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Medicare's new voluntary bundled payment program: Episode selection and participant characteristics

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1. Background

On October 1, 2018, Medicare launched Bundled Payments for Care Improvement-Advanced (BPCI-Advanced), the largest voluntary bundled payment program nationwide to date.[1] BPCI-Advanced is modeled directly upon a prior program, BPCI Model 2, and includes 32 episodes spanning hospitalization through 90-days post-discharge. With physician group practices (PGPs) comprising almost half of its 1,295 participants, BPCI-Advanced represents an important shift in bundled payment policy towards greater inclusion of PGPs.

However, amid this payment model expansion, little is known about the characteristics of participating organizations. In particular, those newly participating in bundled payments through BPCI-Advanced may differ in important ways from organizations with existing experience in prior programs such as BPCI Model 2 – policy and clinically relevant insight as Medicare deliberately tries to engage more organization types in value-based alternative payment models. Such knowledge is particularly important for BPCI-Advanced because the program is designed to enroll another round of participants in January 2020 and run through at least 2023. Insight about PGPs is also especially relevant because of the little information available about their participation in bundled payments, both in Medicare reports and independent evaluations. Therefore, we sought to describe clinical focus areas among BPCI-Advanced participants and compare characteristics of PGPs and hospitals newly participating in bundled payments versus those with prior payment model experience.

2. Methods

The University of Pennsylvania institutional review board approved the study. We used Medicare data to identify PGPs and hospitals participating in BPCI-Advanced as of March 1, 2019 and the episodes selected by each participant among the 29 inpatient and 3 outpatient episodes available.[1] We evaluated participation across clinical episodes overall and by participant type (PGP versus hospital), as well as by convener use (i.e., the extent to which BPCI-Advanced participants engaged conveners, entities that organize, coordinate care, and apportion financial risk among participating PGPs and hospitals).

We also used Medicare data to identify PGPs and hospitals that participated in BPCI Model 2, categorizing BPCI-Advanced participants into those with continuing participation from BPCI into BPCI-Advanced ("continuing") versus participation in BPCI-Advanced alone ("new").[2] We defined health care markets using hospital referral regions (HRRs) and evaluated the geographic distribution of participants of BPCI, BPCI-Advanced, both, or neither. Data from Physician Compare,[3] Hospital Compare,[4] and the American Hospital Association[5] were used to

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Table 1
BPCI-advanced participation by clinical episode.

Clinical Episode	Number (%) of BPCI-Advanced Participants		
	ACH (n = 715)	PGP (n = 580)	Total (n = 1295)
Inpatient			
Major joint replacement of the lower extremity	145 (20%)	389 (67%)	534 (41%)
Congestive heart failure	368 (51%)	111 (19%)	479 (37%)
Cardiac arrhythmia	287 (40%)	182 (31%)	469 (36%)
Sepsis	316 (44%)	118 (20%)	434 (34%)
Simple pneumonia and respiratory infection	274 (38%)	104 (18%)	378 (29%)
Hip and femur procedures except major joint	145 (20%)	214 (37%)	359 (28%)
COPD, bronchitis, asthma	239 (33%)	115 (20%)	354 (27%)
Stroke	230 (32%)	115 (20%)	345 (27%)
Acute myocardial infarction	227 (32%)	117 (20%)	344 (27%)
Urinary tract infection	235 (33%)	109 (19%)	344 (27%)
Renal failure	205 (29%)	108 (19%)	313 (24%)
Spinal fusion, non-cervical	72 (10%)	188 (32%)	260 (20%)
GI hemorrhage	139 (19%)	96 (17%)	235 (18%)
Major joint replacement of the upper extremity	37 (5%)	195 (34%)	232 (18%)
Pacemaker	79 (11%)	142 (24%)	221 (17%)
Lower extremity and humerus procedures except hip	71 (10%)	147 (25%)	218 (17%)
Percutaneous coronary intervention	77 (11%)	132 (23%)	209 (16%)
GI obstruction	108 (15%)	98 (17%)	206 (16%)
Cellulitis	97 (14%)	101 (17%)	198 (15%)
Cervical spinal fusion	48 (7%)	136 (23%)	184 (14%)
Back and neck except spinal fusion	49 (7%)	129 (22%)	178 (14%)
Coronary artery bypass graft	66 (9%)	99 (17%)	165 (13%)
Fractures of the femur and hip or pelvis	48 (7%)	95 (16%)	143 (11%)
Major bowel procedure	39 (5%)	72 (12%)	111 (9%)
Cardiac defibrillator	9 (1%)	94 (16%)	103 (8%)
Disorders of the liver except malignancy, cirrhosis, alcoholic hepatitis	34 (5%)	66 (11%)	100 (8%)
Cardiac valve	11 (2%)	82 (14%)	93 (7%)
Combined anterior posterior spinal fusion	5 (1%)	65 (11%)	70 (5%)
Double joint replacement of the lower extremity	3 (%)	60 (10%)	63 (5%)
Outpatient			
Percutaneous coronary intervention	52 (7%)	92 (16%)	144 (11%)
Back and neck except spinal fusion	20 (3%)	117 (20%)	137 (11%)
Cardiac defibrillator	7 (1%)	79 (14%)	86 (7%)

Notes: ACH = acute care hospital; PGP = physician group practice.

compare characteristics of PGPs and hospitals, respectively, by continuing versus new participation status.

Categorical variables were compared using χ^2 tests and continuous variables were compared using *t* tests, Kruskal-Wallis, and Wilcoxon rank sum tests. Statistical tests were 2-tailed and significant at an $\alpha = 0.05$. Analyses were performed using Stata 14.1 and R 3.5.1.

3. Results

As proportions of all selected episodes, major joint replacement of the lower extremity (41%), congestive heart failure (37%), cardiac arrhythmia (36%), and sepsis (34%) were the most commonly selected inpatient episodes (Table 1). The least commonly selected inpatient episodes were combined anterior posterior spinal fusion and double joint replacement of the lower extremity (5% for both). Episode selection varied by PGP versus hospital participants (e.g., 67% of PGPs enrolled in major joint replacement of the lower extremity episodes, compared to 20% of hospitals). Participation in the three outpatient episodes ranged from 7% for cardiac defibrillator to 11% for percutaneous coronary intervention (Table 1). Most organizations (80%) participated through a convener (Fig. 1).

For comparisons of new versus continuing bundled payment participants, our sample consisted of 408 new and 149 continuing PGPs (96% of 580 BPCI-Advanced participants) and 556 new and 159 continuing hospitals (100% of 715 BPCI-Advanced participants). There was geographic variation in participation, with BPCI-Advanced engaging 60 new HRRs without any prior BPCI participants, most of which were in central regions (Fig. 2).

New and continuing PGPs differed with respect to several characteristics, though differences were small (Table 2). New physician groups were less likely to be multispecialty (96.9% versus 99.9%), hospital-affiliated (91.2% versus 97.3%), and urban (96.4% versus 98.1%) ($p < 0.001$ for all). New PGPs also employed different and

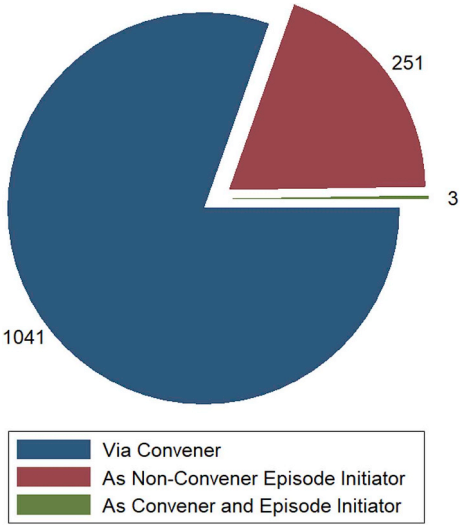

Fig. 1. BPCI-Advanced Participation by Convener Use. **Notes**: Episode initiators refer to PGPs and hospitals participating in BPCI-Advanced as organizations assuming financial and programmatic accountability. Conveners are defined as entities that partner with PGP and hospital episode initiators and organize, coordinate care, and apportion financial risk among them.

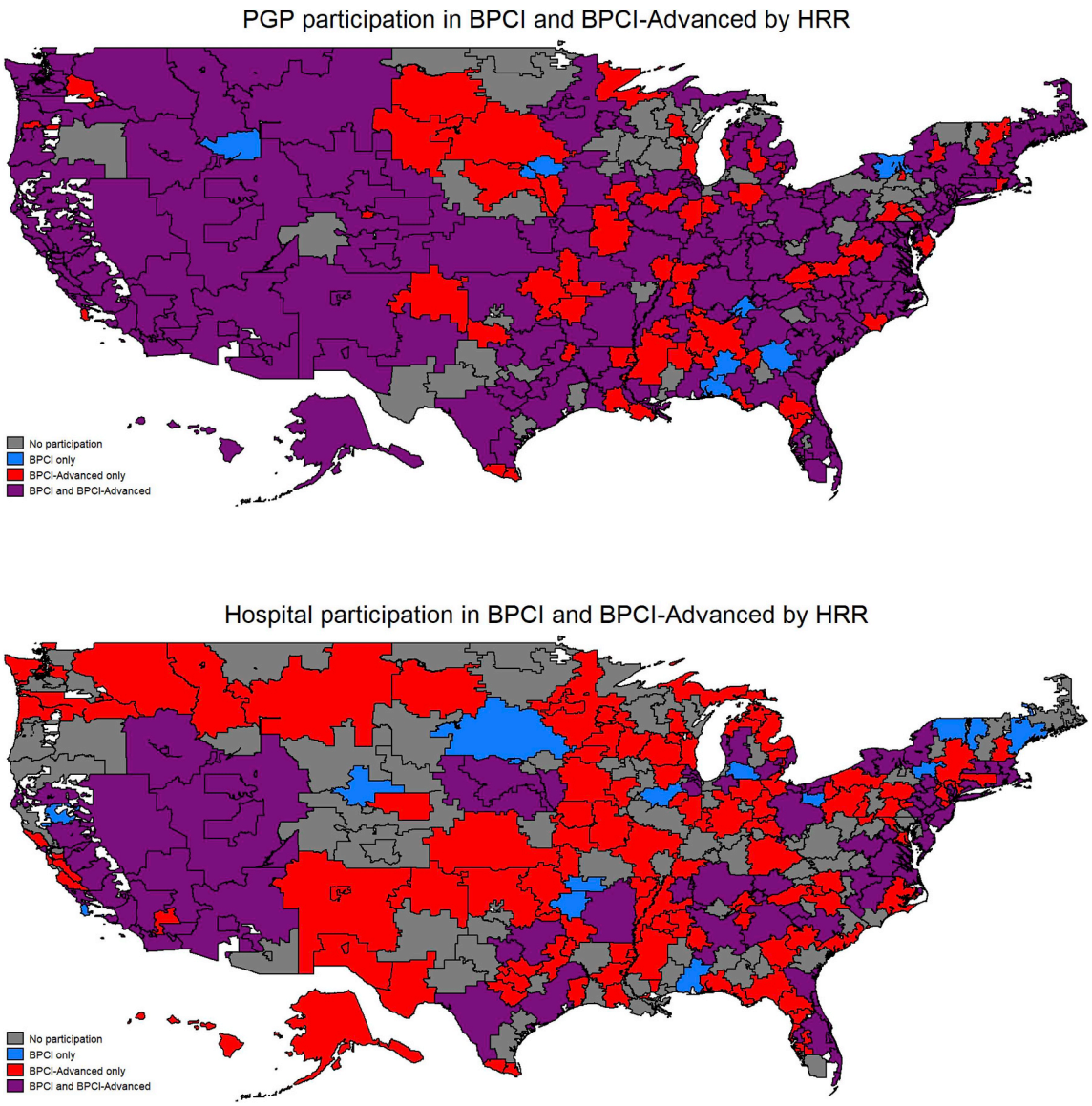

Fig. 2. PGP and Hospital Participation in BPCI and BPCI-Advanced. **Notes:** The maps show health care markets, defined using hospital referral regions (HRRs), categorized by presence of PGP and hospital participants in BPCI or BPCI-Advanced, respectively. Participants were categorized by those who participated in BPCI alone, those continuing participation from BPCI into BPCI-Advanced, and those newly participating in bundled payments via BPCI-Advanced.

more diversely represented specialty types than continuing groups. Internal medicine was the most commonly included specialty type (74.5% of all PGP participants in BPCI-Advanced) compared to orthopedic surgery as the second most common (33.8% of PGP participants).

Among hospitals in BPCI-Advanced, new participants were smaller (mean hospital beds 291 versus 339, $p = 0.03$), lower volume (median annual Medicare admissions 5,145 versus 6,861, $p < 0.001$), and less likely to be teaching hospitals (62% versus 78%, $p = 0.001$). New and continuing hospitals did not vary with respect to ownership status, safety-net status, financial measures, or 30-day readmission rates.

4. Discussion

As the first description of BPCI-Advanced, this study has two main findings. First, it demonstrates notable variation between PGP and hospital participants in episode selection, with the former electing to participate in episodes for common medical conditions (e.g., heart failure, sepsis) and the latter enrolling in surgical episodes (e.g., orthopedic procedures). Second, our study reveals that though the characteristics of new and continuing bundled payment participants were generally similar, BPCI-Advanced has achieved greater geographic representation than its predecessor. Differences for both hospital and PGP participants likely stem from a small number of new organization types engaging in bundled payments, with changes more pronounced for hospitals than physician groups.

Despite manual checks, detailed review of Medicare data (e.g., BPCI and Provider Enrollment, Chain, and Ownership System lists), and achievement of significant sample match (> 95% of PGP participants), this analysis was limited by the lack of data about some PGP characteristics. Additionally, results from comparisons between new and continuing participants reflect overall rather than episode-specific participation. Nevertheless, this study offers the first evidence that some new types of PGP and hospital types are being attracted to Medicare bundled payments, an important insight for other health care organizations without previous experience in Medicare's APMs. These insights are also relevant to policymakers as they try to garner broader

Table 2
PGPand hospital characteristics by new versus continuing participation.

PGP Characteristics			
	New Participants (n = 408)	Continuing Participants (n = 149)	p-value
Practice size, No. (SD)[a]	436 (503)	310 (278)	0.26
Practice scope, %			
Multispecialty	96.9	99.9	< 0.001
Single specialty	3.1	0.07	
Urban status, %[b]	96.4	98.1	< 0.001
Hospital affiliation, %	91.2	97.3	< 0.001
Specialty types employed, No. (SD)	23.9 (18.1)	13.1 (10.5)	< 0.001
Clinical specialties, %			
Internal medicine	23.6	50.9	< 0.001
Orthopedic surgery	17.7	16.1	
Family practice	12.3	10.8	
Obstetrics/gynecology	4.0	1.3	
Cardiology	3.9	2.1	
Diagnostic radiology	2.7	1.1	
General surgery	2.5	0.9	
Anesthesiology	2.5	0.2	
Emergency medicine	2.0	1.2	
Physical medicine and rehabilitation	1.6	1.8	
Other[c]	27.3	13.8	
Hospital Characteristics			
	New Participants (n = 556)	Continuing Participants (n = 159)	p-value
Annual Medicare admissions, median (IQR)	5,145 (3,011 to 8,054)	6,861 (4,451 to 9,608)	< 0.001
Number of beds, mean (SD), No.	291 (239)	339 (232)	0.03
Ownership status, %			
For-profit	28.2	27.0	0.22
Not-for-profit	66.9	71.1	
Government	4.9	1.9	
Teaching status, %[d]			
Major teaching	11.8	13.8	0.001
Minor teaching	50.3	64.2	
Non-teaching	38.0	22.0	
Urban status, %	88.8	96.9	0.002
Safety-net hospitals, %[e]	26.4	27.7	0.74
Hospital margin, median % (IQR)[f]	7.0 (1.5–12.5)	5.3 (1.0–11.1)	0.07
Net patient revenue paid on a shared risk basis, %	1.2	1.4	0.71
30-day readmission rates, No. (%)[g]			
Lower than the national rate	39 (7.2)	10 (6.3)	0.37
No different than the national rate	413 (76.3)	117 (73.6)	
Higher than the national rate	89 (16.5)	32 (20.1)	

Notes: 23 physician group practices could not be matched to available data.

[a] Number of individual clinicians affiliated with the group, based on Group Practice ID.

[b] Urban status is defined in the 2015 AHA Annual Survey as location in a Metropolitan Statistical Area compared to micropolitan or rural areas.

[c] Other specialties included the following: neurology, hospital medicine, pulmonary disease, hand surgery, interventional cardiology, gastroenterology, neurosurgery, psychiatry, sports medicine, pediatrics, hematology oncology, nephrology, otolaryngology, endocrinology, critical care, urology, rheumatology, cardiac electrophysiology, infectious disease, dermatology, pathology, ophthalmology, clinical psychology, vascular surgery, thoracic surgery, radiation oncology, geriatric medicine, plastic surgery, pain management, interventional pain management, colorectal surgery, medical oncology, palliative care, allergy/immunology, general practice, gynecological oncology, interventional radiology, surgical oncology, cardiac surgery, osteopathic manipulative medicine, hematology, maxillofacial surgery, preventative medicine, nuclear medicine, peripheral vascular disease, addiction medicine, neuropsychiatry, and undefined physician type.

[d] From the 2015 AHA Annual Survey, major teaching hospitals are those that are members of the Council of Teaching Hospitals (COTH); minor teaching hospitals are non-COTH members that had a medical school affiliation reported to the American Medical Association, residency training approval by the Accreditation Council for Graduate Medical Education or American Osteopathic Association; and nonteaching hospitals are all other institutions.

[e] Safety-net hospitals were defined as being in the top quartile of disproportionate share (DSH) payment percentage, using the FY2015 CMS IMPACT file.

[f] Hospital Margin is a percentage calculated as the difference between total net revenue and total expenses divided by total net revenue.

[g] Readmission data were obtained from CMS Hospital Compare, which utilizes a methodology that adjusts for patient but not hospital factors.

participation in APMs, particularly among organizations with less experience with new value-based payment arrangements.

Disclosures

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References

1. Centers for Medicare and Medicaid Services. *BPCI Advanced.* 2018; 2018https://innovation.cms.gov/initiatives/bpci-advanced, Accessed date: 11 March 2019.
2. Centers for Medicare and Medicaid Services. *BPCI Model 2.* 2018; 2018https://innovation.cms.gov/initiatives/BPCI-Model-2/index.html, Accessed date: 11 March 2019.
3. Medicare.gov. *Physician Compare.* 2018; 2018https://www.medicare.gov/physiciancompare/, Accessed date: 11 March 2019.
4. Medicare.gov. *Hospital Compare.* 2018; 2018https://www.medicare.gov/hospitalcompare/search.html, Accessed date: 12 March 2019.
5. Annual Hospital Association. *AHA Annual Survey Database.* 2018; 2018 Accessed https://www.ahadataviewer.com/additional-data-products/aha-survey/, Accessed date: 12 March 2019.