistic

Example 1: Once implemented fully, it is anticipated that the Patient Protection and Affordable Care Act (ACA) will provide coverage for nearly 25 million previously uninsured individuals in the United States.

Sentence 2: Current belief

Example 1: By virtue of new insurance exchanges, expansion of Medicaid, and individual requirements for insurance, proponents of the ACA believe that the legislation will enhance access to physicians and necessary health care services, thereby improving population health outcomes and potentially reducing costs over the long term

Paragraph 2 – “THE TENSION”

Sentence 1: The current unknown (should reference F1-3)

Example 1: While much of the enthusiasm for the ACA revolves around providing patients with previously inaccessible preventive and primary care services, the effect of this reform on more complex and expensive hospital-based care, including inpatient surgery, remains undefined.

Sentence 2 and 3: Null and alternative hypothesis

Example 1: For instance, it is plausible that, due to a large unmet need, insurance expansion will yield greater use of surgery across the board. An alternative scenario, however, is that rates of surgery will change mainly for certain procedures and patient populations. Supporting the latter hypothesis, existing data suggest that access to imperative surgical procedures like hip fracture repair and colectomy for cancer may not be affected by insurance status.^{6,7} Conversely, decisions about the use of other, more discretionary, procedures (e.g., joint replacement, back surgery) may be strongly influenced by insurance coverage,^{6–12} and utilization of such surgeries could change most prominently among populations who are at highest risk for being currently uninsured.^{13,14}

Paragraph 3 – “THE VALUE”

Sentence 1: What have previous investigators shown

Example 1: Previous investigators have used the outcomes of healthcare reform in Massachusetts to forecast the ACA’s impact on racial disparities with inpatient surgery.^{13,14}

Sentence 2: How is your work different?

Example 1: Herein, we build on this work by examining the impact of the Massachusetts insurance expansion on utilization of discretionary versus non-discretionary surgical procedures.

Sentence 3: What do you specifically do?

Example 1: We specifically compare the pre- and post-reform rates of discretionary and non-discretionary procedures in Massachusetts to those for two Northeastern control states where no similar reform was implemented. In addition, we assess whether the impact of insurance expansion varies across subgroups that differed in their baseline (i.e., pre-reform) risk of being uninsured.

Sentence 4: What is the broad implication of this study?

Example 1: By virtue of this approach, our findings will provide policymakers with more nuanced insight regarding the potential impact of national insurance expansion for utilization of complex and expensive inpatient surgery

Methods

Paragraph 1 – “THE DATA”

Sentence 1: List the datasets

Example 1: Our primary datasets were the State Inpatient Databases (SID) for Massachusetts and two Northeastern control states (New York and New Jersey).

Sentence 2: Describe what they are

Example 1: Developed as part of the Healthcare Cost and Utilization Project, the SID is a comprehensive all-payer database that contains information on nearly all inpatient discharges.

Sentence 3: Why did you pick this dataset?

Example 1: We selected New Jersey and New York as controls for several reasons: 1) they are in close geographic proximity to Massachusetts; 2) both states had a steady nonelderly uninsured rate during the study period;¹⁵ 3) both states had data available in the SID before and after implementation of health care reform in Massachusetts; and 4) both states had surgical volumes that were similar to those in Massachusetts. In addition to the SID, we used publically-available data from the U.S. Census to account for population growth during the study interval, and to obtain county level measures of insurance status and household income.¹⁵

Sentence 4: IRB statement

Example 1: This study was deemed exempt from review by the University of Michigan Institutional Research Board.

Paragraph 2 – “THE PATIENTS”

Sentence 1: How was the entire population identified?

Example 1: Our study population included all nonelderly patients (ages 19-64) who underwent one of several common inpatient surgeries from January 1, 2003 through December 31, 2010.

Sentence 2: Who was excluded?

Example 1: We excluded patients who did not reside in Massachusetts or the control states.

Paragraph 3 – How did you determine Finding 1

Sentence 1: Outcome

Example 1: Our outcome of interest was the rate of discretionary and non-discretionary inpatient surgeries per 10,000 individuals per quarter in Massachusetts and in control states. For this analysis, we defined discretionary procedures as inpatient surgeries with high levels of preference sensitivity, potential medical management alternatives, and a large degree of geographic variation.^{6–8} We hypothesized that the rate of these surgeries will increase with insurance expansion. Based on this framework, we decided a priori to include knee replacement, hip replacement, transurethral resection of the prostate, back surgery, and inguinal hernia repair as discretionary surgeries. We removed all patients undergoing “emergent” surgery from the discretionary group. As a comparison group, we also identified a set of non-discretionary inpatient procedures. We defined these as imperative surgical procedures that address an immediately threatening diagnosis (e.g., cancer, acute appendicitis). A priori, we specifically classified major cancer surgeries¹⁸, appendectomy and hip fracture repair as non-discretionary surgeries (Appendix Table I). In addition to clinical judgment, our selection of these procedures was based existing literature suggesting that they have relatively lower levels of preference and insurance sensitivity.^{6–8,19–21} We hypothesized that, compared with discretionary procedures, rates of non-discretionary surgeries will be affected less by insurance expansion. Ultimately, our analysis included 5 discretionary and 10 non-discretionary surgeries (Appendix Table I).

Sentence 2: How you examined Finding 1

Example 1: In our first analytic step, we compared the characteristics of patients who underwent surgery in Massachusetts versus control states from 2003 through 2010. Next, we calculated the mean (unadjusted) rates of discretionary and non-discretionary surgery in Massachusetts and control states before and after July 2007.

Sentence 3: How you examined Finding 2

Example 1: We then performed a difference-in-differences (DID) analysis to estimate the causal effect of healthcare reform on rates of discretionary versus non-discretionary surgery. DID analysis is a widely used empirical strategy that allows adjustment for secular changes (e.g., regional trends, economic changes) that may under or overestimate the true effect of the reform.^{13,14,26–29} We implemented the DID analysis by fitting separate ordinary least square regression models for discretionary and non-discretionary procedures.

Sentence 4: How you examined Finding 3

Sentence optional: Why did you use this particular type of modeling

Sentence optional: What was the dependent variable, independent variables?

Example 1: The dependent variable for each model was the total number of surgeries in each state per quarter per 10,000 individuals. We included variables specifying the state where the surgery was performed, as well as reform status (i.e., whether the surgery was performed before or after July 2007). Our models also included an interaction term for the state and reform status variables. The coefficient on this interaction term represents the difference-in-differences estimator. Finally, we included an unemployment variable in the models to account for the five percentage point rise in unemployment from 2006 through 2009 (a result of economic recession),²⁵ and we also adjusted for seasonal differences in rates of surgery.³⁰

Sentence optional: What regression diagnostics were run?

Sentence end: What type of software was used?

Example 2: All analyses were performed using statistical software (Stata 13/SE, College Station, TX), and at the 5% significance level.

Results

Paragraph 1 – “THE DESCRIPTIVE ANALYSIS”

Sentence 1: Total cases identified over time period

Sentence 2: Observations about cases identified

Example 1: We identified a total of 836,311 nonelderly patients who underwent surgery (22% MA, 55% NY, 23% NJ) from January 1, 2003 through December 31, 2010. Table 1 presents the pre- and post-reform characteristics of patients from Massachusetts and control states. While the percentage of surgical patients receiving free care in Massachusetts declined from 4.7% to 2.1% after reform, no similar change was observed in control states. During the entire study interval, percentage of patients in Massachusetts receiving free care for non-discretionary surgery exceeded that for discretionary surgery (Appendix Figure 1).

Paragraph 2 – FINDING 1

Sentence 1: What did the MVA demonstrate about the primary finding?

Sentence 2: What did the MVA demonstrate about the secondary finding?

Example 1: In Massachusetts, the unadjusted mean rate of discretionary surgery increased by 9.7% from before (35.6 cases/year/10,000 individuals) to after (39.2 cases/year/10,000 individuals) implementation of health care reform. (Table 2). In contrast, the mean rate of discretionary surgery in the control states increased by only 0.5%. The mean rate of non-discretionary surgery decreased slightly in Massachusetts after reform, and increased slightly in the control states (Table 2). The difference-in-differences analysis demonstrated that healthcare reform caused a 9.3% net increase in the rate of discretionary surgery and a 4.5% net decrease in the rate of non-discretionary surgeries (Figure 1).

Paragraph 3 – FINDING 2

Paragraph 4 – FINDING 3

Discussion

Paragraph 1 – “THE PUNCHLINE”

Sentence 1: Finding 1

Example 1: In this study, insurance expansion was associated with a greater use of discretionary surgery relative to nondiscretionary surgery.

Sentence 2: Finding 2

Example 1: This finding was consistent for each subpopulation tested whites, nonwhites, and patients from counties with low median income and high numbers of newly insured.

Sentence 3: Finding 3

Example 1: The increase in rate of discretionary surgery was greatest for nonwhites.

Sentence 4: WSJ statement

Example 1: Collectively, these findings suggest that insurance expansion will increase the use of preference sensitive surgery and will have a greater effect on populations at risk for being uninsured.

Paragraph 2 (Does not need to be a paragraph) – “THE FIT OF FINDING #1”

Sentence 1: Are your findings consistent with other researchers?

Example 1: Previous investigators have demonstrated convincingly that utilization of healthcare services rises when previously uncovered patients acquire health insurance.^{10,31–33}

Sentence 2: How do the current findings add to the literature?

Example 1: The current study clarifies this broader relationship by demonstrating that, for inpatient surgical care, the effect of policies aimed at increasing coverage is not uniform. Instead, it appears that patients in need of imperative or non-discretionary inpatient surgery tend to get this care whether or not they have insurance. In contrast, insurance expansion is an important driver of utilization for the relatively large population of patients who are potential candidates for discretionary or elective procedures. Once coverage is available, many of these patients move forward with surgical treatment.

Paragraph 3 – “THE FIT OF FINDING #2”

Sentence 1: Are your findings consistent with other researchers?

Example 1: Our finding that the non-white population was most strongly impacted by insurance expansion is also consistent with findings reported by other investigators.^{13,14,23}

Sentence 2: How do the current findings add to the literature?

Example 1: Taken together, these data suggest that insurance expansion may achieve an intended consequence of attenuating racial disparities in access to care, at least for certain inpatient surgeries. It is unclear, however, whether greater access to such procedures will ultimately close existing gaps between white and non-white populations with respect to overall health status.

Paragraph X – “THE FIT OF FINDING #3” (if applicable)

Paragraph 4 – “THE LIMITATIONS”

Sentence 1: Opening line

Sentence 2: First limitation

Sentence 3: Rebuttal

Sentence 4: Second limitation

Sentence 5: Rebuttal

Sentence 6: Third limitation

Sentence 7: Rebuttal

Example 1: Our study does have several limitations. First, there is no standard definition for discretionary versus non-discretionary surgeries. Thus, we while classified procedures a priori based on both the existing literature and clinical experience, we cannot know with certainty whether any one surgery was truly discretionary or not. Second, because we looked only at utilization of surgical procedures, we do not know whether insurance expansion affected other factors such as the timing or quality of surgery.^{34,35} Third, our analysis did not include outpatient surgical procedures. Accordingly, we could not examine trends in the utilization of cataract surgery, knee arthroscopy, cystoscopy, gastrointestinal endoscopy, and other procedures for which utilization may be particularly sensitive to changes in insurance status or supply of providers. ^{36,37} Finally,

because our outcome variable was a state-level rate, we did not adjust for patient-level variables in our regression models. Nonetheless, while there were some baseline differences in age, race, and payer mix between patients in the control states and Massachusetts, at the state-level these demographic differences were stable at over time and therefore unlikely to affect our estimates.

Paragraph 5 – “THE IMPLICATIONS”

Sentence 1: Opening

Example 1: These limitations notwithstanding, our findings help many stakeholders anticipate the effects of national insurance expansion through the ACA

Sentence 2: Relevance to policymakers

Sentence 3: Relevance to payers

Sentence 4: Relevance to physicians

Sentence 5: Relevance to patients

Example 1: Relevant to policymakers, our results suggest that expected long-term cost savings from national insurance expansion may be dampened to some extent by increased use of certain expensive inpatient surgeries.^{5,33} To this point, healthcare spending in Massachusetts has grown substantially in the last 5 years, prompting new state legislation aimed at limiting expenditures to the rate of the gross state product.^{38–40} If our findings accurately forecast the growth in discretionary inpatient surgery at a national level, insurance expansion with the ACA may well yield similar cost concerns for both federal and state governments. From a policy perspective, the value of such expenditures will depend on whether, and to what extent, greater access to such procedures actually improves quality and/or quantity of life for newly insured individuals.

* Many payers anticipate that insurance expansion will save money by providing access to care that prevents expensive hospitalizations.²⁴ Our findings suggest that such savings that could be offset by greater expenditures for elective inpatient procedures. Given this possibility, payers arguably have strong incentives to work with and support surgeons in their efforts to define optimal selection criteria for many elective surgical procedures.⁴¹ Our findings are also relevant to physicians and specialty societies because they suggest that some surgical disciplines (e.g., orthopedic surgery) could experience a rapid growth in demand with implementation of the ACA. This could have important implications for both post-graduate training programs and for patients

seeking access to such care, particularly in areas with fewer surgical specialists.^{42,43} Finally, for patients who currently lack coverage, insurance expansion offers the promise of access to procedures that may well improve their lives by treating debilitating medical conditions such as severe osteoarthritis. However, as seen in Massachusetts, if payers ultimately experience greater expenditures as a consequence of covering more elective inpatient surgeries, then all patients may ultimately face higher premiums.⁴⁴

Paragraph 5 – “THE FUTURE”

Sentence 1: Summary of findings

Sentence 2: Next research step

Sentence 3: Concluding remark

Example 1: Our collective findings suggest that insurance expansion leads to greater utilization of discretionary inpatient procedures that are often performed to improve quality of life rather than to address immediately life-threatening conditions. Moving forward, research in this area should focus on whether greater utilization of such procedures represents a response to unmet need or changes in treatment thresholds driven by patients, providers, or some combination of the two. In addition, it will be important to examine and define the individual and societal-level returns (e.g., better health outcomes, increased productivity, reduced rates of disability) achieved with such surgical interventions. In the end, the value of insurance expansion for surgical care may depend on the relative balance between increased expenditures and the measurable health benefits derived from greater access to elective inpatient surgery.

Reference for Example 1

Ellimoottil C, Miller S, Ayanian JZ, Miller DC. Effect of insurance expansion on utilization of inpatient surgery. *JAMA Surg.* 2014 Aug;149(8):829-36.

5. Writing the cover letter

Date

[Editor name], MD

Editor-in-chief, [journal name]

[Editorial office address]

Dear Dr. [Editor name]:

Please accept for review our manuscript entitled, “[manuscript title]” co-authored by Dr. Chad Ellimoottil, [list of authors]. This manuscript has been formatted as a [Type of article] for the [Journal Name].

There is widespread interest in understanding [broad statement]. In this empirical work, we test the hypothesis [state hypothesis]. Using data from [data source including years], we performed a [analysis type] to examine [what was research question]

We identified a [main finding]. This finding suggests [implications]. The [Journal Name] seems like an ideal venue for this study.

As corresponding author, I certify that all authors have made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work. All authors have substantially contributed to drafting the work or revising it critically for important intellectual content. All authors have given final approval of the version to be published. Finally, all authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The contents of this manuscript have not been copyrighted or published previously, nor are they under consideration for publication elsewhere.

On behalf of all the authors, thank you for your time and consideration.

Sincerely yours,

[author name], MD

6. Writing response letters

April 15, 2016
Health Affairs
7500 Old Georgetown Rd., #600
Bethesda, MD 20814

Re: 2016-0263

Dear Editorial staff of *Health Affairs*,

We sincerely appreciate the thoughtful comments submitted to us by the editorial board and the external reviewers on our manuscript entitled "The new bundled payment program for joint replacement may unfairly penalize hospitals that treat patients that are older and have more comorbidities" (ID # 2016-0263). After addressing all of the tremendously instructive comments point-by-point, we now present to you an enhanced manuscript that is much stronger than the original.

Please note that all changes to our manuscript are bolded and italicized in both this document and in the revised manuscript:

In response to the editorial comments, we have also reviewed and updated the word count, while also confirming that the number and formatting of the citations is in compliance with the requirements for the *Health Affairs*. We made language changes throughout the abstract and manuscript to minimize jargon, clarify points, etc.

On behalf of my co-authors, thank you very much for your time and consideration,

Sincerely,



Chad Ellimoottil, M.D., M.S.,

Reviewer #1:

1. "Well written analysis of a timely subject. The only question I have is whether or not hip replacements for hip fractures were included in this analysis. Prosthetic replacements for hip fractures have a higher case mix index and are associated with poorer outcomes compared to replacements for hip arthritis. CMS has decided to remove hip fractures from the CJR. If prosthetic replacements for hip fractures are included, the authors should remove them

and reanalyze the data. If this is impossible, the authors should include this fact in there discussion under weaknesses.”

We thank the reviewer for the kind words and positive assessment of the manuscript. We actually excluded all hip fractures in this analysis. Approximately, 12% of cases were identified as fracture episodes using ICD-9-CM diagnosis codes and excluded. In the revised submission, we performed a sensitivity analysis with hip fractures included and found no substantive difference in our results. Please see our response to Reviewer #4, Question 2 for details of this sensitivity analysis.

Generic Opening lines

We thank the reviewer for noting this specific point regarding our analyses.

The reviewer points out a key component of our statistical methods.

The reviewer raises a number of excellent questions that we hope to answer with future work, but we also agree that these topics are beyond the goals of our current study.

We would like to thank this reviewer for their thoughtful analysis of our manuscript.