Development of a New *Communication About Pain* Composite Measure for the HCAHPS Survey
(July 2017)

Summary

In response to stakeholder concerns, in 2016 CMS created and tested several new items about pain management for possible use in the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) Survey. This report describes the statistical properties of the new *Communication About Pain* composite measure proposed for use in the HCAHPS Survey.

Background

The HCAHPS Survey contains three items about pain management. Hospital scores on the Pain Management composite measure have been publicly reported on the Hospital Compare Web site since 2008. Beginning in 2012, HCAHPS scores, including Pain Management, have been used in the Hospital Value-Based Purchasing program.

Responding to concerns raised by some stakeholders that the HCAHPS pain items create pressure on physicians to overprescribe opioids in hopes of achieving better survey results, CMS removed the Pain Management dimension from the HCAHPS component of the Hospital VBP beginning with FY 2018 program (see 2016 Outpatient Prospective Payment System Final Rule, https://federalregister.gov/d/2016-26515.pdf. In the 2017 Inpatient Prospective Payment System proposed rule, CMS presented three new Pain Management items that focus on communication with the patient as replacements for the pain items currently in the HCAHPS Survey; https://www.federalregister.gov/documents/2017/04/28/2017-07800/medicare-program-hospital-inpatient-prospective-payment-systems-for-acute-care-hospitals-and-long.

Approach

In 2016 CMS conducted a large-scale, randomized mode experiment of the HCAHPS Survey. The primary goal of the 2016 mode experiment was to re-evaluate and if necessary refine the survey mode adjustments employed in the HCAHPS Survey; a secondary goal was to test the impact of tiers of supplemental survey items on response rate.   CMS adjusts for the effect of survey mode to allow fair comparison of hospitals' HCAHPS scores regardless of the survey mode employed. Among the supplemental items tested were several new Pain Management items, including how often staff talked about how much pain the patient had, how to treat pain during hospital stay, side effects of prescription pain medication, how to treat pain post-discharge, and possible side effects associated with new pain prescriptions. CMS hypothesized that the five new Pain Management items, along with their associated screener items, would comprise two new composite measures: *Communication about pain during hospital stay* and *Communication about pain post-discharge*. **Table 1** lists these new pain items and the survey versions and modes in which they were included in the 2016 HCAHPS mode experiment; item

numbers indicate placement in the longest version of the survey, HCAHPS +44 supplemental items.

2016 HCAHPS Mode Experiment Sample Design

The new pain management items were investigated using data from the 2016 HCAHPS mode experiment. Data was collected from patients discharged in January, February and March 2016. The HCAHPS mode experiment employed the four permitted HCAHPS survey administration protocols (Mail Only, Telephone Only, Mixed Mode, and active Touch-tone Interactive Voice Response [TT-IVR]) in English. CMS recruited a nationally representative sample of 51 hospitals to participate in the mode experiment and adhered to the procedures and sample eligibility requirements specified in the HCAHPS Quality Assurance Guidelines Version 10.0 (March 2015), which include initiation of data collection between 2 and 42 days after discharge, completion of data collection within 42 days after initiation and exclusion of proxy respondents. CMS collected the data through a subcontractor.

The mode experiment sample was randomized across the four administration protocols (modes) and to survey version within mode. Randomization occurred within hospital; the monthly discharge sample from each hospital was randomly assigned to survey version within mode using rules set by the sampling team.

Results

Table 2 displays the number of patients surveyed and the number eligible to respond to the new and current pain items, as well the percentage completed among eligible patients. Cases were deemed eligible if patients provided a response other than "No" to the item's corresponding screener. An item is considered complete if the response was non-missing and other than "don't know."

Table 3 displays the overall frequency distribution of each new pain item in order to identify ceiling or floor effects; all items are ordinal. We define ceiling or floor effects as *strong* if the top category ("Yes" or "Always") or bottom category ("No" or "Never") contains at least 90% of the responses, *moderate* if neither the top nor bottom category contains at least 90% of the responses but the top or bottom category contains at least 80%, and *weak* if the top and bottom categories each contain less than 80%. All five of the new pain items fully meet the ceiling or floor criteria (with weak evidence of ceiling or floor effects).

Patterns of association between the new pain items and standard patient-mix characteristics are generally consistent with those reported in prior analyses of HCAHPS data, although owing to the small sample size these patterns do not always attain statistical significance (results not shown). Patients' age generally has a nonlinear relationship with the new pain measures, though most of these coefficients are not statistically significant. Evaluations of pain experience items worsen with worse self-reported overall health and with more education, as is typical for HCAHPS items. Maternity patients have generally more positive evaluations than the other service lines, followed by surgical, also as is typical (Elliott et al. 2009). Response percentile (relative lag time) findings show that late responders tend to provide less positive evaluations

than earlier responders, as is typical for HCAHPS items. Also typical, Telephone Only respondents tend to provide more positive evaluations than the other modes. Mode effects could not be estimated at this time for *how treat pain* as this item was not included on surveys administered by Telephone Only or TT-IVR.

Table 4 shows the intra-class correlations (ICC) and hospital-level reliabilities at 100 and 300 completed surveys for the new and current pain items and composite measures. ICC is a measure of the extent to which patient-level scores on HCAHPS items or measures vary between hospitals relative to the amount that the items vary within hospitals; ICC is used in combination with sample size to calculate hospital-level reliability. At the recommended 300 completed surveys, reliability is excellent (>0.90) for the *how treat pain* item (0.902), good (>0.80) for *how much pain* (0.883), and adequate (>.70) for the *pain side effects* item (0.787), the three items originally considered for the *Communication about pain during hospital stay* composite measure. Reliability is good (0.870) for a two-item version *(how much pain* and *how treat pain*) of this composite. Reliability is adequate (>.70) or poor (<0.70) for the items in the other composite (*Communication about pain post-discharge*) and poor for the composite itself (0.676). Reliability is adequate or good for the current pain items at 300 completes and adequate for the composite itself. These results generally hold both with and without adjustments for patient-mix and mode, with the adjusted reliability being the most relevant results.

Patient-level Pearson correlations of the unadjusted new pain items with the current pain item *pain control* (Q13) are (listed in order of decreasing magnitude) r=0.42 (n=1054) with *how treat pain*, r=0.39 (n=2015) with *how much pain*, r=0.26 (n=1983) with *home pain*, r=0.24 (n=2085) with *pain side effects*, and r=0.23 (n=1364) with r*x side effects*. Pearson correlations for the current *help pain* (Q14) item are (listed in order of decreasing magnitude) r=0.46 (n=1054) with *how treat pain*, r=0.43 (n=2014) with *how much pain*, r=0.28 (n=1984) with *home pain*, r=0.27 (n=2084) with *pain side effects*, and r=0.26 (n=1365) with *rx side effects*. All patient-level correlations are statistically significant (p<0.0001).

Statistically significant hospital-level (n=51) Pearson correlations of the unadjusted new pain items with the current pain item *pain control* (Q13) are (listed in order of decreasing magnitude) r=0.62 with *how treat pain*, r=0.51 with *how much pain,* and r=0.44 with *home pain* (p<0.01 for all). Correlations with current *help pain* item (Q14) are (listed in order of decreasing magnitude) r=0.57 with *how treat pain*, r=0.54 with *how much pain*, and r=0.52 with *home pain* (p<0.01 for all).

Next, we transform all new pain measures to z-scores. Using both linear scoring and top-box scoring of both the outcome and predictor variables, we predict the survey's Hospital Rating measure (formerly known as Overall Hospital Rating) (Q21) from the new pain items and composite measures. Standardized coefficients from multivariate regressions of the Hospital Rating item on the new and current pain items appear in **Table 5**. Two of the three new pain items in the proposed *Communication about pain during hospital stay* composite have the third and fourth largest unique association with both the linear and top-box coded Hospital Rating, after the two current pain items, *pain control* (Q13) and *help pain* (Q14). All new pain items

have a bivariate association with linear Hospital Rating of 0.27 or higher, evidence of validity and importance to patients in making their overall assessments. The bivariate association with linear Hospital Rating is 0.51 for *Communication about pain during hospital stay* and 0.30 for *Communication about pain post-discharge.*

Internal consistency reliability (standardized coefficient alpha*,* also known as Cronbach's alpha) for the three-item *Communication about pain during hospital stay* composite is 0.71. Internal consistency reliability is a 0-1 scale where 1 represents perfect measurement of the underlying construct via multiple inter-correlated items. Because of the low correlation of the *pain side effects* with the other two items in this proposed composite, we also estimated a two-item version of this composite that excludes the side effects item. The alpha for this two-item version is indeed higher (0.81). The internal consistency of the second two-item composite, *Communication about pain post-discharge,* is poor (0.50).

Summary

The analysis presented here suggests that a two-item version of *Communication about pain during hospital stay* composite based on how often staff talked about pain and how often staff discussed how to treat pain, preceded by a screener item asking whether the patient had any pain during the hospital stay, has strong psychometric properties. The properties of the individual items used in the proposed *Communication about pain during hospital stay* composite themselves are as good as or better than the two pain management items currently on the HCAHPS Survey. The two new items are not subject to floor or ceiling effects, have good (>0.80) or excellent (>0.90) hospital-level reliability at recommended sample sizes, are not redundant with the current items, are related in a predictable manner with the standard patient-mix characteristics, are predictive of the global Hospital Rating item, and do not vary systematically by survey mode after adjusting for patient mix. They also have high internal consistency as a composite (Cronbach's alpha=0.81). A three-item version of *Communication about pain during hospital stay* that also included a new item on discussion of prescription pain medication side effects had poorer psychometric properties than the two-item version, including lower internal consistency (Cronbach's alpha=0.71) and lower hospital-level reliability. We also investigated a two-item *Communication about pain post-discharge* composite, however its psychometric properties were quite poor, including inadequate Cronbach's alpha (0.50) and hospital-level reliability (0.676).

Conclusion

The empirical research summarized above, coupled with cognitive testing of the new pain items and interviews with patients, caregivers and stakeholders, supports CMS's proposal to replace the three pain items currently on the HCAHPS Survey with two new items that focus on communication about pain (*how much pain* and *how treat pain)*, along with a screener item. These new items comprise the proposed new Pain Management composite measure*;* see **Table 6**. Going forward, the new Pain Management composite measure will be labelled more simply "*Communication About Pain*." CMS will not proceed with the other pain composite it examined, *Communication about pain post-discharge.*

Reference

Elliott MN, Zaslavsky AM, Goldstein E, Lehrman W, Hambarsoomians K, Beckett MK, Giordano L. Effects of survey mode, patient mix, and nonresponse on CAHPS® Hospital Survey scores. Health Services Research. 2009 Apr 1; 44 (2; Part 1): 501-18.

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Table 1. New pain items included in the 2016 HCAHPS mode experiment, by survey version					
Screener and Dependent Items:	Q38: During this hospital stay, did you have any pain?		Q42: During this hospital stay, did you get medicine for pain?		Q63: Before you left the hospital, did staff give you prescription to treat pain?
Survey Version:	Q39: During this hospital stay, how often did hospital staff talk with you about how much pain you had? (*how much pain*)	Q40: During this hospital stay, how often did hospital staff talk with you about how to treat your pain? (*how treat pain*)	Q43: Before giving you pain medicine, did hospital staff describe possible side effects in a way you could understand? (*pain side effects*)	Q61: Before you left the hospital, did someone talk with you about how to treat pain after you got home? (*home pain*)	Q64: Before giving you the prescription for pain medicine, did hospital staff describe possible side effects in a way you could understand? (*rx side effects*)
Standard 32-item HCAHPS survey[1]					
HCAHPS +9 supplemental items (totaling 41 items)[2]	X		X	X	X
HCAHPS +16 supplemental items (totaling 48 items)[3]	X		X	X	X
HCAHPS +27 supplemental items (totaling 59 items)[4]	X	X	X	X	X
HCAHPS +44 supplemental items (totaling 76 items)[5]	X	X	X	X	X

[1]Administered in Mail Only, Telephone Only, Mixed, and TT-IVR modes.
[2]Administered in Telephone Only and TT-IVR modes.
[3]Administered in Telephone Only and TT-IVR modes.
[4]Administered in Mail Only and Mixed Mode.
[5]Administered in Mail Only.

Table 2. Number of patients surveyed, eligible patients, and completed Pain Management items in the 2016 HCAHPS mode experiment.

	Communication about pain during hospital stay					Communication about pain post-discharge			Current HCAHPS pain items		
	Q38 **Had pain** (screener)	Q39 **How much pain**	Q40 **How treat pain**	Q42 **Med for pain** (screener)	Q43 **Pain side effects**	Q61 **Home pain**	Q63 **Rx for pain** (screener)	Q64 **Rx side effects**	Q12 **Need pain med** (screener)	Q13 **Pain control**	Q14 **Help pain**
Patients surveyed, total	3349	3349	1705	3349	3349	3349	3349	3349	7123	7123	7123
N Eligible patients (% of Surveyed)	3349 (100%)	2371 (70.80%)	1232 (72.30%)	3349 (100%)	2504 (74.8%)	3349 (100%)	3349 (100%)	1790 (53.40%)	7123 (100%)	5091 (71.50%)	5091 (71.50%)
N Item completes (% of Eligibles)	3228 (96.39%)	2240 (94.50%)	1160 (94.20%)	3191 (95.28%)	2272 (90.70%)	3114 (93.00%)	3100 (92.56%)	1519 (84.90%)	6925 (97.22%)	4914 (96.50%)	4912 (96.5%)

Table 3. Frequency Distributions of New Pain Items, 2016 HCAHPS Mode Experiment

New Pain Items	Response Frequencies		Ceiling %	Floor %
	N	%		
Composite: *Communication about pain during hospital stay*				
Q38 had_pain_screener = During this hospital stay, did you have any pain?				
1. No	978	30.3%		
2. Yes	2250	69.7%		
Q39 how much pain = During this hospital stay, how often did hospital staff talk with you about how much pain you had?			58.7%	3.3%
1. Never	73	3.3%		
2. Sometimes	286	12.8%		
3. Usually	567	25.3%		
4. Always	1314	58.7%		
Q40 how_treat_pain = During this hospital stay, how often did hospital staff talk with you about how to treat your pain?			55.0%	8.2%
1. Never	83	8.2%		
2. Sometimes	146	12.6%		
3. Usually	293	25.3%		
4. Always	638	55.0%		

Q42 pain_med_screener = During this hospital stay, did you get medicine for pain?				
1. No	845	26.48		
2. Yes	2346	73.52		
Q43 pain_side_effects = Before giving you pain medicine, did hospital staff describe possible side effects in a way you could understand?			76.2%	23.8%
1. No	541	23.8%		
2. Yes	1731	76.2%		
Composite: *Communication about pain post-discharge*				
Q61 home_pain = Before you left the hospital, did someone talk with you about how to treat pain after you got home?			77.0%	23.0%
1. No	566	23.0%		
2. Yes	1899	77.0%		
Q63 rx_for_pain screener = Before you left the hospital, did hospital staff give you a prescription for medicine to treat pain?				
1. No	1559	50.29%		
2. Yes	1541	49.74%		
Q64 rx_side_effects = Before giving you the prescription for pain medicine, did hospital staff describe possible side effects in a way you could understand?			77.1%	22.9%
1. No	348	22.9%		
2. Yes	1171	77.1%		

Table 4. Intra-class correlations and hospital-level reliabilities at 100 and 300 completed surveys for the new and current pain items in the 2016 HCAHPS Mode experiment, unadjusted and adjusted for standard patient-mix adjustment

Notes:
All models (unadjusted and adjusted) were adjusted for hospital fixed effects.
Estimates generated with the SAS software.
Reliability>0.70; 0.60 < Reliability <0.70; **Reliability <0.60**

Item	Item number and label	Survey Mode	Unadjusted			Adjusted		
				Reliability			Reliability	
			ICC	n=100	n=300	ICC	n=100	n=300
Communication about pain during hospital stay								
how_much_pain	**Q39** During this hospital stay, how often did hospital staff talk with you about how much pain you had?	Avg across mode	0.023	**0.700**	**0.875**	0.025	**0.716**	**0.883**
		Mail Only	0.039			0.040		
		Telephone Only	0.016			0.012		
		Mixed Mode	0.008			0.011		
		TT-IVR	0.029			0.035		
how_treat_pain	**Q40** During this hospital stay, how often did hospital staff talk with you about how to treat your pain?	Avg across mode	0.034	**0.777**	**0.913**	0.030	**0.754**	**0.902**
		Mail Only	0.046			0.037		
		Telephone Only						
		Mixed Mode	0.022			0.023		
		TT-IVR						
pain_side_effects	**Q43** Before giving you pain medicine, did hospital staff describe possible side effects in a way you could understand?	Avg across mode	0.013	**0.565**	**0.796**	0.012	**0.552**	**0.787**
		Mail Only	0.000			0.000		
		Telephone Only	0.018			0.015		
		Mixed Mode	0.033			0.034		
		TT-IVR	0.000			0.000		

Communication about pain post-discharge								
home_pain	**Q61** Before you left the hospital, did someone talk with you about how to treat pain after you got home?	Avg across mode	0.003	**0.214**	**0.449**	0.001	**0.070**	**0.184**
		Mail Only	0.000			0.000		
		Telephone Only	0.000			0.000		
		Mixed Mode	0.011			0.003		
		TT-IVR	0.000			0.000		
rx_side_effects	**Q64** Before giving you the prescription for pain medicine, did hospital staff describe possible side effects in a way you could understand?	Avg across mode	0.008	**0.443**	**0.705**	0.008	**0.438**	**0.701**
		Mail Only	0.004			0.002		
		Telephone Only	0.013			0.024		
		Mixed Mode	0.014			0.005		
		TT-IVR	0.000			0.000		
Current pain items								
pain_control	**Q13** During this hospital stay, how often was your pain well controlled?	Avg across mode	0.014	**0.580**	**0.806**	0.008	**0.447**	**0.708**
		Mail Only	0.006			0.001		
		Telephone Only	0.013			0.003		
		Mixed Mode	0.019			0.015		
		TT-IVR	0.017			0.013		
help_pain	**Q14** During this hospital stay, how often did the hospital staff do everything to help you with your pain?	Avg across mode	0.018	0.644	**0.844**	0.016	0.614	**0.827**
		Mail Only	0.000			0.000		
		Telephone Only	0.000			0.000		
		Mixed Mode	0.016			0.015		
		TT-IVR	0.055			0.048		

Pain Composites								
New Composite 1	Communication about pain during hospital stay (Q39, Q40)	Avg across mode	0.025	**0.716**	**0.883**	0.022	0.691	**0.870**
		Mail Only	0.035			0.028		
		Telephone Only						
		Mixed Mode	0.014			0.015		
		TT-IVR						
New Composite 2	Communication about pain post-discharge (Q61, Q64)	Avg across mode	0.005	**0.345**	0.613	0.007	**0.411**	0.676
		Mail Only	0.000			0.000		
		Telephone Only	0.000			0.007		
		Mixed Mode	0.009			0.006		
		TT-IVR	0.012			0.014		
Current Pain Composite	Pain Management Composite (Q13, Q14)	Avg across mode	0.017	0.637	**0.840**	0.013	**0.562**	**0.794**
		Mail Only	0.003			0.000		
		Telephone Only	0.007			0.000		
		Mixed Mode	0.022			0.020		
		TT-IVR	0.037			0.031		

Table 5. Predicting Hospital Rating from each pain item and composite separately, 2016 HCAHPS Mode Experiment Data

Hospital fixed effects were included in all models.

		Bivariate			Multivariate		
		No additional covariates			Models include six HCAHPS composites (excluding pain and recommend)		
		Est	SE		Est	SE	
Linear Hospital Rating							
Q39	how_much_pain = During hospital stay, how often staff talk about *how much pain* you had?	0.44	0.02	***	0.09	0.03	***
Q40	how_treat_pain = During hospital stay, how often staff talk about how to treat your pain?	0.47	0.03	***	0.11	0.03	**
Q43	pain_side_effects = Before giving pain med, staff describe possible side effects?	0.34	0.02	***	0.06	0.03	*
Q61	home_pain = Before you left, someone talk about how to treat pain after you got home?	0.27	0.02	***	-0.01	0.02	
Q64	rx_side_effects = Before giving you the pain prescription, staff describe possible side effects?	0.28	0.02	***	0.01	0.03	
Q13	During hospital stay, how often was your pain well controlled?	0.49	0.01	***	0.12	0.02	***
Q14	During hospital stay, how often staff do everything to help you with your pain?	0.56	0.01	***	0.15	0.02	***
Q39 & Q40	Communication about pain during hospital stay (Q39, Q40)	0.51	0.03	***	n/a		
Q61 & Q64	Communication about pain post-discharge (Q61, Q64)	0.30	0.02	***	n/a		
Q13 & Q14	Pain management Composite (Q13, Q14)	0.58	0.01	***	n/a		
Top-box coded Hospital Rating							
Q39	how_much_pain = During hospital stay, how often staff talk about *how much pain* you had?	0.36	0.02	***	0.07	0.03	*
Q40	how_treat_pain = During hospital stay, how often staff talk about how to treat your pain?	0.39	0.03	***	0.09	0.04	*
Q43	pain_side_effects = Before giving pain med, staff describe possible side effects?	0.31	0.02	***	0.05	0.03	
Q61	home_pain = Before you left, someone talk about how to treat pain after you got home?	0.22	0.02	***	-0.01	0.03	
Q64	rx_side_effects = Before giving you the pain prescription, staff describe possible side effects?	0.29	0.02	***	0.04	0.03	
Q13	During hospital stay, how often was your pain well controlled?	0.38	0.01	***	0.10	0.02	***
Q14	During hospital stay, how often staff do everything to help you with your pain?	0.43	0.01	***	0.10	0.02	***
Q39 & Q40	Communication about pain during hospital stay (Q39, Q40)	0.41	0.03	***	n/a		
Q61 & Q64	Communication about pain post-discharge (Q61, Q64)	0.26	0.02	***	n/a		
Q13 & Q14	Pain management Composite (Q13, Q14)	0.44	0.01	***	n/a		

*p<0.05; **p<0.01; ***p<0.001.

Table 6. Proposed new HCAHPS Survey composite measure: "*Communication About Pain.*"

New HCAHPS Survey composite measure: "**Communication About Pain**"	Survey Item	Response Options
Q12	During this hospital stay, did you <u>have any pain</u>?	1=Yes 2=No → *If No, Go to Question 15*
Q13	During this hospital stay, how often did hospital staff talk with you about how much pain you had?	1=Never 2=Sometimes 3=Usually 4=Always
Q14	During this hospital stay, how often did hospital staff talk with you about how to treat your pain?	1=Never 2=Sometimes 3=Usually 4=Always