Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

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SUPPLEMENTARY APPENDIX

The accuracy of valuations of surgical procedures in the Medicare Fee Schedule

David C. Chan, Johnny Huynh, David M. Studdert

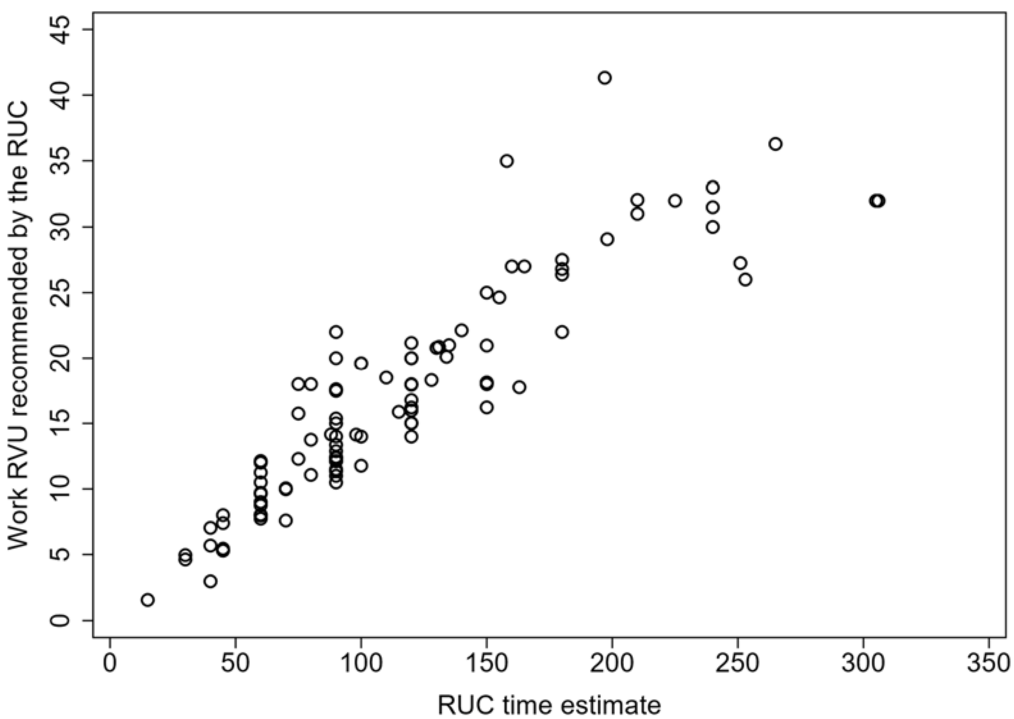
TABLE OF CONTENTS

1. IMPORTANCE OF SERVICE TIME IN DETERMINING WORK RELATIVE VALUE UNITS IN THE RESOURCE-BASED RELATIVE VALUE SCALE 2
2. THE RUC REVIEW PROCESS 3
3. MEASUREMENT OF PROCEDURE TIME ACCURACY: CONCEPT AND CALCULATION 5
4. ESTIMATION OF REVENUE IMPACTS 7
5. PROCEDURE TIME DISCREPANCY AND PROBABILITY OF RUC REVIEW 11
6. SENSITIVITY ANALYSES: TESTING POTENTIAL EFFECTS OF NON-REPRESENTATIVENESS IN NSQIP ON RESULTS 12
7. ALTERNATIVE MEASURES OF THE ACCURACY OF RUC TIME ESTIMATES 15
8. TIME ESTIMATES 17

1. IMPORTANCE OF SERVICE TIME IN DETERMINING WORK RELATIVE VALUE UNITS IN THE RESOURCE-BASED RELATIVE VALUE SCALE

In describing the importance of service time measures to the overall work RVU assigned to procedures in the Introduction section of the manuscript, we report that "the service times used [by the RUC] in valuing the sample of surgical procedures analyzed in this study explained 81% of the variance in the work RVUs assigned to those procedures." **Figure S1** (below) plots the correlation. A simple bivariate linear regression analysis estimated an intercept term of 3.0 (95% CI, 1.5-4.5), a coefficient of 0.12 (95% CI, 0.11-0.13), and an R-squared value of 0.81.

Figure S1. Association between the RUC time estimate and the work RVU recommended by the RUC



2. The RUC Review Process

As we note in the manuscript, the review processes used by the Relative Value Scale Update Committee (RUC) have been described in detail in other publications.[1,2,3,4] We do not aim to recapitulate those descriptions here. Rather, we focus on elaborating several aspects of the Committee's workings, deeper understanding of which may provide useful context for interpreting our results.

Nominally, the Centers for Medicare and Medicaid Services sets the RUC's agenda. However, a range of other actors and procedures exert influence, both in decisions about which services are tabled for RUC review and in the reviews themselves. Indeed, those other actors and procedures are so relevant that the RUC is best understood as the nucleus of a larger valuation apparatus (see **Figure S2**).

Three influential actors in the RUC's orbit are the Current Procedural Terminology (CPT) Editorial Panel, the Specialty Society Advisory Committee, and the specialty societies more generally. The CPT Editorial Panel, another AMA-organized group, has an important agenda-setting role: it is tasked with adding, deleting, and revising service codes and their descriptions. Such modifications often trigger RUC reviews, and the two bodies coordinate closely with each other. The Specialty Society Advisory Committee consists of over 100 representatives of specialty societies; its members advocate when reviews that affect them are brought before the RUC.

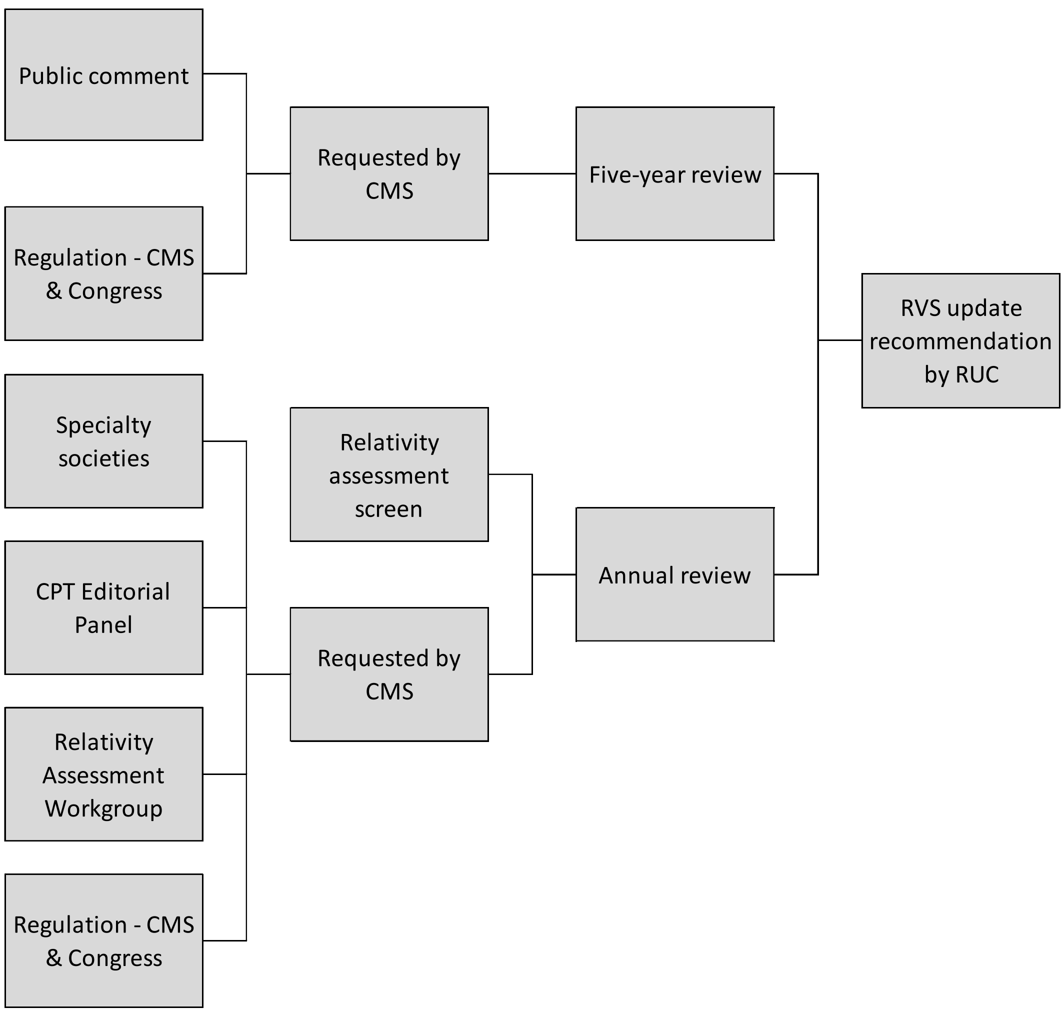
Physician specialty societies have played an active role in the service valuation process since the RUC's inception. Societies lobby CMS and the RUC for review or re-review of specific services; they gather evidence to support their positions; they comment on recommendations developed by other societies; and they sometimes mobilize against proposed changes. Specialty societies in the AMA House of Delegates play a formal and direct role in preparing recommendations for the RUC and marshaling evidence to support those recommendations; this role includes actually conducting the physician surveys that produce the time and complexity measures RUC uses, as described in the manuscript.

The RUC's work is also shaped by policies and procedures. In 2006, for example, the RUC adopted objective standards that were intended to facilitate more systematic identification services that were at highest risk of being misvalued in their current form and hence most in need of review. A new body, the Relativity Assessment Workgroup, was established to lead this work and advise CMS and the RUC.

The reviews themselves can be characterized in various ways. As we note in the manuscript, they divide roughly equally into those that are valuations of new or modified services and those that involve revaluations of existing services. Another distinction that was relevant until relatively recently is between "annual reviews" and "five-year reviews". Annual reviews are the standard type of review; they involve ad hoc decisions to review selected services. The RUC, CMS, and specialty societies exercise substantial discretion over which services are selected for annual reviews.

Five-year reviews, by contrast, are a broader form of review and the RUC has much less discretion over which services are chosen for this type of review. The Omnibus Budget Reconciliation Act of 1990 mandated that the practice expenses and work RVUs associated with the entire Resource-Based Value Scale (RBVS) be reviewed every 5 years in order to correct misvalued services. For obvious reasons, it was infeasible to do this using the same process as the RUC uses for its annual reviews. The regulations also stipulated certain steps for five-year reviews, including a public comment period in their early stages. The RUC conducted four rounds of five-year reviews, resulting in changes to the Medicare Physician Fee Schedule in 1997, 2002, 2007, and 2012. Five-year reviews were discontinued after 2012 and replaced with the relativity assessment screening, which seeks to identify misvalued services on a rolling basis. Nonetheless, five-year reviews are relevant to our study because our study period spans years in which they were being conducted.

Figure S2. The RUC review process



3. Measurement of Procedure Time Accuracy: Concept and Calculation

Our analytic approach was based on conceptualizing discrepancies between the RUC service time estimates and the NSQIP-derived benchmark times as consisting of two severable components: (1) discrepancy at the time of review; and (2) post-review changes in discrepancy.

RUC time estimate. For nearly all of the 293 procedures the RUC time estimates used in calculating discrepancies came from RUC reviews conducted between 1992 and 2015. However, a small number of the procedures in our sample had not undergone a RUC review through 2015. For these procedures, prevailing work RVUs were based on procedure times estimated at the inception of the Medicare Physician Fee Schedule;[5] we obtained those estimates. We call these time estimates RUC_i for a procedure i at the time of review.

Measurement of discrepancy at review. This component of accuracy relates to the difference between the RUC time estimate and the benchmark measure at the time of the RUC review. This difference is calculated as follows:

$$\left|\text{RUC}_i - \text{NSQIP}_{i,0}\right|$$

where RUC_i is the RUC's survey-based time estimate for service i at the time of RUC review and $\text{NSQIP}_{i,0}$ is the benchmark time for the same service during the same calendar quarter in which the RUC review of service i occurs. This produces an absolute difference (in minutes) between these two time values.

To address the fact that procedures vary considerably in length, we converted the observed discrepancies to proportions in several of the analyses. To ensure comparability to our other measure of discrepancy (changes subsequent to review) we chose as the denominator average NSQIP time over all calendar quarters in which the particular RVU was in force. Thus,

$$\text{Discrepancy at review}_i = \frac{(T+1)\cdot\left|\text{RUC}_i - \text{NSQIP}_{i,0}\right|}{\sum_t \text{NSQIP}_{i,t}}$$

for service i that was subsequently observed in NSQIP calendar-quarters $t = 0, \dots, T$, relative to the RUC review.

Measurement of changes in discrepancy after review. NSQIP time measures for the sampled procedures are observed throughout the 2005-15 period. The average duration of most procedure changes over time, in some cases quite substantially. Hence, the discrepancy between the RUC time measure and the benchmark measure is dynamic. Such "drift" could be in either direction, increasing or decreasing the size of the discrepancy at review.

We calculated average NSQIP times for each procedure in the sample over the calendar-quarters $0, \dots, T$ following the RUC review. We signed drift as positive if it went in the direction of the discrepancy at review and negative if it went in the opposite direction. As with our cross-sectional measures, to standardize across procedures of varying durations we calculated longitudinal changes as a proportion of average NSQIP time.

$$\text{Drift}_i = Sign(\text{RUC}_i - \text{NSQIP}_{i,0}) \frac{\sum_t (\text{NSQIP}_{i,t} - \text{NSQIP}_{i,0})}{\sum_t \text{NSQIP}_{i,t}}$$

Total discrepancy. **Figure S3** illustrates how the cross-sectional and longitudinal forms of discrepancy described above were measured and combined to produce a measure of total discrepancy in time.

The vertical height of the blue area in the figures at *t*=0 represents gap between the RUC time estimate and the benchmark measure at the time of RUC review. The vertical height of the green area represents drift in the NSQIP-derived benchmark measures. In Panel A of **Figure S3**, drift in procedure time increases the total discrepancy. In Panel B drift decreases total discrepancy by reversing some of the discrepancy created at the moment of review.

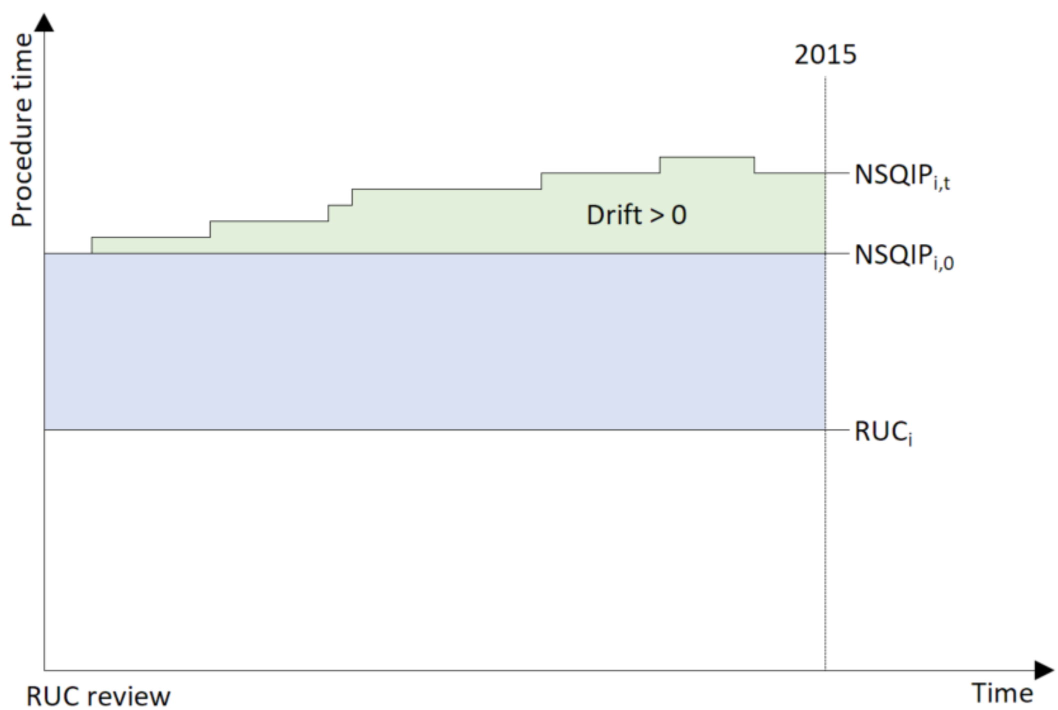
Thus, total discrepancy consists of the sum of the two forms of discrepancy.

$$\text{Total discrepancy}_i = \text{Discrepancy at review}_i + \text{Drift}_i$$

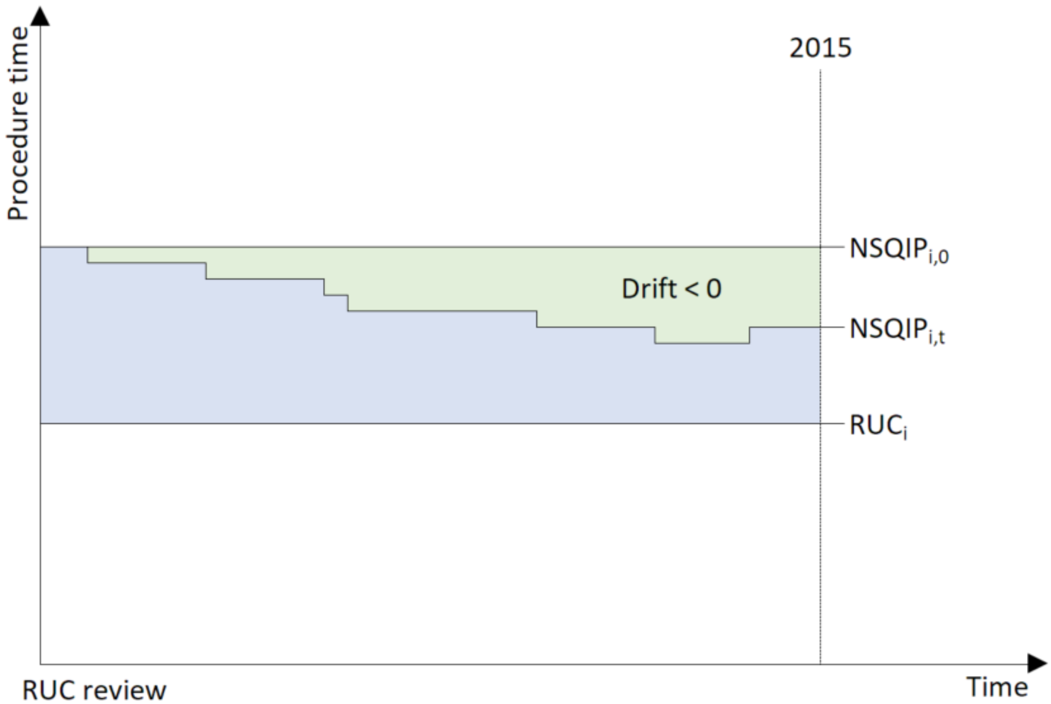
In our data, drift was never larger in magnitude than discrepancy at review, ensuring that values for total time discrepancy were always positive.

Figure S3. Total discrepancy as a function of cross-sectional and longitudinal discrepancies

A. Increases in total discrepancy resulting from changes in average procedure time following RUC review



B. Decreases in total discrepancy resulting from changes in average procedure time following RUC review



4. Estimation of Revenue Impacts

<u>Method of Calculation</u>

Profit (or loss) was calculated by subtracting the counterfactual work revenue from the actual work revenue among the 293 procedures used in our analysis of revenue effects.

$$\text{Revenue Impact}_s = \text{Work revenue}_s - \text{Counterfactual work revenue}_s$$

Actual Medicare work-component revenue for each physician specialty was calculated as follows: multiply the total Medicare volume ($Q_{i,s,y}$) for each procedure i performed by specialty s in year y by the CMS-approved work RVU ($\text{wRVU}_{i,y}$), and the conversion factor (CF_y) in force at the relevant time. Then aggregate procedure-specific payments across all procedures performed by the specialty s ($i \in I_s$) from 2011 to 2015:

$$\text{Work revenue}_s = \sum_{i \in I_s} \sum_{y=2011}^{2015} \left(Q_{i,s,y} \times \text{wRVU}_{i,y} \times \text{CF}_y\right)$$

We estimated counterfactual payments by scaling each procedure's work RVU by the proportion of work RVU attributed to intraservice time ($\pi_{i,y}$) and the ratio of the up-to-date NSQIP time estimate to the prevailing RUC time in the period during which the Medicare claim was made:

$$\text{CF work revenue}_s = \sum_{i \in I_s} \sum_{y=2011}^{2015} \left(Q_{i,s,y} \times \text{wRVU}_{i,y} \times \text{CF}_y \times \left(1 - \pi_{i,y} + \pi_{i,y} \frac{\text{NSQIP}_{i,y}}{\text{RUC}_{i,y}} \right) \right)$$

Work revenue is composed of two parts: (i) intraservice work, which is related to intraservice time and intraservice work per unit time (IWPUT), and (ii) pre- and post-service work. Since our analysis focuses on intraservice work, we hold pre- and post-service work constant with respect to any counterfactual change in intraservice time.

The constancy of pre- and post-service work is captured by the $1 - \pi_{i,y}$ term in the inner parentheses that does not depend on the relationship between NSQIP and RUC intraservice times. Discrepancies between NSQIP and RUC intraservice times only affect the work RVUs via the intraservice work, the last term in the inner parentheses. In order to calculate $\pi_{i,y}$, we use data provided by the RUC on all services and time components for each CPT code at the time of review, e.g., evaluation pre-service time; positioning pre-service time; scrub, dress, and wait pre-service time; immediate post-service time; and subsequent visits. Each of these pre- and post-service components has a pre-defined intensity, which the RUC also shared with us. Denoting pre- and post-service components as $q_{c,i,y}$ and corresponding intensities as p_c, intraservice work is thus known as

$$\text{Intraservice work}_{i,y} \equiv \text{wRVU}_{i,y} - \sum_c q_{c,i,y} p_c.$$

This gives us $\pi_{i,y} \equiv \text{Intraservice work}_{i,y} / \text{wRVU}_{i,y}$,

This ratio-scaling technique used to estimate counterfactual work payments is based on underlying logic of the RBRVS. Specifically, work is thought to be a product of time and intensity or "intraservice work per unit time" (IWPUT). The latter concept of intensity is thought to be a latent function of (i) technical skill and physical effort, (ii) mental effort and judgment, and (iii) psychologic stress. This design treats intensity as independent of procedure time; increasing procedure time while holding intensity constant would be consistent with our approach.

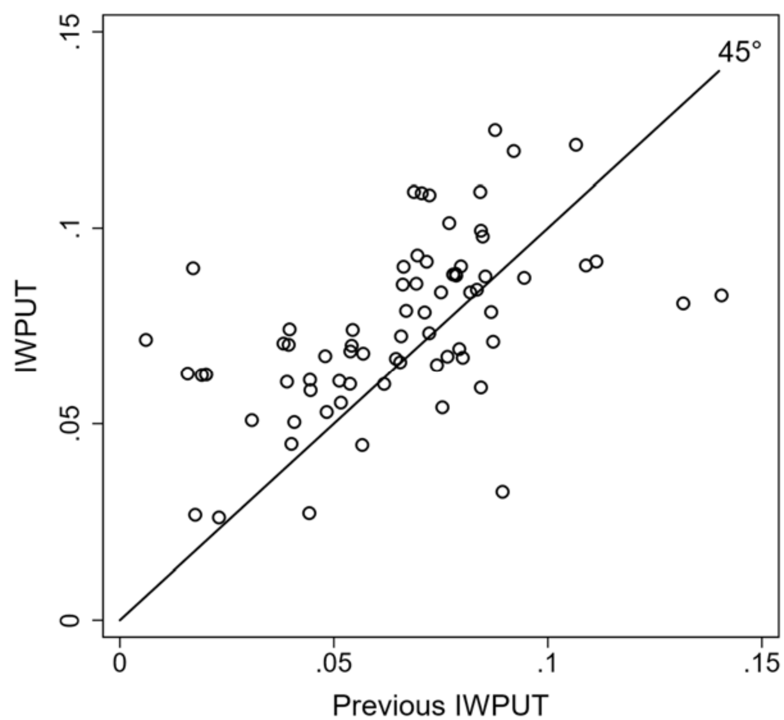
Robustness of Scaling Assumption

We cannot fully test the assumption that intensity (or IWPUT) will be held constant if counterfactual intraservice time estimates were used by the RUC. However, we conducted additional analyses of RUC data to test this assumption. Specifically, we first calculate $\text{IWPUT}_{i,y} \equiv \text{Intraservice work}_{i,y} / \text{RUC}_{i,y}$ then analyze (i) how $\text{IWPUT}_{i,y}$ changes over time within the same service and (ii) how it changes when $\text{RUC}_{i,y}$ changes.

In **Figure S4** below, we show the relationship between $\text{IWPUT}_{i,y}$ and $\text{IWPUT}_{i,y'}$ for CPT codes that are evaluated by the RUC on separate years y and y'. The figure shows an upward sloping relationship, which indicates that codes with a high IWPUT are likely to remain with a high

IWPUT on revaluation, even when the intraservice time changes. However, there does appear to be some reversion to the mean.

Figure S4. Changes in IWPUT measures among procedures re-reviewed by the RUC.

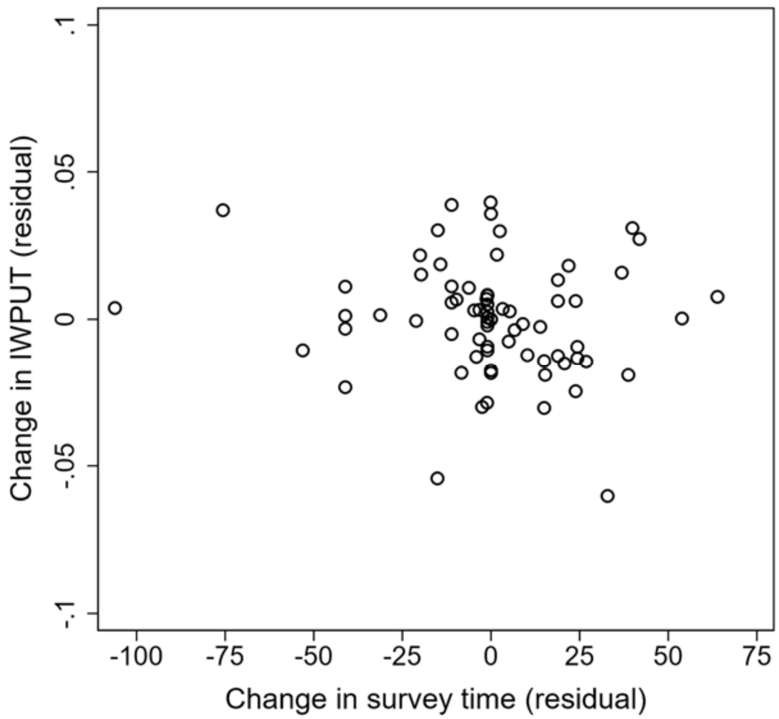


We find further direct evidence to support our assumption that IWPUT does not change *on average* as intraservice time increases or decreases by running the following regression,

$$\text{IWPUT}_{i,y} = \beta \text{RUC}_{i,y} + \alpha_i + \eta_y + \varepsilon_{i,y} \ ,$$

which measures the relationship between changes in IWPUT and changes in intraservice times for CPT codes with more than one review. We find a small and statistically insignificant estimate of $\hat{\beta} = -0.000091$ RVU per minute squared. Given that the standard deviation of intraservice time changes is 30 minutes, and the standard deviation of IWPUT values is 0.025 RVUs per minute among surgical codes (and 0.038 among all codes), this means that a standard deviation change in intraservice times is related to only a tenth of a standard deviation in IWPUT values. **Figure S5** below shows this regression result graphically.

Figure S5. Relationship between change in intraservice time and change in IWPUT

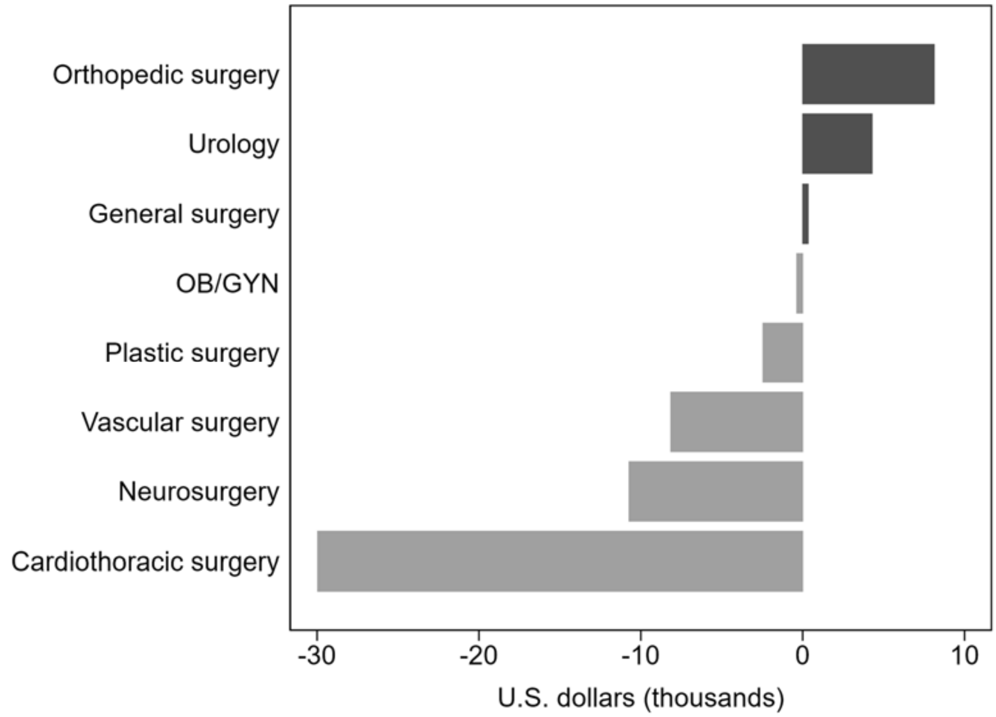


Revenue Impacts at Surgeon Level

Figure 3 in the manuscript reports the estimated effects of inaccuracies in the RUC measures of procedure time at the specialty level.

Figure S6 (below) presents these results at the surgeon level. They should be interpreted as the average loss or gain in revenue for surgeons in each specialty. However, the gains and losses for particular surgeons may be substantially higher or lower than this average, depending on the mix and volume of procedures they perform.

Figure S6. Average effect of time inaccuracies for 293 procedures on Medicare reimbursement for physicians in 8 surgical specialties, 2011-15 *



* We were able to obtain reliable data indicating the size of the practicing population of cardiac surgeons and thoracic surgeons *combined*, but not separate counts for these specialties. Therefore, we combined them for purposes of this figure.

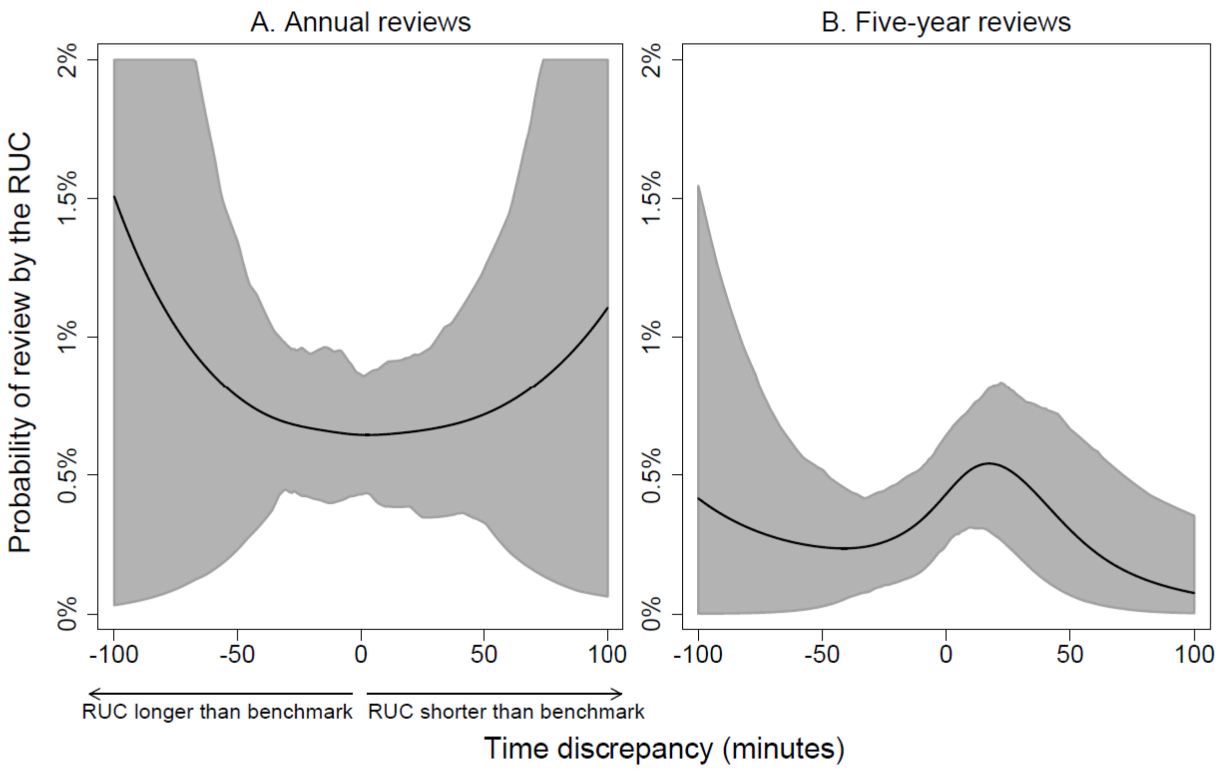
5. Procedure Time Discrepancy and Probability of RUC Review

As noted in the manuscript, this analysis used a procedure-RUC meeting level dataset consisting of 8,071 observations (293 procedures in up to 31 meetings per procedure). The dataset included 61 annual reviews and 41 5-year reviews.

The outcome variable specified whether a procedure was reviewed at a meeting. The independent variable of interest was the time discrepancy (positive or negative) for the procedure in the year of the meeting. The model adjusted for absolute NSQIP time, the number of quarters since the procedure's last RUC review, the volume of the procedures in the relevant year (as determined from the PSPS data), and the work RVU. To allow for nonlinear relationships, we constructed restricted cubic splines of the time discrepancy. To calculate 95% confidence intervals we bootstrapped the model using 200 iterations with resampling.

Panel A of **Figure S7** shows the results for annual reviews, and Panel B shows the results for five-year reviews. (For an explanation of the differences between these 2 types of reviews, see Section 2 above.)

Figure S7. Relationship between procedure time discrepancy and selection for RUC review*



* Shading indicates 95% confidence intervals.

6. SENSITIVITY ANALYSES: TESTING POTENTIAL EFFECTS OF NON-REPRESENTATIVENESS IN NSQIP ON RESULTS

Sensitivity Analysis #1: Weighted Analyses

We conducted additional analyses to explore whether the non-representativeness of NSQIP hospitals adversely affected the quality of our benchmark time estimates—and hence the validity of our discrepancy measures. Specifically, we constructed probabilistic weights to make the NSQIP sample more representative of the Medicare population, recalculated NSQIP times using those weights, and then compared those times to unweighted NSQIP times. These sensitivity analyses suggest that demographic differences between the populations of surgical cases in NSQIP and Medicare generally did not affect our main findings.

The data used to create the weights came from demographic information drawn from two sources: (1) the NSQIP Public Use Files for 2005-15; and (2) a 5% sample of final action Physician/Supplier Part B claims for the 2005-2013 from CMS. Both sources include procedure-level information on patients' age, gender, and race. A comparison of these demographic characteristics among patients who underwent the procedures in our sample showed that, on average, NSQIP patients were younger and more racially diverse than Medicare patients.

We used iterative proportional fitting (or "raking") to construct probabilistic weights at the procedure level. Raking allocates a value to each case in the NSQIP sample such that the weighted distribution of the NSQIP sample is similar to the marginal distribution of the Medicare population. The following categories were used: white race, sex, age under 65, age 65 to 69, age 70 to 74, and age 75 and over. When one category made up less than 5% of procedures in the Medicare population, we excluded it from that procedure's weight-generating process to ensure that the raking algorithm converged. For example, sex was not used to construct weights for hysterectomies because the procedure is performed exclusively on female patients.

Figure S8 presents a binned scatter plot of 8,348 weighted and unweighted NSQIP time estimates, which were measured at the procedure-calendar quarter level. We divided the sample into 20 equally-sized bins and computed the mean of the weighted and unweighted time estimates within each bin. The plot indicates that the weighted NSQIP time estimates for the procedures in our sample were not systematically larger or smaller than unweighted estimates.

We also replicated the analysis of cross-sectional accuracy using weighted time estimates and compared them to the results reported in Figure 1 of the manuscript. The red circles in **Figure S9** represent the weighted time estimates and the black circles represent the unweighted estimates. Bivariate linear regression analysis using weighted time estimates produced a coefficient of 1.09 (95% Confidence Interval, 1.05-1.13) and an R-squared value of 0.96.

Figure S8. Relationship between weighted and unweighted NSQIP time measures

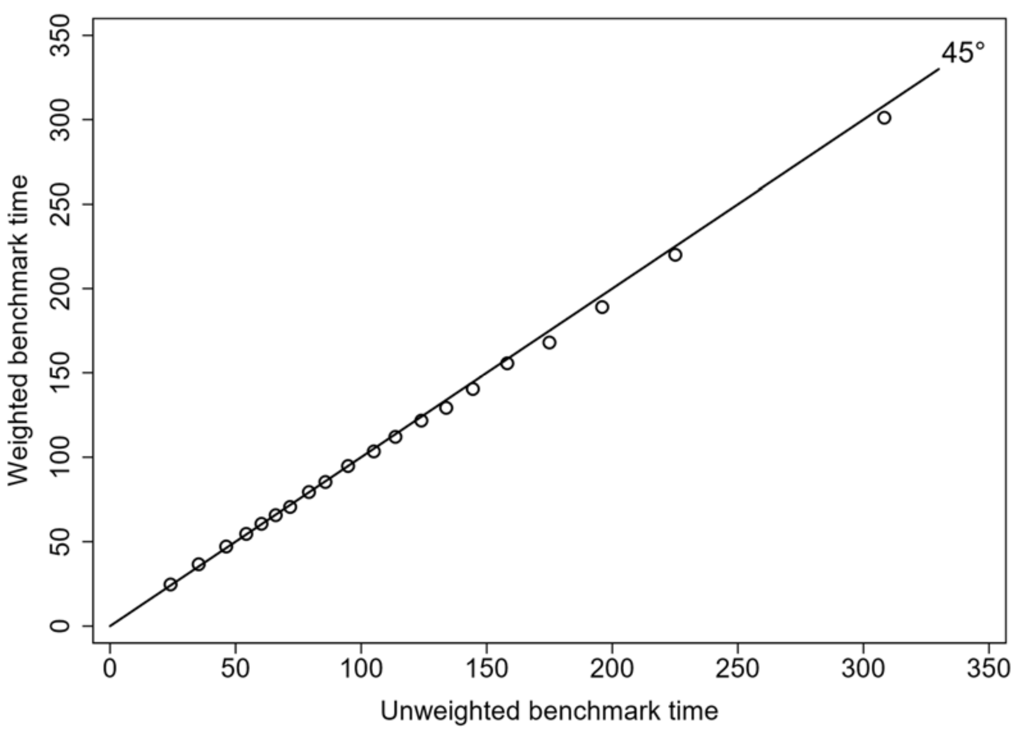
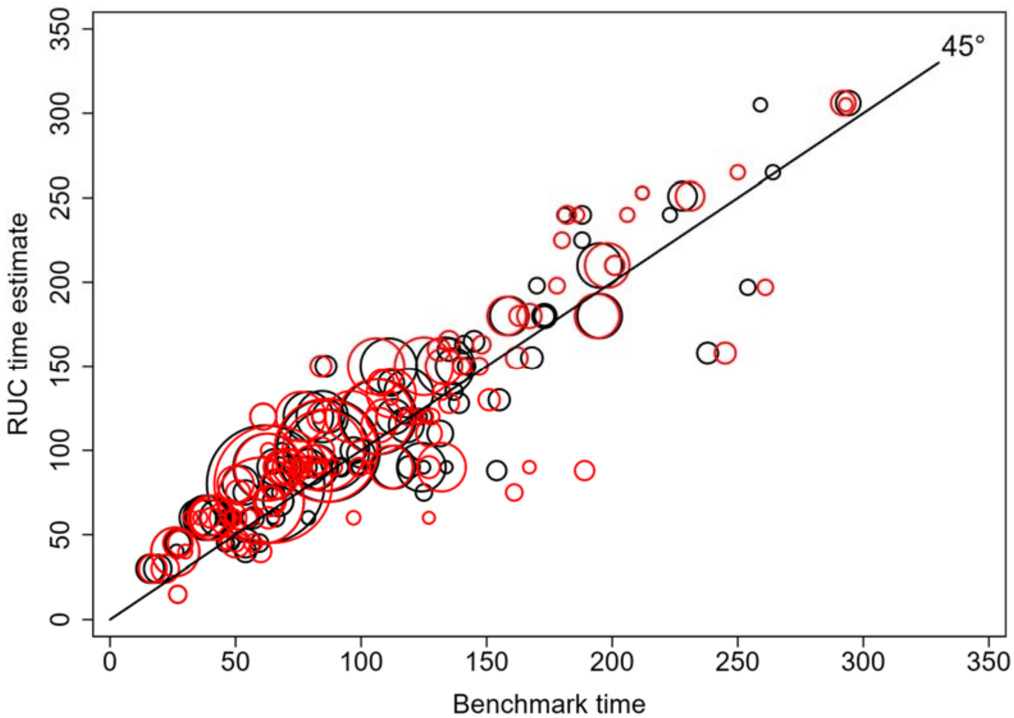


Figure S9. Association between RUC survey time estimates and weighted NSQIP time measures



Sensitivity Analysis #2: Trend Analyses

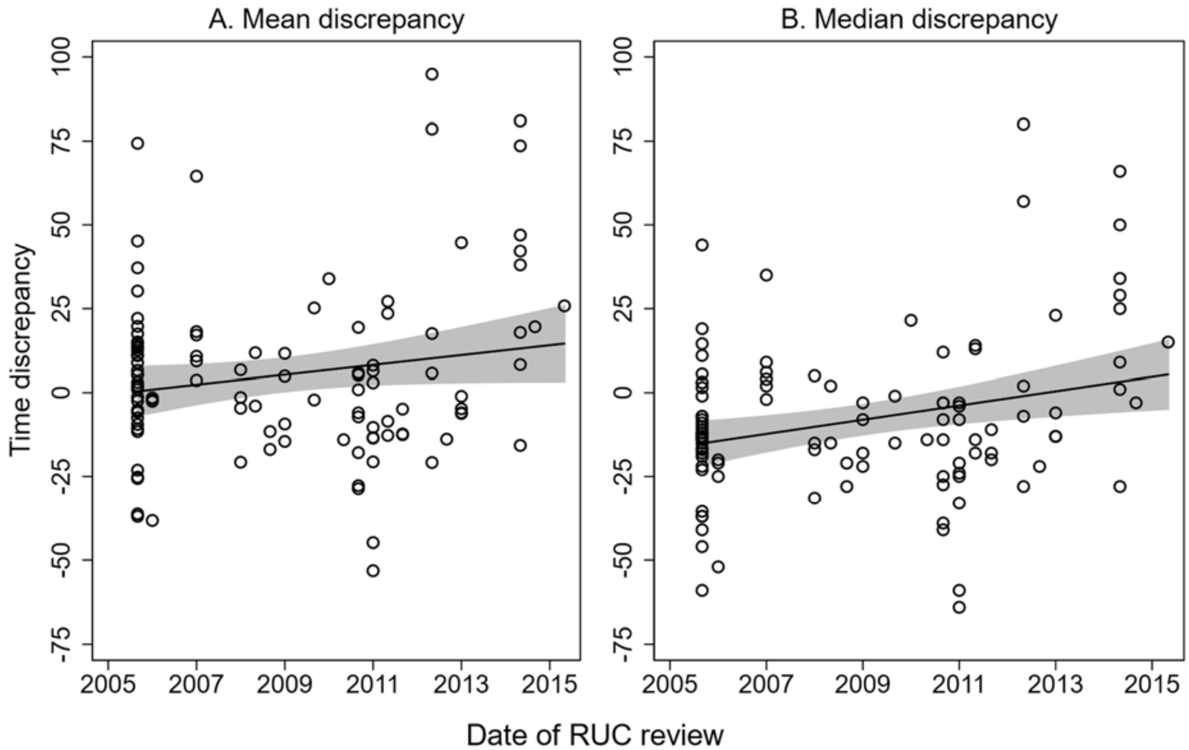
As a second analysis of the sensitivity of our findings to non-representativeness in the NSQIP sample, we investigated whether summary measures of the discrepancy between NSQIP times and the RUC time were sensitive to the year of comparison to NSQIP data. The NSQIP sample has become more representative over time, as more and more hospitals joined the program and began contributing cases. Therefore, the intuition behind this sensitivity analysis is that, if our results are affected by non-representativeness among NSQIP cases, we would expect any resulting biases to attenuate over time.

Figure S10 shows summary measures of the NSQIP-RUC discrepancy for each procedure at the time of review. We represent NSQIP times that were smaller than the RUC time as a "negative" discrepancy and NSQIP times that were larger than the RUC time as a "positive" discrepancy. We also recognize, as we did in our main analysis, that discrepancies may be calculated by reference to benchmark values that are defined either as means or medians of the distribution of time values from which the benchmarks are derived. We present both in Figure S10.

In sum, Figure S10 indicates no clear trend over the 2005-15 period. If there is any trend at all, discrepancies become slightly more positive over time—in other words, NSQIP times became slightly *longer* relative to the RUC time as the NSQIP sample became more representative. This suggests either that the bias from NSQIP sampling slightly underestimates NSQIP times relative to the RUC times. Alternatively, for this interpretation to be incorrect, changes in the RUC estimates would have had to almost exactly offset changes in the bias due to NSQIP sampling over time. This alternative interpretation is convoluted and much less plausible.

Thus, both of our sensitivity analyses point toward the conclusion that the results reported in Figure 1 of the manuscript (as well as our other results) are not substantially affected by non-representativeness in NSQIP sampling. To the extent any bias arises from this non-representativeness, it is likely to be small.

Figure S10. NSQIP-RUC discrepancy as function of calendar year, 2005-2015



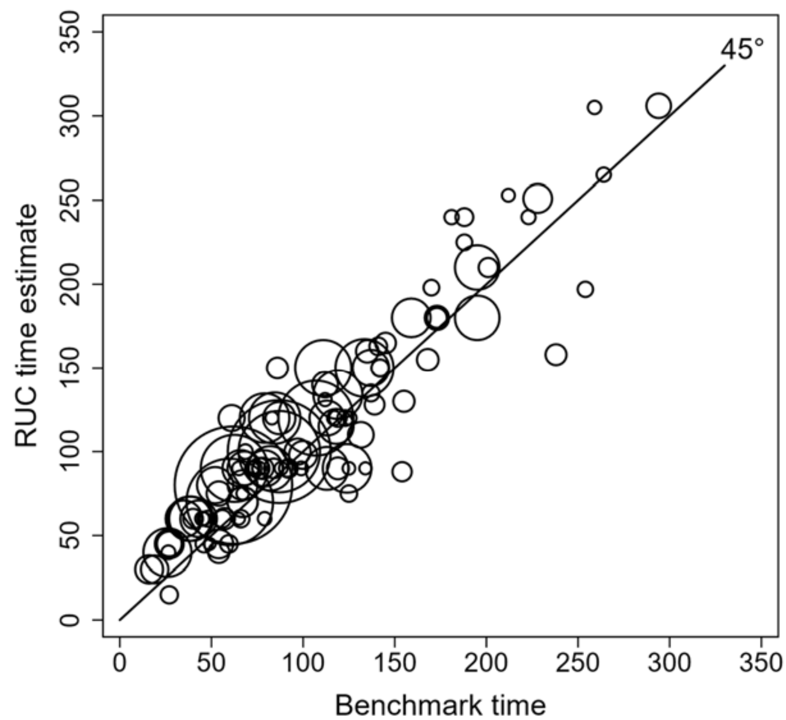
7. Alternative Measures of the Accuracy of RUC Time Estimates

<u>Mean- and Median-defined Benchmark Values</u>

In seeking to reconcile our results with those of previous studies of RUC time estimates, we state: "Our finding that the RUC does not systematically overestimate procedure times conflicts with results from prior studies. The conflict may be partially explained by the fact that prior studies have benchmarked using median time values. Using median rather than mean NSQIP times in our data showed that RUC time estimates tended to be 9% longer at the time of review [β, 1.09 (95% confidence interval, 1.06 to 1.13, P<0.001] (see Figure S11)."

Figure S11 appears below. The methodology used to produce the plot is identical to the one used for Figure 1, except median values of the NSQIP times for each procedure were used as the benchmark.

Figure S11. Relationship between RUC time estimates and median-based benchmark times for 108 reviews of common surgical procedures*



* Each bubble represents a surgical procedure reviewed by the RUC in 2005-2015. Bubble size represents frequency of the procedures in NSQIP.

The choice of mean-based or median-based measures of discrepancy is debatable. Although most previous studies have defined benchmarks according to median values, we believe that mean values have an equally if not more compelling claim. In one part of our study, however—the analysis of revenue impacts—mean-based measures are clearly the superior choice. The reason is that we are estimating revenue effects across entire specialties. The specialty-wide revenue impact for procedure k in specialty m = [mean discrepancy for procedure k × number of times procedure k is performed by surgeons in the specialty m]. Using a median discrepancy value in this calculation would produce an irrelevant result (unless the mean and median discrepancies happened to be the same). This example from our study illustrates that, in evaluations that involve aggregative calculations across groups, mean values may, for mathematical reasons, be the appropriate way to define benchmarks and discrepancies.

Systematic and Idiosyncratic Forms of Discrepancy

Another important distinction in measurement of time inaccuracies relates to the difference between "systematic" and "idiosyncratic" forms of discrepancy.

Systematic discrepancy refers to comparisons of average values of RUC and NSQIP times for a sample of services. Most previous studies of RUC times have centered on this form of discrepancy, in part because the studies were motivated by concerns that RUC processes tended to overestimate service times. The coefficient reported for the regression analysis associated with Figure 1 addresses systematic discrepancy. We do not find evidence of systematic discrepancy in our study sample as a whole.

Idiosyncratic discrepancy, on the other hand, refers to discrepancies between the RUC and NSQIP time values on a procedure-by-procedure basis. The lack of systematic discrepancy we observe may logically coexist with significant idiosyncratic discrepancy, because zero average discrepancy is compatible with substantial dispersion in the discrepancies. Measurement error from small survey samples, such as those the RUC uses to estimate service time, may be one source of idiosyncratic discrepancy. If service-specific time discrepancies are spread unevenly across specialties, they may lead to larger pay distortions in some specialties than others.

We measured idiosyncratic discrepancies in several ways. First, we calculated simple differences between RUC time estimates and NSQIP times for each procedure; these are depicted in Figure 1 as deviations from 45-degree and summarized by the "mean absolute discrepancy" statistic we report. Second the bars in Figure 2 show the distribution of discrepancies across procedures, with the light gray segments indicating absolute discrepancies at the time of RUC review and the dark gray segments indicating changes in the size of absolute discrepancies over time.

Finally, our revenue analysis (Figure 3) examines how discrepancies are distributed among selected specialties. Thus, this analysis decomposes how discrepancies may be idiosyncratic as opposed to systematic from a specialty perspective: Idiosyncratic discrepancies will cancel out when aggregated at the specialty level, while systematic discrepancies will imply revenue reallocations at the specialty level when moving from RUC to NSQIP times. We find that revenue reallocations (relative to an idealized counterfactual distribution estimated off benchmark times) are non-trivial in size, but generally smaller than the mean absolute discrepancy (i.e., mean absolute deviation in regression terms) of 17.4%. This suggests that much of the discrepancy is idiosyncratic and not systematically distributed across specialties.

8. TIME ESTIMATES

The following table shows the RUC time estimate and the NSQIP time estimate for each of the 293 procedures that underwent RUC review in 1992-2015. The table also shows the number of NSQIP cases that were used to derive the benchmark time estimate.

Table S12. Time values for 293 procedures

	CPT	Year of RUC review	Number of surgical cases in NSQIP	RUC survey time	NSQIP time estimate (median)	NSQIP time estimate (mean)
1	10140	1992	4,677	16		
2	10140	2010	4,677	15	27	34.4
3	10180	1992	2,897	20		
4	11005	2004	2,240	120		
5	11042	1992	9,825	30		

6	11042	2005	9,825	15		
7	11042	2010	9,825	15		
8	11043	1992	7,260	49		
9	11043	1995	7,260	45		
10	11043	2010	7,260	30		
11	11044	1992	4,121	79		
12	11044	1995	4,121	90		
13	11044	2010	4,121	45		
14	14301	2009	2,914	100		
15	15734	1992	4,945	194		
16	15734	2005	4,945	163	141	178.1
17	15830	2006	7,985	120		
18	19020	1992	3,892	28		
19	19020	2002	3,892	48		
20	19120	1992	42,303	35		
21	19120	1995	42,303	45		
22	19125	1993	48,633	60		
23	19160	1992	3,028	52		
24	19180	1992	2,336	73		
25	19180	2005	2,336	90	134	164.4
26	19301	2007	67,429	60		
27	19302	2010	10,754	100	97	105.9
28	19303	2005	57,229	90		
29	19304	1992	4,750	94		
30	19307	1992	28,601	104		
31	19316	1992	2,744	110		
32	19318	1995	18,193	150		
33	19325	1992	4,688	71		
34	19325	1995	4,688	90		
35	19340	1992	4,843	88		
36	19340	2009	4,843	120	119	145.2
37	19342	1992	4,605	115		
38	19357	2010	10,360	110	131.5	143.9
39	19364	1992	4,308	428		
40	19364	1998	4,308	390		
41	19371	1992	2,392	117		
42	19380	1992	6,563	89		
43	22551	2010	26,625	120		
44	22554	1992	4,542	142		
45	22554	1995	4,542	120		
46	22554	2005	4,542	90		
47	22558	1992	7,408	217		
48	22558	1995	7,408	180		

49	22600	1992	3,274	167		
50	22600	1995	3,274	120		
51	22612	1992	17,842	165		
52	22612	1995	17,842	150		
53	22612	2005	17,842	150		
54	22630	1992	7,069	225		
55	22630	1995	7,069	180		
56	22633	2011	6,321	200		
57	23412	1992	3,401	93		
58	23412	2008	3,401	100	68.5	79.3
59	23472	1992	10,451	142		
60	23472	1995	10,451	155		
61	23472	2000	10,451	165		
62	23472	2012	10,451	140	112	119.2
63	23515	1992	2,648	83		
64	23515	2007	2,648	90	88	100.8
65	23615	1992	2,470	103		
66	23615	1995	2,470	120		
67	23615	2007	2,470	90	125	154.6
68	25111	1992	3,753	41		
69	25447	1992	3,263	117		
70	25447	2005	3,263	100		
71	25607	2006	3,476	60		
72	25608	2006	3,049	90		
73	25609	2006	3,092	120		
74	26615	1992	2,252	56		
75	26615	2007	2,252	45	49	54.4
76	27125	1992	11,100	84		
77	27130	1992	104,562	128		
78	27130	2005	104,562	135		
79	27130	2013	104,562	100	87	94.0
80	27132	1992	3,020	194		
81	27134	1992	7,348	238		
82	27134	1995	7,348	240		
83	27137	1992	2,431	161		
84	27137	1995	2,431	180		
85	27236	1992	18,108	89		
86	27236	2005	18,108	90		
87	27236	2012	18,108	90	68	76.2
88	27244	1992	9,345	79		
89	27244	2008	9,345	75	54	63.4
90	27245	1992	20,765	85		
91	27245	2008	20,765	80	52	63.1

92	27301	1992	2,354	44		
93	27446	1992	6,113	105		
94	27446	2013	6,113	90	84	88.9
95	27447	1992	166,998	139		
96	27447	2005	166,998	124		
97	27447	2013	166,998	100	87	93.8
98	27486	1992	4,304	141		
99	27486	1995	4,304	150		
100	27487	1992	8,204	195		
101	27487	1995	8,204	200		
102	27590	1992	11,789	69		
103	27650	1992	2,245	68		
104	27650	2008	2,245	60	65	66.7
105	27792	1992	4,777	83		
106	27792	2007	4,777	60	66	77.1
107	27792	2011	4,777	60	56	62.9
108	27814	1992	5,489	87		
109	27814	2007	5,489	90	92	93.6
110	27822	1992	2,963	106		
111	27822	2000	2,963	90		
112	27822	2007	2,963	90	99	108.1
113	27880	1992	14,091	68		
114	27880	2005	14,091	80	67	74.9
115	27882	1992	2,585	53		
116	28805	1992	4,021	66		
117	28805	2005	4,021	60	48	54.6
118	29806	2001	3,221	100		
119	29806	2002	3,221	100		
120	29807	2001	3,618	90		
121	29822	1992	3,375	69		
122	29823	1992	3,229	84		
123	29824	2001	3,078	60		
124	29826	1992	7,154	95		
125	29826	2010	7,154	60	57	65.2
126	29826	2011	7,154	40	54	63.6
127	29827	2002	17,933	120		
128	29877	1992	5,456	69		
129	29879	1992	2,275	68		
130	29880	1992	13,116	80		
131	29880	2011	13,116	45	27	32.3
132	29881	1992	36,423	66		
133	29881	2011	36,423	40	26	31.5
134	29888	1992	12,309	127		

135	29888	2008	12,309	98	100	109.8
136	32480	1992	7,623	131		
137	32480	1993	7,623	180		
138	32480	1995	7,623	180		
139	32480	2000	7,623	155		
140	32650	1993	2,266	90		
141	32657	2005	2,870	60	79	90.2
142	32663	1993	7,325	240		
143	32663	2005	7,325	145		
144	32663	2011	7,325	155	168	182.2
145	32666	2011	5,149	75		
146	33405	1992	3,681	186		
147	33405	2000	3,681	240		
148	33405	2005	3,681	198		
149	33405	2012	3,681	197	254	275.6
150	33533	2000	6,915	155		
151	33533	2005	6,915	151		
152	33533	2012	6,915	158	238	252.9
153	34101	1992	2,405	68		
154	34101	2000	2,405	60		
155	34201	1992	6,159	65		
156	34201	2000	6,159	75		
157	34201	2005	6,159	128	139	142.6
158	34800	2000	3,087	120		
159	34802	2000	17,802	150		
160	34803	2004	10,549	165		
161	34804	2000	3,061	150		
162	35081	1992	5,781	167		
163	35081	1995	5,781	203		
164	35081	2005	5,781	210	201	215.4
165	35091	1992	2,311	249		
166	35091	1995	2,311	249		
167	35102	1992	3,191	247		
168	35102	1995	3,191	240		
169	35102	2005	3,191	265	264	271.5
170	35141	1992	2,699	145		
171	35141	2000	2,699	150		
172	35301	1992	88,863	120		
173	35301	1995	88,863	144		
174	35301	2013	88,863	120	107	115.2
175	35302	2006	2,269	150		
176	35355	1992	2,418	174		
177	35355	2000	2,418	120		

178	35371	1992	7,770	118		
179	35371	2000	7,770	103		
180	35556	1992	12,944	156		
181	35556	1995	12,944	200		
182	35556	2005	12,944	251	228	243.5
183	35566	1992	9,478	218		
184	35566	1995	9,478	258		
185	35566	2005	9,478	306	294	311.2
186	35571	1992	3,375	193		
187	35571	2000	3,375	180		
188	35583	1992	2,610	188		
189	35583	1995	2,610	220		
190	35583	2005	2,610	253	212	227.4
191	35585	1992	2,792	233		
192	35585	1995	2,792	270		
193	35585	2005	2,792	305	259	279.8
194	35646	1992	5,892	194		
195	35646	2001	5,892	210		
196	35656	1992	12,336	148		
197	35656	1995	12,336	150		
198	35661	1992	5,555	92		
199	35661	2000	5,555	120		
200	35666	1992	3,494	173		
201	35666	2000	3,494	150		
202	35903	1993	3,074	150		
203	36475	2004	12,962	60		
204	36475	2014	12,962	45	54	62.9
205	36478	2004	4,616	55		
206	36478	2014	4,616	45	46	53.3
207	37221	2010	6,048	90		
208	37224	2010	5,278	80		
209	37226	2010	6,859	90	76	76.0
210	37228	2010	3,053	90		
211	37607	1993	4,218	90		
212	37700	1992	2,881	41		
213	37722	2005	6,362	60		
214	37765	2003	6,695	60		
215	37766	2003	4,421	90		
216	38100	1992	3,938	91		
217	38100	2000	3,938	90		
218	38100	2005	3,938	120	123	131.2
219	38120	1998	4,289	180		
220	38724	1992	6,279	155		

221	38724	1995	6,279	180		
222	38724	2005	6,279	180	173	217.2
223	38745	1992	4,448	80		
224	38745	2000	4,448	90		
225	39400	1992	4,875	46		
226	39400	2005	4,875	45	59.5	64.7
227	42145	1992	3,109	63		
228	42145	1995	3,109	60		
229	42145	2008	3,109	60	45	55.4
230	42145	2008	3,109	60	45	56.0
231	42415	1992	4,725	156		
232	42415	2009	4,725	150	142	161.6
233	42415	2011	4,725	150	142	158.1
234	42821	1992	4,613	35		
235	42826	1992	17,898	28		
236	43117	1994	3,000	300		
237	43117	2000	3,000	410		
238	43279	2008	3,162	150		
239	43280	1997	19,787	150		
240	43281	2009	8,929	180		
241	43282	2009	5,823	210		
242	43632	1993	3,895	180		
243	43632	2000	3,895	150		
244	43632	2005	3,895	225	188	201.9
245	43633	1993	3,204	200		
246	43633	2000	3,204	175		
247	43633	2005	3,204	240	181	203.7
248	43644	2004	83,353	180		
249	43645	2004	2,269	200		
250	43770	2005	28,752	90		
251	43774	2005	5,367	90		
252	43775	2009	51,581	120		
253	43820	1992	2,838	75		
254	43820	2000	2,838	90		
255	43820	2005	2,838	120	125.5	142.1
256	43840	1992	7,195	59		
257	43840	2000	7,195	90		
258	43840	2005	7,195	90	78	88.7
259	43846	1992	5,796	145		
260	43846	1994	5,796	180		
261	43846	2000	5,796	180		
262	44005	1992	20,167	80		
263	44005	2000	20,167	120		

264	44050	1992	3,668	66		
265	44050	2000	3,668	82.5		
266	44120	1992	37,707	95		
267	44120	2000	37,707	90		
268	44120	2005	37,707	134	119	147.7
269	44130	1992	2,757	90		
270	44130	2000	2,757	120		
271	44130	2005	2,757	131	112	128.6
272	44140	1992	53,037	104		
273	44140	1995	53,037	150		
274	44140	2005	53,037	150	133.5	151.0
275	44141	1992	7,976	142		
276	44141	1995	7,976	180		
277	44141	2006	7,976	160	135	158.5
278	44143	1992	21,001	118		
279	44143	1995	21,001	180		
280	44143	2005	21,001	150	137	152.1
281	44144	1992	6,672	136		
282	44144	1995	6,672	180		
283	44144	2006	6,672	165	145	162.8
284	44145	1992	23,581	155		
285	44145	1995	23,581	210		
286	44145	2006	23,581	180	159	177.5
287	44146	1992	4,971	173		
288	44146	2006	4,971	240	188	201.8
289	44150	1992	9,225	157		
290	44150	2005	9,225	180	173	190.9
291	44155	1992	3,112	223		
292	44155	2005	3,112	240	223	257.4
293	44160	1992	30,304	156		
294	44160	2000	30,304	120		
295	44180	1992	13,807	120		
296	44188	2005	4,168	90		
297	44202	1997	4,527	200		
298	44204	2001	57,893	180		
299	44205	2001	27,063	165		
300	44206	2002	2,855	180		
301	44207	2002	30,862	195		
302	44208	2002	2,524	205		
303	44210	2002	4,872	240		
304	44211	2002	2,455	300		
305	44227	2005	3,000	150		
306	44310	1992	2,697	59		

307	44310	2000	2,697	62.5		
308	44320	1992	6,377	73		
309	44320	2000	6,377	90		
310	44346	1992	2,684	115		
311	44346	2000	2,684	120		
312	44602	1993	2,842	120		
313	44602	2000	2,842	90		
314	44602	2005	2,842	90	76	91.7
315	44620	1992	12,835	80		
316	44620	2000	12,835	90		
317	44625	1992	15,949	102		
318	44625	2000	15,949	120		
319	44626	1997	10,946	180		
320	44626	2000	10,946	150		
321	44950	1992	23,938	37		
322	44950	1995	23,938	50		
323	44950	2000	23,938	60		
324	44960	1992	7,542	65		
325	44960	2000	7,542	75		
326	44970	1996	206,460	73		
327	45110	1992	7,967	194		
328	45110	2000	7,967	180		
329	45111	1992	2,651	93		
330	45130	1992	3,678	117		
331	45130	2000	3,678	120		
332	45170	1992	2,777	57		
333	45395	2005	3,069	210		
334	46040	1992	12,181	20		
335	46040	2000	12,181	30		
336	46040	2005	12,181	30	16	20.6
337	46060	1992	2,994	41		
338	46060	2000	2,994	50		
339	46060	2005	2,994	40	26.5	28.4
340	46947	2004	3,994	30		
341	47120	1992	16,446	195		
342	47120	2000	16,446	225		
343	47122	1992	2,324	260		
344	47122	2000	2,324	300		
345	47125	1992	2,619	207		
346	47125	2000	2,619	225		
347	47130	1992	4,941	232		
348	47130	2000	4,941	240		
349	47562	2005	217,447	80	62	69.2

350	47563	2010	70,945	90	62.5	72.1
351	47600	1992	19,210	64		
352	47600	2000	19,210	80		
353	47600	2005	19,210	115	118	128.3
354	47600	2012	19,210	120	113	125.7
355	47605	1992	4,593	82		
356	47605	2000	4,593	90		
357	47605	2012	4,593	135	137	152.5
358	48140	1992	12,839	174		
359	48140	2000	12,839	150		
360	48150	1992	16,015	309		
361	48150	1993	16,015	360		
362	48150	2000	16,015	345		
363	48153	1993	10,767	345		
364	48153	2000	10,767	315		
365	49000	1992	20,711	66		
366	49000	1995	20,711	90		
367	49000	2005	20,711	90	79	98.8
368	49002	1992	2,397	80		
369	49002	2005	2,397	75	67	78.1
370	49020	1992	2,535	76		
371	49020	1995	2,535	125		
372	49020	2000	2,535	120		
373	49203	2007	2,679	120		
374	49205	2007	3,079	225		
375	49321	1993	6,189	60		
376	49321	1996	6,189	45		
377	49322	1997	2,257	45		
378	49324	2006	6,297	60		
379	49422	1994	2,864	48		
380	49505	1992	117,986	48		
381	49505	1993	117,986	60		
382	49505	2000	117,986	60		
383	49505	2005	117,986	70	60	64.2
384	49507	1993	14,439	98		
385	49507	2000	14,439	67.5		
386	49507	2009	14,439	70	67	74.9
387	49507	2011	14,439	70	67	76.4
388	49520	1992	11,814	78		
389	49520	1993	11,814	90		
390	49520	2000	11,814	60		
391	49521	1993	2,951	120		
392	49521	2000	2,951	90		

393	49521	2009	2,951	90	72	80.7
394	49521	2011	2,951	90	65	76.5
395	49525	1992	3,107	78		
396	49525	1993	3,107	90		
397	49525	2000	3,107	60		
398	49550	1992	2,325	64		
399	49550	1993	2,325	75		
400	49550	2000	2,325	60		
401	49553	1993	3,023	108		
402	49553	2000	3,023	75		
403	49560	1992	71,234	73		
404	49560	1993	71,234	90		
405	49560	2000	71,234	90		
406	49561	1993	30,322	120		
407	49561	2000	30,322	100		
408	49565	1992	20,397	96		
409	49565	1993	20,397	90		
410	49565	2000	20,397	100		
411	49566	1993	9,695	120		
412	49566	2000	9,695	120		
413	49570	1992	5,473	39		
414	49570	1993	5,473	60		
415	49570	2000	5,473	60		
416	49572	1993	3,361	60		
417	49572	2000	3,361	60		
418	49585	1993	67,765	60		
419	49585	2000	67,765	45		
420	49587	1993	31,001	75		
421	49587	2000	31,001	60		
422	49587	2009	31,001	60	38	45.5
423	49587	2011	31,001	60	39	46.6
424	49650	1993	47,390	60		
425	49651	1993	6,403	90		
426	49652	2007	21,131	90		
427	49652	2011	21,131	90	66	79.7
428	49653	2007	10,694	120		
429	49653	2011	10,694	120	61	75.2
430	49654	2007	16,391	120		
431	49654	2011	16,391	120	87	99.4
432	49655	2007	6,908	150		
433	49655	2011	6,908	150	86	96.8
434	49656	2007	4,423	120		
435	49657	2007	2,503	180		

436	50220	1992	3,141	126		
437	50220	1995	3,141	120		
438	50230	1992	3,777	222		
439	50230	1992	3,777	222		
440	50240	1992	5,041	158		
441	50240	1995	5,041	180		
442	50543	2002	9,273	240		
443	50545	2000	6,443	240		
444	50546	1999	5,037	205		
445	50548	1999	2,246	270		
446	51595	1992	4,162	328		
447	52234	1992	11,868	35		
448	52234	2011	11,868	30	19	25.1
449	52235	1992	9,731	37		
450	52235	2011	9,731	45	27	32.5
451	52240	1992	6,117	71		
452	52240	2011	6,117	60	40	47.7
453	52601	1992	22,625	62		
454	52601	2005	22,625	75		
455	52630	1992	2,612	48		
456	52630	2010	2,612	60	46	52.8
457	52648	1994	11,875	60		
458	55040	1992	4,407	50		
459	55845	1992	3,845	247		
460	55845	2014	3,845	198	170	182.3
461	55866	2002	31,189	310		
462	55866	2009	31,189	210	195	207.9
463	55866	2015	31,189	180	195	205.8
464	57240	1992	3,452	45		
465	57240	2005	3,452	60		
466	57250	1992	3,261	37		
467	57250	2005	3,261	60		
468	57260	1992	4,423	61		
469	57260	2005	4,423	90		
470	57265	1992	2,607	71		
471	57265	2005	2,607	120	83	83.0
472	57288	1992	21,176	64		
473	57288	2005	21,176	60		
474	57288	2008	21,176	60	43	58.6
475	57288	2010	21,176	60	35	54.0
476	57425	2003	2,396	120		
477	58140	1992	3,399	73		
478	58140	1995	3,399	120		

479	58146	2002	2,672	150		
480	58150	1992	41,532	89		
481	58150	1995	41,532	120		
482	58150	2005	41,532	120	84.5	165.2
483	58180	1992	6,616	71		
484	58180	1995	6,616	130		
485	58210	1992	3,077	192		
486	58210	1995	3,077	240		
487	58260	1992	16,584	70		
488	58260	2000	16,584	60		
489	58260	2002	16,584	60		
490	58262	2002	7,903	91		
491	58541	2006	4,303	95		
492	58541	2014	4,303	75	125	148.6
493	58542	2006	5,849	110		
494	58542	2014	5,849	88	154	169.0
495	58545	2003	3,007	120		
496	58548	2006	3,739	240		
497	58550	2003	7,163	100		
498	58552	2003	17,806	120		
499	58554	2003	2,513	167.5		
500	58570	2007	7,582	120		
501	58570	2014	7,582	90	119	132.2
502	58571	2007	37,194	135		
503	58571	2014	37,194	90	124	137.0
504	58573	2007	7,074	165		
505	58573	2014	7,074	130	155	168.1
506	58720	1992	4,510	52		
507	58720	1995	4,510	120		
508	58720	2005	4,510	90	91.5	102.5
509	59151	1992	4,171	75		
510	59151	1997	4,171	80		
511	60210	1994	6,292	105		
512	60220	1992	31,047	97		
513	60220	2000	31,047	90		
514	60220	2010	31,047	90	82	90.9
515	60225	1992	2,548	122		
516	60240	1992	49,652	159		
517	60240	2010	49,652	150	111	122.3
518	60252	1992	10,042	209		
519	60252	2000	10,042	180		
520	60260	1992	4,442	159		
521	60260	2000	4,442	145		

522	60271	2000	3,493	150		
523	60500	1992	38,597	138		
524	60500	2010	38,597	120	79	91.4
525	60650	1998	5,960	180		
526	61312	1992	2,377	150		
527	61312	1995	2,377	120		
528	61312	2005	2,377	150		
529	61510	1992	13,771	219		
530	61510	1995	13,771	200		
531	61512	1992	4,568	241		
532	61512	1995	4,568	240		
533	61518	1992	2,236	299		
534	61518	1995	2,236	240		
535	63005	1992	3,006	142		
536	63005	1995	3,006	143		
537	63020	1992	2,435	129		
538	63020	1995	2,435	120		
539	63030	1992	38,682	91		
540	63030	1995	38,682	90		
541	63042	1992	5,615	159		
542	63042	1995	5,615	120		
543	63045	1992	3,242	137		
544	63045	2014	3,242	120	117	139.6
545	63047	1992	28,976	121		
546	63047	1995	28,976	120		
547	63047	2005	28,976	90		
548	63047	2013	28,976	90	113	134.7
549	63075	1992	4,764	138		
550	63075	1995	4,764	120		
551	63075	2005	4,764	90		
552	63081	1992	3,559	175		
553	69631	1992	3,850	104		

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