How Have Hospital Pricing Practices for Surgical Episodes of Care Responded to Affordable Care Act-Related Medicaid Expansion?

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OBJECTIVE To determine how Medicaid expansion under the Affordable Care Act of 2010 (ACA) has affected hospital pricing practices for surgical episodes of care.

METHODS Given that safety net hospitals would be more vulnerable to decreasing reimbursement due to an increase in proportion of Medicaid patients, we utilized the Premier Healthcare Database to compare institutional charge-to-cost ratio (CCR) in safety net hospitals vs nonsafety net hospitals for 8 index urologic surgery procedures during the period from 2012 to 2015. The effect of Medicaid expansion on CCR was assessed through difference-in-differences analysis.

RESULTS CCR among safety net hospitals increased from 4.06 to 4.30 following ACA-related Medicaid expansion. This did not significantly differ from the change among nonsafety net hospitals, which was from 4.00 to 4.38 ($P = .086$). The census division with the highest degree of Medicaid expansion experienced a smaller increase in CCR among safety net hospitals relative to nonsafety net ($P < .0001$). CCR increased by a greater degree in safety net hospitals compared to nonsafety net in the census division where Medicaid expansion was the least prevalent ($P < .0001$).

CONCLUSION Safety net hospitals have not preferentially increased CCR in response to ACA-related Medicaid expansion. Census divisions where safety net hospitals did increase CCR more than their nonsafety net counterparts do not correspond to those where Medicaid expansion was most prevalent. This could indicate that, despite being more vulnerable to an increased proportion of more poorly reimbursing Medicaid patients, safety net hospitals have not reacted by increasing charges to private payers. UROLOGY 125: 79–85, 2019. © 2018 Elsevier Inc.

Along with improving healthcare access and elevating quality of care, enactment of the Patient Protection and Affordable Care Act of 2010 (ACA) sought to drive down healthcare expenditures in the United States. Indeed, in the first 3 years following passage of the bill, per capita healthcare expenditures slowed to a historically low rate of increase (3.2% annually, compared with 5.6% annually over the preceding decade). Additionally, while increases in national healthcare expenditures are still expected to outpace growth in GDP over the coming decade, current projections indicate this may be by a lesser margin than in decades past.[1] Debate remains, however, whether these results are attributable to effects of the ACA vs a consequence of broader macroeconomic trends.[2]

The contribution of the ACA to decreased national healthcare expenditures may theoretically stem from the law's focus on moderating spending and improving the efficiency of care among Medicare and Medicaid patients. In particular, this includes reduced payments, strengthened primary care, proliferation of accountable care organizations, reductions in Medicare readmissions, and decreased hospital-acquired conditions.[3] However, given the decreased rate of reimbursement relative to charge that is already associated with government plans vs private counterparts, further cost control measures in the form of such programs as the Medicare value-based purchasing program or the Hospital Readmissions Reduction Program could financially stress certain healthcare organizations.[4] These effects could be exacerbated by ACA-related Medicaid expansion, through which over 10 million additional individuals have acquired coverage.[5,6]

It is not yet known, however, how hospital pricing structures have responded to these cost control measures and shifts in access to care. Conceivably, compensatory increases

Financial Disclosures: The authors declare that they have no relevant financial interests.

Funding Support: None.

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Submitted: August 7, 2018, accepted (with revisions): October 18, 2018

in charges could be employed by hospitals in an effort to retain higher reimbursement from private payers and thereby offset lower payments from government insured patients and growth of the more poorly reimbursing Medicaid patient population. This theorized practice has been termed dynamic cost shifting.[7-9] We recently showed that safety net hospitals are associated with a greater degree of charge inflation (data pending publication), which could be attributable to such cost shifting behavior. In this context, we utilize the surgical subspecialty of urology here as a model to explore the effect of the ACA on charge-to-cost ratio specifically among both safety net and nonsafety net hospitals for surgical episodes of care during the first 2 years following ACA-related Medicaid expansion.

METHODS

Data Source

The Premier Healthcare Database (Premier, Inc, Charlotte, NC), was used for this analysis. Encompassing roughly 20% of annual discharges in the United States and featuring all payer data, this represents the largest available inpatient resource utilization database. To ensure accuracy of resource utilization data, audits are performed on a periodic basis; if there are inconsistencies between reported costs and the hospital's financial statement, Premier works with the respective institution to rectify the discrepancy.[10] Charges represent institution-specific chargemaster values. In addition to complete billing and coding information, this database also includes such demographic information as patient age, race, sex, and insurance status. There is also clinical documentation of all procedures, administered pharmaceuticals, and laboratory or diagnostic tests.

Given the policy implementation date of January 1, 2014, the study period was defined as spanning 2 years prior to and following coverage expansion. As such, for the period spanning from January 1, 2012, to September 30, 2015, we utilized International Classification of Diseases, 9th Revision, Clinical Modification (ICD9) procedural codes to extract all instances of radical prostatectomy, radical nephrectomy, radical cystectomy, partial nephrectomy, extracorporeal shock wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), ureteroscopy with lithotripsy, and transurethral resection of the prostate (TURP). Because we used publicly available data, this analysis was exempt from review by the Partners HealthCare Institutional Review Board.

Outcome Measures and Covariates

Cost and charge analyses were calculated as previously described. Within the Premier Healthcare Database, hospitals with cost-accounting systems assign relative value units to procedures to determine "reported costs."[11] Institutions without accounting systems provide "estimated costs."[12] To improve reliability of cost data in the present study, institutions without internal accounting systems were excluded. Hospital costs and charges were both defined at the level of each respective episode of care. Total costs were summation of all billed items during the index hospitalization. Charge data were extracted for all encounters and categorized in the same manner.

Institutional characteristics included census region (Northeast, Midwest, West or South), census division (East North Central, East South Central, Middle Atlantic, Mountain, New England, Pacific, South Atlantic, West North Central, West South Central) location (urban or rural), hospital size (fewer than 400 vs 400 or more beds), and teaching status. We defined "safety net" hospitals as the top quartile of hospitals in which the patients were considered self-pay or Medicaid, consistent with the methodology used in similar prior studies.[13,14] With respect to patient level characteristics, for each urologic surgery episode of care, insurance status was defined as either Medicaid, Medicare, private, no insurance, or other.

Statistical Analyses

We calculated median charge-to-cost ratio (CCR) by dividing aggregate chargemaster rates by recorded total cost for each unique surgical encounter. Median cost and charge were defined for each study quarter for both safety net and nonsafety net hospitals. Additionally, median CCR for each procedure was determined per year. All costs and charges were adjusted to 2016 US dollar.

To determine the effect of implementation of Medicaid expansion on charge inflation among safety net hospitals, we performed a difference-in-differences (DID) analysis.[15] This statistical approach is often used to assess the impact of policy changes. We compared the difference in CCR in safety net hospitals before and after the 2014 implementation of Medicaid expansion to the remaining hospitals—deemed "nonsafety net hospitals"—during the same period. We performed subanalyses within each census division.

Percent of overall population residing in a state participating in ACA-related Medicaid expansion was calculated for each census division based on United States Census Bureau 2014 state-based population estimates. We defined Pacific as the model Medicaid expansion division for this study due to it containing the highest proportion of individuals residing in state participating in Medicaid expansion (98.58%). The West South Central division was deemed the control population given that it had the lowest proportion of individuals residing in state participating in Medicaid expansion of all census divisions (7.71%).

Comparisons of institutional characteristics between groups were conducted using the chi-square test. All statistical analyses were performed using Stata SE 13; tests were 2-sided and $P < .05$ was considered statistically significant.

RESULTS

There were 367 unique hospitals determined to have performed the surgeries considered in this study. Of these, 92 met safety net criteria, and 275 were nonsafety net. The characteristics of these institutions are displayed in Table 1. Within the safety net hospitals, 82.61% were under 400 beds and 17.39% contained 400 beds or more. This compared to 73.82% and 26.18% among nonsafety net hospitals ($P = .09$). 27.17% of the safety net hospitals were rural, compared with 72.83% urban. This did not significantly differ from the ratio of 18.55% rural vs 81.45% urban amongst nonsafety net hospitals ($P = .10$). The majority of safety net hospitals in were nonteaching (66.30%), as was the case amongst nonsafety net (74.55%; $P = .14$). The most common geographic location for safety net hospitals was in the South, with 43.48% in that region compared to 22.83% in the West, 19.57% in the Midwest, and 14.13% in the Northeast. This did not differ significantly from nonsafety net hospitals, whose geographic distribution was 45.45%, 16.73%, 28.73%, and 9.09% for the same geographic areas ($P = .15$).

As shown in **Supplementary Figure 1a**, CCR trended upward in a statistically significant manner for all procedures except for

Table 1. Characteristics of 367 unique hospitals performing urologic surgery in the Premier Healthcare Database, 2012-2015

	Percent of hospitals		
	Non-safety net (n = 275)	Safety net (n = 92)	p value
Hospital Size (Number of beds)			0.09
≤ 400	73.82	82.61	
≥ 400	26.18	17.39	
Location			0.10
Rural	18.55	27.17	
Urban	81.45	72.83	
Geography			0.15
Midwest	28.73	19.57	
Northeast	9.09	14.13	
South	45.45	43.48	
West	16.73	22.83	
Teaching Hospital			0.14
No	74.55	66.30	
Yes	25.45	33.70	

ureteroscopy. This included the highest CCR procedure, ESWL, which increased from 4.23 to 5.45 (P for trend <.0001). The lowest CCR was associated with radical cystectomy, which trended from 3.29 to 3.87 (P for trend <.0001). **Supplementary Figure 1b** shows CCR specifically amongst safety net hospitals, which experienced significant increases in CCR for TURP, radical nephrectomy, ESWL, and ureteroscopy (P for trend < .0001 for all). This is compared to CCR trends among nonsafety net hospitals, which are displayed in **Supplementary Figure 1c**. Nonsafety net hospitals experienced significant CCR increases for TURP, radical cystectomy, radical nephrectomy, partial nephrectomy, PCNL, ESWL, and ureteroscopy (P for trend <.0001 for all).

Overall, CCR among safety net hospitals increased from 4.06 during the period prior to ACA-related Medicaid expansion to 4.30 in the period thereafter (Fig. 1). This was compared to a change among nonsafety net hospitals of 4.00 to 4.38 during the same period and corresponded to an adjusted DID estimator of 0.029 (P = .086). By census division, there were significantly different CCR trends within the Pacific, Mountain, East South Central, West South Central, and West North Central geographic regions (Supplementary Table 1). CCR increased by a greater margin among safety net hospitals in the Mountain (DID estimator = 0.46; P = .003), West South Central (DID estimator = 0.71; P < .0001), and West North Central divisions (DID estimator = 0.54; P < .0001). CCR preferentially increased among nonsafety net hospitals in the East South Central (DID estimator = -0.81; P < .0001) and Pacific divisions (DID estimator = -0.67; P < .0001). There was no relationship between percent of patients residing in a state participating in ACA-related Medicaid expansion and adjusted DID estimator (R^2 = 0.07).

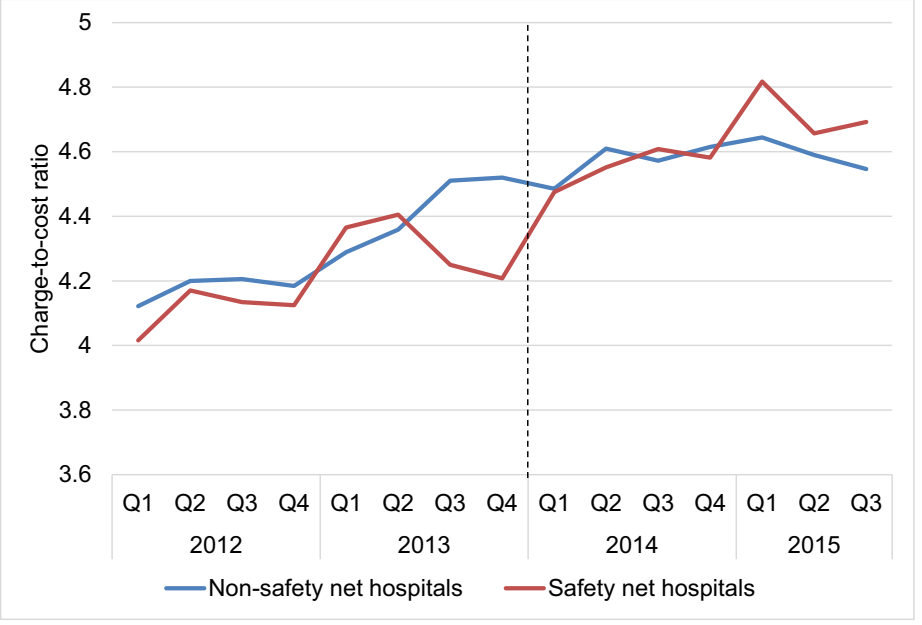
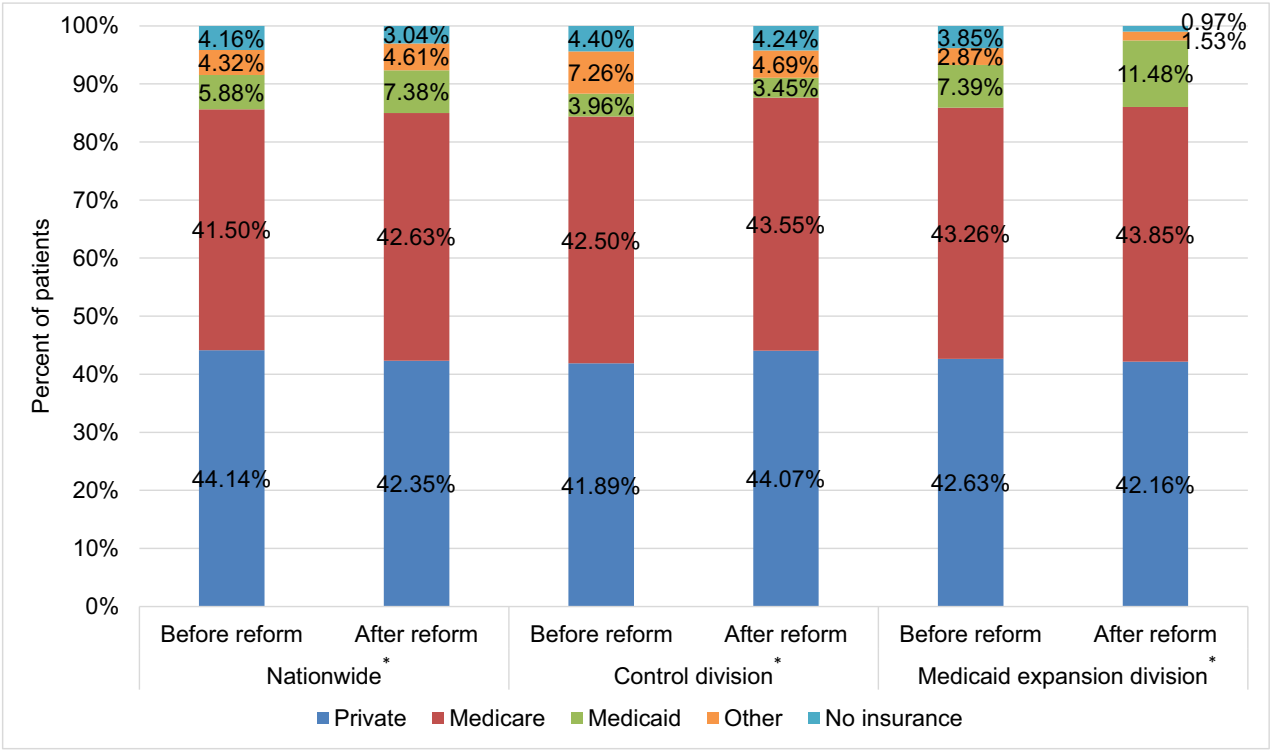


Figure 1. Quarterly hospital charge-to-cost ratio for urologic surgery episodes of care relative to January 2014 expansion of Medicaid coverage. (Color version available online.)



*p<0.05

Figure 2. Change in distribution of insurance coverage relative to Affordable Care Act-related Medicaid expansion among both an expansion and control census division. (Color version available online.)

Table 2. Change in distribution of insurance coverage by hospital safety net status relative to Affordable Care Act-related Medicaid expansion among both an expansion and control census division

		Distribution of insurance coverage status (%)					
		Safety net			Non-safety net		
Geographic area	Insurance	Before reform	After reform	p value	Before reform	After reform	p value
Nationwide	Medicaid	12.73	15.43	<0.0001	4.61	5.67	<0.0001
	Medicare	35.57	38.73		42.59	43.45	
	Private	39.32	37.89		45.03	43.30	
	No insurance	7.64	4.38		3.51	2.75	
	Other	4.74	3.56		4.25	4.83	
Control division*	Medicaid	6.67	10.15	<0.0001	3.77	2.88	<0.0001
	Medicare	38.83	31.33		42.75	44.60	
	Private	33.17	33.05		42.49	45.01	
	No insurance	7.67	9.12		4.17	3.82	
	Other	13.67	16.35		6.81	3.69	
Medicaid expansion division**	Medicaid	12.72	19.49	<0.0001	5.62	6.50	<0.0001
	Medicare	40.34	44.15		44.23	43.67	
	Private	37.76	33.45		44.26	47.58	
	No insurance	5.20	1.03		3.39	0.93	
	Other	3.97	1.88		2.50	1.32	

* West South Central division (7.71% of population residing in Medicaid expansion participating state)
** Pacific division (98.58% of population residing in Medicaid expansion participating state)

The effect of the ACA on insurance coverage is shown in Figure 2, illustrating distribution of insurance status both before and after Medicaid expansion. There was a statistically significant change in insurance distribution nationwide following policy implementation, as well as in the control and Medicaid expansion divisions ($P < .0001$ for all). Table 2 further divides change in distribution of insurance coverage by hospital safety net status. There was a statistically significant difference between insurance status between nonsafety net and safety net institutions for all groups when before reform was compared to after reform ($P < .0001$ for all).

DISCUSSION

In this first study of the effect of ACA-related Medicaid expansion on pricing of surgical episodes of care, we have shown that CCR has continued to rise in both safety net and nonsafety net hospitals in the first 2 years following policy implementation. On a national level, CCR did not preferentially increase among safety net hospitals during this time. There were differences between rate of change in CCR between safety net and nonsafety net hospitals in the Pacific, Mountain, East South Central, West South Central, and West North Central census divisions. These differences, however, did not correspond with prevalence of state-based Medicaid expansion.

Our findings provide the initial data to inform the discussion regarding potential cost shifting as a result of the ACA. In this context, cost shifting refers to certain hospitals seeking to increase private payer reimbursement in order to offset decreased revenue caused by a higher proportion of Medicaid patients. The existence and impact of dynamic cost shifting remains a contentious point in the more general debate over healthcare reform and cost control.[16-18] While readily apparent that healthcare entities necessarily engage in price discrimination by collecting variable service fees according to patient insurance type, the degree to which they seek increased reimbursement from private payers in direct response to decreasing government payer reimbursement remains less clear. Indeed, certain models or observational studies have illustrated the cost shifting phenomenon—for example, throughout California for-profit and nonprofit hospitals in response to declining Medicare and Medicaid reimbursement in the 1980s, in Illinois during the same time period, and throughout the United States in response to the Balanced Budget Act of 1997.[19-22] There has, however, arisen contrary evidence that goes so far as to demonstrate lower private prices in response to government rate cuts.[23,24] These seemingly disparate observations denote what is a likely complex interaction of multiple factors that ultimately determine a given hospital's response to declining public insurer reimbursement.

Overall, it appears probable that some degree of cost shifting does occur among healthcare organizations, though it is merely one of many factors in private payer rate dynamics and may occur at a more moderate rate closer to 20 cents per Medicare dollar lost to private payers.[8,9,20] Furthermore, there are certain market conditions necessary for an organization to engage in cost shifting. This includes both possessing market power and having not fully exploited it.[19,22] Of note, many hospitals in possession of the former may not also possess the latter, as those with higher market power tend to already be associated with higher costs, lower public payer margins, and higher private payer margins.[25] In other words, their prices are more likely to have already reached profit-maximized levels. Conversely, certain other institutions would likely have the desire to further maximize profit, though hold no leverage to do so.[20] Consistent with our findings, for example, it has been suggested that hospitals with a smaller share of private patients (represented by the safety net hospitals in this analysis) may be seen as less valuable clients to private insurers and therefore hold lesser bargaining power in reimbursement negotiations in addition to possessing a smaller population of private patients upon whom costs can be shifted.[26-28]

Specifically considering the ACA, cost shifting pressure stems from both cost control measures as well as the fluctuating landscape of insurance coverage. Early models of institutional response to cost control under the value-based purchasing program and Hospital Readmissions Reduction Program suggest that hospitals penalized by these programs responded by obtaining 1.5% higher reimbursement from private payers.[26] This effect was most pronounced in institutions with high market power, measured through share of private insurance patients. With respect to changes in payer composition, which is considered in the present analysis, cost shift potential is related to the more than 10 million individuals who have enrolled in Medicaid since expansion of eligibility to adults 18-64 years of age whose income falls below 138% of the federal poverty line.[3,6] This is because a "crowd out effect" could theoretically occur as some new beneficiaries who may have otherwise been covered by private insurance plans enroll in Medicaid, thereby promoting cost shifting amongst hospitals that face a population comprised of a higher proportion of patients for whom reimbursement would be at a lower public rate.[9,29-31] Indeed, the model Medicaid expansion division in our study demonstrated an increase in share of surgical patients in safety net hospitals who were covered by Medicaid (from 12.72% to 19.49%) while a coincident decrease in private insurance coverage took place during the same period (from 37.76% to 33.45%). The counterbalance to these aforementioned cost shifting pressures, however, is that the ACA also seeks to expand private coverage through insurance market reforms and the individual mandate, both of which reduce the burden of uncompensated care and therefore decrease the need for institutions to cost shift.[9] Our Medicaid expansion division, for example, saw the proportion of patients without insurance drop from 5.20% to 1.03% following policy implementation.

While the ability of the ACA to increase healthcare access is limited by a 2012 Supreme Court decision that gave state legislatures discretionary power to determine whether to expand Medicaid in their states, this created a natural experiment to determine the relative balance of opposing ACA cost shifting influences. In particular, the geographic regions considered in the present study vary dramatically in terms of percent of patients residing in states participating in ACA-based Medicaid expansion, ranging from 7.71% in the West South Central division to 98.58% in the Pacific division. Our results, therefore,

demonstrate a lack of significant cost shifting as a result of Medicaid expansion, as there was no preferential increase in CCR amongst safety net hospitals in the divisions with the highest rates of Medicaid expansion (ie, the institutions who would be most exposed to the crowd out effect caused by the growing Medicaid population). In fact, the overall effect of the ACA in areas with full participation in Medicaid expansion may have been moderation of charge inflation among safety net hospitals, as the division with the highest degree of Medicaid expansion (Pacific) experienced a smaller increase in CCR among safety net hospitals relative to nonsafety net.

The present study is limited in certain regards. First, the population is restricted only to inpatient facilities. As such, the findings here may not be generalizable to outpatient facilities and ambulatory surgery centers. Second, we are unable to analyze charge trends at the state level, as census division serves as the most specific geographic indicator in this database. Given that Medicaid expansion was enacted in a state-specific manner, this introduces undesired heterogeneity in comparing expansion to control populations. Third, regional representation of healthcare institutions is more from the South in our study. However, because there is no statistically significant difference in institutional characteristics between the 2 comparison groups in our study, we would propose that this is less likely to bias our findings. Fourth, while the present study analyzes the 2 years following ACA-related Medicaid expansion, more time may be needed to fully appreciate the impact of broadened access to care. Fifth, reimbursement data are not available to assist in detailing the magnitude of effect of specific cost control measures such as pay for performance programs or in determining the comprehensive effect of the ACA on individual hospital revenue streams.

In conclusion, we have shown that safety net hospitals have not preferentially increased CCR in response to implementation of Medicaid expansion as part of the ACA. Though there are certain census divisions where CCR has increased by a greater degree among safety net hospitals, these do not correspond to geographic regions containing a large proportion of Medicaid expansion states. This may indicate that, despite being more vulnerable to an increased proportion of more poorly reimbursing Medicaid patients, safety net hospitals have not enacted compensatory charge increases to buttress reimbursement from private payers. It will be necessary to continue monitoring hospital charge practices in response to improved access under the ACA, as pricing of surgical services continues to hold the potential to serve as a driver of cost containment.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.1016/j.urology.2018.10.034.

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