Target Price Specifications
Model Years 1 and 2

Centers for Medicare & Medicaid Services (CMS)

**Center for Medicare & Medicaid Innovation
(Innovation Center)**

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1   INPUTS

Table 1: Target Price and Setting-Specific Update Factor Datasets

#	Name	Source	Description
Target Price Datasets			
1	BPCI Advanced National Clinical Episodes	BPCI Advanced Clinical Episode Specifications Document	The national set of Clinical Episodes, constructed using the methodology described in the specifications document. Additional inputs to this file include: Common Working File (CWF), Medicare Enrollment Database (EDB), and Official CMS Standardized Allowed Amounts.
2	BPCI Advanced Participant List	CMS	The Participant List identifies the Convener, ACH and PGP Participants in the BPCI Advanced model.
3	Provider of Service (POS) Files	https://www.cms.gov/Research-Statistics-Data-and-Systems/Downloadable-Public-Use-Files/Provider-of-Services/index.html	The Provider of Services (POS) Extract is created from the QIES (Quality Improvement Evaluation System) database as of second quarter 2011 and all future POS files. The file contains an individual record for each Medicare-approved provider and is updated quarterly. The file includes information for all institutional providers, Ambulatory Surgical Centers (ASCs), and Clinical Laboratories.
4	Provider Specific Files (PSF)	https://www.cms.gov/Medicare/Medicare-Fee-For-Service-Payment/ProspMedicareFeeSvcPmtGen/psf_SAS.html	The file contains information about the facts specific to the provider that affect computations for Prospective Payment Systems.
5	Academic Medical Center (AMC) List	CMS	The official list of AMCs was created by CMS, along with publicly available listings from the American Association of Academic Medical Centers (AAMC) and teams of clinicians.
6	Common Medicare Environment (CME)	CMS	The CME contains comprehensive data on individuals in the Medicare program. It provides information on insurance coverage and Medicare health plan and demonstration programs in addition to information about Medicare Parts A,B,C and non-subsidy Part D beneficiaries.
7	Long Term Minimum Dataset (MDS)	CMS	This file includes information on beneficiaries that are institutionalized long term.
Setting-Specific Price Update Datasets			
8	Inpatient Prospective Payment System (IPPS) Base Rates and MS-DRG Weights	https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/FY2018-IPPS-Final-Rule-Home-Page-Items/FY2018-IPPS-Final-Rule-Tables.html?DLPage=1&DLEntries=10&DLSort=0&DLSortDir=ascending	These inputs are used to update historical prices for the IPPS setting.

#	Name	Source	Description
9	Geographic Practice Cost Index (GPCI), Relative Value Units (RVU), County/Locality Crosswalk, and Physician and Anesthesia Conversion Factors (CF)	GPCI : https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched/PFS-Federal-Regulation-Notices-Items/CMS-1676-F.html?DLPage=1&DLEntries=10&DLSort=2&DLSortDir=descending RVU/Physician CF: https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched/PFS-Relative-Value-Files-Items/RVU18A.html?DLPage=1&DLEntries=10&DLSort=0&DLSortDir=descending Anesthesia CF: https://www.cms.gov/Center/Provider-Type/Anesthesiologists-Center.html	These inputs are used to update historical prices for the PFS setting.
10	Inpatient Rehabilitation Facility (IRF) Conversion Factor (most recent only)	https://www.federalregister.gov/documents/2017/08/03/2017-16291/medicare-program-inpatient-rehabilitation-facility-prospective-payment-system-for-federal-fiscal See Table 4	These inputs are used to update historical prices for the IRF setting.
11	Medicare Economic Index (MEI) (most recent only)	https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MedicareProgramRatesStats/MarketBasketData.html	The MEI is used to update historical prices for the "Other" setting.
12	Skilled Nursing Facility (SNF) Resource Utilization Group (RUG) weights	https://www.federalregister.gov/documents/2017/10/04/2017-21327/medicare-program-prospective-payment-system-and-consolidated-billing-for-skilled-nursing-facilities See Tables 4 and 5	These inputs are used to update historical prices for the SNF setting.
13	Home Health Agency (HHA) base rates and Home Health Resource Group (HHRG) weights (most recent only)	https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HomeHealthPPS/Home-Health-Prospective-Payment-System-Regulations-and-Notices.html	These inputs are used to update historical prices for the HHA setting.
14	Addendum B and J from the Outpatient Prospective Payment System (OPPS) Final Rule	https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalOutpatientPPS/Hospital-Outpatient-Regulations-and-Notices.html	These inputs are used to update historical prices for the OPPS setting.

2 TARGET PRICE OVERVIEW

The following document describes the methodology used to calculate Target Prices for the BPCI Advanced model. The BPCI Advanced initiative Target Prices are constructed to satisfy the following essential features:

- Encourage both high and low cost providers to participate;

- Reward Participants' improvement over time;

- Adjust for patient case mix that is not under the control of providers;

- Allow for trends in Clinical Episode spending that are distinct according to providers' regions and other relevant provider characteristics; and

- Induce Medicare savings while maintaining high quality care.

To satisfy these essential features, the BPCI Advanced Benchmark Price methodology incorporates both regional and historical pricing. The methodology brings these elements together to provide both those Participants who have been historically efficient and those who have been historically inefficient with an incentive to lower costs over time and to benefit from the financial incentives of the BPCI Advanced model.[1] The methodology achieves this by benchmarking Participants against other providers with (i) patient populations with similar levels of expenditure risk and (ii) similar hospital-level characteristics, henceforth referred to as *peer groups*.[2]

The methodology produces Benchmark Prices, represented in official CMS standardized allowed amounts, for acute care hospital (ACH) Participants and for physician group practice (PGP) Participants, each with three components that are multiplied to produce the Benchmark Price. Since PGPs will initiate Clinical Episodes at ACHs, PGP Benchmark Prices build upon ACH Benchmark Prices to account for the fact that PGPs can initiate Clinical Episodes at multiple ACHs.

The Hospital Benchmark Price (henceforth, HBP) is comprised of the following components, each of which is described in detail later in this document:

- *Standardized Baseline Spending (SBS)*: This component accounts for the historical efficiency of ACHs in the baseline period by calculating risk- and peer-standardized Clinical Episode spending in the baseline period.

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[1] Efficiency, as defined in Step 8 of Section 4.3.1, refers to lower Clinical Episode spending, relative to other Episode Initiators, for Clinical Episodes with the same patient and peer group characteristics.

[2] Peer groups are defined by the list of peer group characteristics within the regression models, as opposed to distinct groups delineated by a single characteristic. See section 4.1.2 for more information.

- *Patient Case Mix Adjustment (PCMA)*: This component adjusts for varying levels of severity in ACHs' patient case mix that are outside the control of ACHs.

- *Peer Adjusted Trend (PAT) factor*: This component (i) adjusts for persistent differences in Clinical Episode spending levels across ACH peer groups and (ii) trends each peer group's Clinical Episode spending to the Model Year[3] based on trends in Clinical Episode spending during the baseline period within each ACH peer group. Peer groups are determined by geographical and hospital-type characteristics, described in Section 4.1.2.

Similarly, each PGP-ACH Benchmark Price is comprised of the following components:

- *HBP:* This component, as described above, provides the basic dollar value of the PGP-ACH Benchmark Price which is adjusted to account for: (i) the relative efficiency of, (ii) the relative case mix of, and (iii) trends in Clinical Episode spending at, the ACHs at which the PGP initiates Clinical Episodes.

- *PGP Offset:* The PGP offset measures a PGP's historical risk- and peer-standardized efficiency relative to the efficiency of the ACH at which it initiates Clinical Episodes.

- *Relative Case Mix:* The relative case mix accounts for whether the case mix of a PGP's Clinical Episodes at an ACH is expected to be more or less costly than the overall case mix of Clinical Episodes at that ACH.

The result of this methodology is a set of Target Prices that blends Participants' historical performance with trends in each Clinical Episode category's spending for each peer group. The Target Prices reflect each Participant's level of Clinical Episode spending relative to expected Clinical Episode spending for Episode Initiators with similar patient case mix and other characteristics.

The following discussion describes the step-by-step implementation of the methodology used to construct a Target Price for a given BPCI Advanced Clinical Episode category and Episode Initiator.

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[3] Since separate Target Prices are not provided for Model Years 1 (2018 Q4) and 2, the single set of prices will be trended to Model Year 2.

3   CLINICAL EPISODE CONSTRUCTION BACKGROUND

While the purpose of this document is to describe how BPCI Advanced Target Prices are calculated, this section provides some initial background on the preceding process of constructing Clinical Episodes. The Clinical Episode construction specifications describe how to construct Clinical Episode-level spending, apply service-level exclusions, convert Clinical Episode-level spending to Model Year dollars by applying setting-specific update factors, and cap outlier Clinical Episodes at the 1st and 99th percentiles within each MS-DRG or APC pooled for each calendar year.

The twenty-nine inpatient and three outpatient BPCI Advanced Clinical Episode categories are identified by an admission in the inpatient setting or a procedure performed in an outpatient setting initiated by specific MS-DRGs or HCPCS.[4] Clinical Episodes are constructed to include all services that overlap the Clinical Episode window, with some exceptions for services and supplies provided for certain readmissions, which are defined by MS-DRG.[5] Clinical Episode-level payments are created by summing official CMS standardized payments for all non-excluded services.[6] These standardized payments reflect the cost of services after removing variation in spending arising from geographical adjustment of reimbursement in CMS payment systems (e.g. hospital wage index and GPCI) and from policy-driven adjustments (e.g. indirect medical education (IME) adjustments). This process produces spending for each Clinical Episode in the baseline period, and henceforth all references to spending are assumed to be in standardized dollars unless noted otherwise as *real* dollars.

Prior to estimating the model of Clinical Episode spending on data from the baseline period, standardized payments for each Clinical Episode are updated to Model Year dollars using setting-specific (e.g., IPPS, OPPS, SNF, IRF, or HHA) price update factors. This allows the model to update the standardized allowed amount that providers would receive based on how inputs have changed in the various Medicare payment systems while holding constant the mix of services in the baseline period. This approach, referred to as index price trending, is similar to the method used to update Target Prices in the Comprehensive Care for Joint Replacement (CJR) model.

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[4] A complete list of the DRGs and HCPCS that trigger a BPCI Advanced Clinical Episode can be found in the "Episode Definitions – Model Year 1" xls file on https://innovation.cms.gov/initiatives/bpci-advanced/.

[5] A complete list of Clinical Episode exclusions can be found in the "MS-DRG Exclusions from Clinical Episodes List" xls file on https://innovation.cms.gov/initiatives/bpci-advanced/

[6] "CMS Standardization Methodology for Allowed Amount, Version 5." QualityNet - Measure Methodology, Centers for Medicare & Medicaid Services (CMS), Acumen, LLC, 24 Aug. 2016. Available at: http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=122877 2057350

These index price-trended historical Clinical Episode spending amounts are in the same standardized dollar terms as setting-specific prices in the Model Year and represent the basis for comparing Episode Initiator performance in subsequent sections.[7] Other changes in Clinical Episode spending, due to efficiency gains, peer group trends, or changes in patient case-mix, are discussed in subsequent steps of the model.

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[7] The setting-specific prices update factors will be re-calculated to reflect the changes in Medicare payment systems as more recent fee schedules become available during the Model Year of the model.

4   STEPS IN TARGET PRICE CONSTRUCTION

The following section presents the step-by-step methodology used to construct Target Prices for both ACH and PGP Participants. Section 4.1 describes the risk adjusters used to estimate beneficiary- and peer-adjusted Clinical Episode-level spending. Section 4.2 discusses using the risk adjustment model to estimate Clinical Episode spending. Finally, Section 4.3 outlines how to use model estimates to obtain HBPs and PGP-ACH Benchmark Prices, which are used to calculate Target Prices.

4.1   Patient and Peer Group Risk Adjusters

For all Clinical Episodes that overlap the BPCI Advanced model time periods, build a relevant set of patient and peer group characteristics to merge into the Clinical Episode-level file.

4.1.1   Patient Case Mix Adjusters

Build the following groups of patient characteristics to merge into the Clinical Episode-level file, as shown in Table 2.[8] These characteristics were selected to align closely with the CMS v22 Part C HCC and Relative Resource Use HCC (RRU-HCC) models. Preliminary Target Price summary workbooks contain coefficients for each risk adjuster included in the model.

Table 2: Patient Characteristics Categories used to Risk Adjust BPCI Advanced Target Prices

Risk Adjuster Category	Data Source/Input	Specifications
HCCs	Inpatient, Outpatient, and Part B Carrier Claims	HCCs are constructed using Version 22 of the CMS Medicare Advantage Risk Adjustment software[9]
HCC Interactions	Inpatient, Outpatient, and Part B Carrier Claims	HCCs are interacted with each other and other demographic characteristics as used in the PAC-PRD, RRU and Part C Models
HCC Severity	Inpatient, Outpatient, and Part B Carrier Claims	Count of HCCs for a given beneficiary, categorized into three groups: 1-3, 4-6, 7+

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[8] Table 2 lists general categories for patient case mix characteristics and does not represent the comprehensive set of risk adjusters. CMS may need to add or remove certain elements of the risk adjustment model during construction of Target Prices.

[9] Software is available at https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors.html

Risk Adjuster Category	Data Source/Input	Specifications
Recent Resource Use	Inpatient, Outpatient, and Part B Carrier Claims	Indicates whether a Clinical Episode was preceded by a relevant utilization of healthcare services
Demographics	Enrollment Database (EDB) and Common Medicare Environment (CME)	Includes age, disability as the reason for Medicare entitlement, and dual eligibility for Medicare and Medicaid
Long-Term Institutional	Long-Term Minimum Data Set (MDS)	Indicates whether the beneficiary was institutionalized in a long-term care facility within 90 days of the Clinical Episode start date
MS-DRG/APCs	Inpatient and Outpatient Claims	MS-DRGs are acquired from inpatient claims and mapped from the baseline period to the Model Year to ensure consistency across years. APCs are based on HCPCS and are mapped from the baseline period to the Model Year. [10]
Comprehensive APC (Outpatient Clinical Episode Categories Only)	Outpatient Claims	Comprehensive APCs are taken from Addendum J of the OPPS Final Rule
Clinical Episode Category Specific Adjustments	Inpatient Claims	Clinical Episode category specific risk adjusters such as fracture[11] indicator for Major Joint Replacement of the Lower Extremity

4.1.2 Peer Groups

Construct ACH peer group characteristics using the following methodology, as shown in Table 3. Merge peer group indicators to the Clinical Episode-level files based on the ACH of the Clinical Episode.

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[10] IPPS and OPPS Final Rules as well as OPPS addenda are used for MS-DRG and APC mapping. IPPS Final Rules can be found at https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/index.html. OPPS final rules and addenda can be found at https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalOutpatientPPS/index.html.
[11] Fracture codes are available for download at https://innovation.cms.gov/initiatives/cjr.

Table 3: Peer Group Characteristics used to Construct BPCI Advanced Target Prices

Peer Group Characteristic	Values	Data Source/Input	Construction Methodology
Academic Medical Centers	AMC/Non-AMC	CMS AMC List	The official list of AMCs was created by CMS, along with publicly available listings from the American Association of Academic Medical Centers (AAMC) and teams of clinicians.
Urban/Rural	Urban/Rural	CBSA Urban-Rural Indicator from the POS Current Files	If the indicator is "U", the provider is flagged as urban; otherwise, the provider is not flagged as urban. If the POS file does not contain information on a provider, the provider is not flagged as urban.
Safety-Net Hospitals	Safety Net/Non-Safety Net	CME dataset	For each Anchor Stay/Anchor Procedure hospital with anchor discharge dates in a specific year, first extract all inpatient stays for that anchor provider with a positive standardized allowed amount and discharge dates in the same calendar year as the Clinical Episode. Calculate the proportion of total inpatient stays for beneficiaries that are identified as either "full" or "partially" dual eligible If this proportion exceeds 60%, flag the hospital as a safety-net hospital for the year selected in the first step.
Census Division	Census Division 1-9, other	PSF	Acquire the census division for each Anchor Stay/Anchor Procedure provider. If census division information cannot be found, flag as "other".

Peer Group Characteristic	Values	Data Source/Input	Construction Methodology
Bed Size	Small, Medium, Large, Extra-Large, Missing	PSF	Use the bed size to group the hospital into one of the following four categories: • Small: 0-250 beds • Medium: 251-500 beds • Large: 501-850 • Extra-Large: 850 + If the PSF file contains no bed size information for a provider, assign that provider's bed size as missing.

Lastly, create a series of quarter-year flags to fully interact with the peer group characteristics in Table 3.[12]

4.2   Estimate Model of Clinical Episode-Level Spending

Once the Clinical Episode-level files have been constructed and merged with the risk adjusters, estimate a model of Clinical Episode-level spending using a two-stage risk adjustment model, as described in the following section. This process is run separately for each of the 32 Clinical Episode categories. These estimates are used as inputs in the multiplicative terms that are used to construct HBPs and PGP-ACH Benchmark Prices. To illustrate how the risk adjustment model estimates are used to construct these components, the remainder of this document uses fabricated data from a single Clinical Episode category to walk through each step of the Target Price construction process. The numerical example simplifies the methodology by considering 25 Clinical Episodes, each attributed to one of two ACHs and one of two PGPs.[13,14]

- **Step 1. Estimate a Clinical Episode-level risk adjustment model:** Using the patient characteristics, peer group characteristics, and quarter year dummies from the national population of Clinical Episodes, estimate a compound lognormal risk adjustment model.

- **Step 2. Limit the population to eligible providers:** Participation in a specific Clinical Episode category in the BPCI Advanced model is limited to ACHs that initiate more than 40 Clinical Episodes in the baseline period for the same Clinical Episode category. This

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[12] The bed size categories are not interacted with the quarterly flags.

[13] In the baseline period, a Clinical Episode can be attributed to both an ACH and a PGP, since precedence rules are not applied.

[14] Values in the tables are rounded for simplicity. Actual Target Price construction will be exact.

restriction reduces the uncertainty of estimating Clinical Episode prices for low-volume ACHs by excluding the lowest-volume providers. There is no restriction on PGP participation[15]; a PGP can participate in the BPCI Advanced model as long as it was formed and all providers are grouped under a single TIN before the application due date. As such, only build Preliminary Target Prices for ACHs with more than 40 Clinical Episodes in the initial baseline period. Because an ACH with 40 or fewer Clinical Episodes in the baseline period does not receive a HBP, PGP Participants do not receive Preliminary Target Prices if they only initiated Clinical Episodes at ineligible ACHs. For the PGP Participants eligible to receive Preliminary Target Prices, create PGP Offsets for those that have more than 40 Clinical Episodes during the baseline period. PGPs that do not have more than 40 Clinical Episodes in the baseline period will not have PGP Offsets applied, and thus will have the applicable ACH measure of efficiency applied for each ACH at which they initiate Clinical Episodes. Table 4 below provides an example to illustrate how Clinical Episode count thresholds are applied to restrict the population to eligible ACHs. Additionally, it shows whether preliminary Target Prices will be distributed or not for the PGPs depending on their Clinical Episode count.

Table 4: Clinical Episode Category Level Participant Eligibility Examples

BPID	PGP/ACH	CCN/TIN	ACH CCN Associated with Anchor Claim	4 Year Baseline Period Clinical Episode Count for One Clinical Episode Category	Eligible for Participation	Preliminary Target Price Calculated
BPID1	ACH	CCN1		39	N	N
BPID2	ACH	CCN2		40	N	N
BPID3	ACH	CCN3		41	Y	Y
BPID4	ACH	CNN4		42	Y	Y
BPID5	PGP	TIN1	CCN1	20	Y	N
BPID5	PGP	TIN1	CCN2	21	Y	N
BPID6	PGP	TIN2	CCN3	20	Y	Y
BPID6	PGP	TIN2	CCN4	21	Y	Y
BPID7	PGP	TIN3	CCN4	20	Y	Y

Note: PGPs that initiate Clinical Episodes at ACHs not eligible for participation due to low volume will not receive Preliminary Target Prices. However, these PGPs are still eligible to participate in the model. For example, BPID5 would not receive a Preliminary Target Price because it only initiates at ineligible ACHs. However, if BPID5 began initiating at CCN4 while the model was active, BPID5 would receive the ACH price for CCN4 during the reconciliation period

- o As shown in Table 4 above, the eligibility criteria for each ACH will depend on having more than 40 Clinical Episodes in the baseline period. BPID1 initiated 39 Clinical Episodes in the baseline period and is ineligible to receive Target Prices for this Clinical Episode category. Likewise, BPID2 only initiated 40 Clinical Episodes and is also ineligible to receive Target Prices. However, BPID3 and BPID4 initiated 41 and 42 Clinical Episodes, respectively, and will receive Target Prices. Note that eligibility is determined independently for each Clinical Episode category. An

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[15] This is to allow newly formed PGPs from mergers and divisions to participate in the model.

Episode Initiator can be eligible for some Clinical Episode categories, yet ineligible for others.

- o As indicated in Table 4, all PGP Participants are eligible to participate but they will only receive Preliminary Target Prices for the ACH's at which they initiated Clinical Episodes that meet the Clinical Episode minimum, which includes every Clinical Episode during the baseline period regardless of PGP. The PGP, BPID5, initiated 41 Clinical Episodes in the baseline period, but these Clinical Episodes were initiated at two different ACHs, BPID1 and BPID2, neither of which initiated sufficient Clinical Episodes in the baseline period. As a result, although BPID5 is eligible to participate in the model, it will not receive any Preliminary Target Prices. In the Model Year, if this Participant initiates Clinical Episodes at an ACH that meets the Clinical Episode minimum, it will receive final Target Prices based upon that ACH's HBP. In addition, no Episode Initiator, including BPID5, will be attributed Model Year Clinical Episodes initiated at ineligible ACHs such as CCN1 and CCN2. Conversely, BPID6 initiated 41 Clinical Episodes and BPID7 initiated 20 Clinical Episodes at ACHs that meet the minimum Clinical Episode Count allowing them to receive Preliminary Target Prices. Although both BPIDs will receive Target Prices, the PGP Offset will only be calculated for BPID6 since it initiated more than 40 Clinical Episodes. This is discussed later in Section 4.3.2.

- o ACHs that fall below the minimum Clinical Episode threshold in the first application period are not eligible to participate in a Clinical Episode category in Model Years 1 or 2. The ACH may apply again for Model Year 3 if they initiate more than 40 Clinical Episodes in the new baseline period, which CMS expects to span a longer time period.

- **Step 3. Calculate the Clinical Episode level patient case mix adjustment:** Calculate the patient case mix adjustment as the predicted Clinical Episode spending from the compound lognormal model.[16] Combined with **Step 7**, these will be the inputs to the ACH's Preliminary PCMA component and the PGP's Preliminary Relative Case Mix component. This step is demonstrated in the right column of Table 5 below.

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[16] The peer group characteristics and quarter-year dummy estimates are omitted from this calculation and are reintroduced in the second stage.

Table 5: Model Estimation - PCMA Input Calculation

					Model Estimation Steps
Sample Data for a Single Clinical Episode Category					**Step 3**
Clinical Episode ID	**Quarter**	**ACH**	**PGP ID**	**Clinical Episode Spending (Observed Spending)**	**Patient Case Mix Adj. Clinical Episode Spending**
1	2014Q1	H1001	P001	$10,000	$4,000
2	2014Q1	H1001	P001	$12,000	$18,000
3	2014Q1	H1001	P001	$12,500	$8,000
4	2014Q1	H1001	P001	$60,000	$67,800
5	2014Q1	H1001	P001	$45,000	$30,000
6	2014Q1	H1001	P001	$55,000	$45,000
7	2014Q2	H1001	P001	$87,000	$70,000
8	2014Q2	H1001	P002	$70,000	$64,000
9	2014Q1	H1001	P002	$12,500	$8,600
10	2014Q1	H1001	P002	$27,000	$32,000
11	2014Q2	H1001	P002	$32,500	$37,000
12	2014Q2	H1001	P002	$15,000	$9,500
13	2014Q1	H1002	P001	$24,000	$20,000
14	2014Q1	H1002	P001	$25,000	$18,000
15	2014Q1	H1002	P001	$36,000	$35,000
16	2014Q1	H1002	P001	$24,000	$23,000
17	2014Q1	H1002	P001	$68,000	$52,000
18	2014Q2	H1002	P001	$45,000	$26,000
19	2014Q2	H1002	P001	$29,000	$24,000
20	2014Q2	H1002	P002	$63,000	$56,000
21	2014Q2	H1002	P002	$57,000	$34,000
22	2014Q3	H1002	P002	$38,000	$29,000
23	2014Q3	H1002	P002	$54,000	$49,000
24	2014Q1	H1002	P002	$31,000	$37,000
25	2014Q1	H1002	P002	$27,000	$19,000

Note: All spending is expressed in standardized dollars. All dollar values are rounded to the nearest dollar. Ratios are rounded to two decimal places.

- **Step 4. Capture coefficients for ACH peer group characteristics:** In the second stage of the risk adjustment model, obtain estimates for peer group characteristics and peer group trends using ordinary least squares (OLS), as shown in the two rightmost columns of Table 6 below.

  - **4a.** Calculate the ratio of observed Clinical Episode spending to patient case mix-adjusted Clinical Episode spending (calculated in **Step 3.**) This is the portion of the observed Clinical Episode spending that is not explained by the patient case mix severity.

  - **4b.** At the ACH-quarter level, calculate the average ratio of observed Clinical Episode spending to predicted Clinical Episode spending and regress the average

ratio on peer group characteristics, time trends, and the interactions between them. The predicted ratio trended to the middle of the Model Year is the PAT Factor.

Table 6: Model Estimation - PAT Factor Input Calculations

						Model Estimation Steps		
							Peer Group Characteristics	
Sample Data for a Single Clinical Episode Category					Step 3	Step 4a	Step 4b	
Clinical Episode ID	Quarter	ACH	PGP ID	Clinical Episode Spending (Observed Spending)	Patient Case Mix Adj. Clinical Episode Spending	Observed Spending/ Patient Case Mix Adj. Clinical Episode Spending	Predicted Ratio from Peer Group Factor OLS
1	2014Q1	H1001	P001	$10,000	$4,000	2.50	1.25
2	2014Q1	H1001	P001	$12,000	$18,000	0.67	1.25
3	2014Q1	H1001	P001	$12,500	$8,000	1.56	1.25
4	2014Q1	H1001	P001	$60,000	$67,800	0.88	1.25
5	2014Q1	H1001	P001	$45,000	$30,000	1.50	1.25
6	2014Q1	H1001	P001	$55,000	$45,000	1.22	1.25
7	2014Q2	H1001	P001	$87,000	$70,000	1.24	1.15
8	2014Q2	H1001	P002	$70,000	$64,000	1.09	1.15
9	2014Q1	H1001	P002	$12,500	$8,600	1.45	1.25
10	2014Q1	H1001	P002	$27,000	$32,000	0.84	1.25
11	2014Q2	H1001	P002	$32,500	$37,000	0.88	1.15
12	2014Q2	H1001	P002	$15,000	$9,500	1.58	1.15
13	2014Q1	H1002	P001	$24,000	$20,000	1.20	1.28
14	2014Q1	H1002	P001	$25,000	$18,000	1.39	1.28
15	2014Q1	H1002	P001	$36,000	$35,000	1.03	1.28
16	2014Q1	H1002	P001	$24,000	$23,000	1.04	1.28
17	2014Q1	H1002	P001	$68,000	$52,000	1.31	1.28
18	2014Q2	H1002	P001	$45,000	$26,000	1.73	1.26
19	2014Q2	H1002	P001	$29,000	$24,000	1.21	1.26
20	2014Q2	H1002	P002	$63,000	$56,000	1.13	1.26
21	2014Q2	H1002	P002	$57,000	$34,000	1.68	1.26
22	2014Q3	H1002	P002	$38,000	$29,000	1.31	1.3
23	2014Q3	H1002	P002	$54,000	$49,000	1.10	1.3
24	2014Q1	H1002	P002	$31,000	$37,000	0.84	1.28
25	2014Q1	H1002	P002	$27,000	$19,000	1.42	1.28

Note: All spending is expressed in standardized dollars. All dollar values are rounded to the nearest dollar. Ratios are rounded to two decimal places.

- **Step 5. Calculate predicted Clinical Episode spending:** As shown in Table 7, calculate the predicted Clinical Episode spending by multiplying the predicted ratio **(Step 4b)** and the case mix-adjusted Clinical Episode spending **(Step 3).**

- **Step 6. Calculate ratio of observed to predicted Clinical Episode spending:** Also shown in Table 7, calculate the observed Clinical Episode spending to the predicted

Clinical Episode spending **(Step 5)** ratio. This is an input for the ACH's SBS component and PGP Offset component.

Table 7: Model Estimation - SBS Input Calculations

						Model Estimation Steps			
Sample Data for a Single Clinical Episode Category					**Step 3**	**Peer Group Characteristics**		**Step 5**	**Step 6**
						Step 4a	**Step 4b**		
Clinical Episode ID	**Quarter**	**ACH**	**PGP ID**	**Clinical Episode Spending (Observed Spending)**	**Patient Case Mix Adj. Clinical Episode Spending**	**Observed Spending/ Patient Case Mix Adj. Clinical Episode Spending**	**Predicted Ratio from Peer Group Factor OLS**	**Predicted Clinical Episode Spending**	**Observed Spending/ Predicted Spending**
1	2014Q1	H1001	P001	$10,000	$4,000	2.50	1.25	$5,000	2.00
2	2014Q1	H1001	P001	$12,000	$18,000	0.67	1.25	$22,500	0.53
3	2014Q1	H1001	P001	$12,500	$8,000	1.56	1.25	$10,000	1.25
4	2014Q1	H1001	P001	$60,000	$67,800	0.88	1.25	$84,750	0.71
5	2014Q1	H1001	P001	$45,000	$30,000	1.50	1.25	$37,500	1.20
6	2014Q1	H1001	P001	$55,000	$45,000	1.22	1.25	$56,250	0.98
7	2014Q2	H1001	P001	$87,000	$70,000	1.24	1.15	$80,500	1.08
8	2014Q2	H1001	P002	$70,000	$64,000	1.09	1.15	$73,600	0.95
9	2014Q1	H1001	P002	$12,500	$8,600	1.45	1.25	$10,750	1.16
10	2014Q1	H1001	P002	$27,000	$32,000	0.84	1.25	$40,000	0.68
11	2014Q2	H1001	P002	$32,500	$37,000	0.88	1.15	$42,550	0.76
12	2014Q2	H1001	P002	$15,000	$9,500	1.58	1.15	$10,925	1.37
13	2014Q1	H1002	P001	$24,000	$20,000	1.20	1.28	$25,600	0.94
14	2014Q1	H1002	P001	$25,000	$18,000	1.39	1.28	$23,040	1.09
15	2014Q1	H1002	P001	$36,000	$35,000	1.03	1.28	$44,800	0.80
16	2014Q1	H1002	P001	$24,000	$23,000	1.04	1.28	$29,440	0.82
17	2014Q1	H1002	P001	$68,000	$52,000	1.31	1.28	$66,560	1.02
18	2014Q2	H1002	P001	$45,000	$26,000	1.73	1.26	$32,760	1.37
19	2014Q2	H1002	P001	$29,000	$24,000	1.21	1.26	$30,240	0.96
20	2014Q2	H1002	P002	$63,000	$56,000	1.13	1.26	$70,560	0.89
21	2014Q2	H1002	P002	$57,000	$34,000	1.68	1.26	$42,840	1.33
22	2014Q3	H1002	P002	$38,000	$29,000	1.31	1.3	$37,700	1.01
23	2014Q3	H1002	P002	$54,000	$49,000	1.10	1.3	$63,700	0.85
24	2014Q1	H1002	P002	$31,000	$37,000	0.84	1.28	$47,360	0.65
25	2014Q1	H1002	P002	$27,000	$19,000	1.42	1.28	$24,320	1.11

Note: All spending is expressed in standardized dollars. All dollar values are rounded to the nearest dollar. Ratios are rounded to two decimal places.

4.3   Obtain ACH and PGP Target Prices

This section describes the methodology used to construct Target Prices based on the estimates obtained in Section 4.2. Section 4.3.1 discusses the methodology used to construct HBPs. Section 4.3.2 discusses the methodology used to construct PGP-ACH Benchmark Prices. Finally, Section 4.3.3 discusses the final steps used to convert Benchmark Prices to Target Prices

through the application of the CMS Discount Factor and conversion from standardized to real dollars.

4.3.1 Formulation of the Preliminary Hospital Benchmark Price

The HBP takes the following form:

$$HBP_{ht} = SBS_h * PCMA_{h,t} * PAT\ Factor_{h,t}$$

The Benchmark Price for ACH h at time t (the Model Year) accounts for all Clinical Episodes triggered at ACH h and is decomposed into the Standardized Baseline Spending of ACH h (SBS_h), expenditure riskiness of the ACH h's patients ($PCMA_{h,t}$) and a trend factor ($PAT\ Factor_{ht}$) to account for the fact that the baseline period is composed of multiple years and is prospectively projected forward to the Model Year.

The remainder of this section describes the steps used to derive each of these three components of the HBP using the risk adjustment model estimates described in Section 4.2. These steps are further illustrated in Table 8, using the numerical example from above.

- **Step 7. Calculate the Dollar Amount:** Calculate the Dollar Amount by taking the average predicted Clinical Episode spending **(Step 5)** for all Clinical Episodes in that Clinical Episode category across ACHs. Dollar Amount is an input to the SBS and is the denominator for the Preliminary PCMA.

- **Step 8. Calculate the Efficiency Measure:** Calculate the Efficiency Measure as the average of the observed to predicted Clinical Episode spending **(Step 6)** for each ACH. A value less than one (exceeding one) indicates an ACH's baseline period Clinical Episode spending was lower (higher) than the average ACH, controlling for patient and peer group influences on spending. In other words, ACHs with lower efficiency measure values have historically treated the same Clinical Episode with lower spending than ACHs with higher efficiency measure values.

- **Step 9. Calculate SBS:** For each ACH, calculate SBS by multiplying the Dollar Amount **(Step 7)** by the Efficiency Measure **(Step 8).**

- **Step 10. Calculate Preliminary PCMA:** Calculate the Preliminary PCMA by taking the average patient case mix adjusted Clinical Episode spending (**Step 3**) for each ACH and dividing by the Dollar Amount (**Step 7**).
  - **Note:** The Preliminary PCMA is calculated using all of an Episode Initiator's baseline period Clinical Episodes. The Final PCMA is constructed using realized case mix from an Episode Initiator's attributed Clinical Episodes in the applicable Model Year.

- **Step 11. Calculate the PAT Factor:** Calculate the PAT Factor using the predicted ratio **(Step 4b)** trended to the middle quarter (rounded to the nearest whole quarter) of the Model Year (calculation not shown in table).

- **Step 12: Calculate the Preliminary HBP:** Calculate the Preliminary HBP by multiplying the SBS **(Step 9)**, the Preliminary PCMA **(Step 10)**, and the PAT Factor **(Step 11)** for each ACH.

Table 8: Preliminary HBP Calculation

			HBP Construction Steps			
	Step 7	**Step 8**	**Step 9**	**Step 10**	**Step 11**	**Step 12**
ACH	**Dollar Amount**	**Efficiency Measure**	**Standardized Baseline Spending (SBS)**	**Preliminary Patient Case Mix Adjustment**	**Peer-Adjusted Trend (PAT) Factor**	**Preliminary HBP**
H1001	$40,530	1.06	$42,962	0.81	1.36	$47,327
H1002	$40,530	0.99	$40,125	0.80	1.15	$36,915

Note: All spending is expressed in standardized dollars. All dollar values are rounded to the nearest dollar. Ratios are rounded to two decimal places.

The three components that comprise the Preliminary HBP are summarized in Table 9.

Table 9: Components of the Preliminary HBP

Component	Standardized Baseline Spending (SBS)	Patient Case Mix Adjustment (PCMA)	Peer Adjusted Trend (PAT) Factor
Purpose	Standardizes ACH $h's$ spending across the baseline period to account for historical efficiency	Adjusts the HBP for the expenditure riskiness of ACH $h's$ patients	Adjusts for persistent differences across ACH peer groups and is trended to the Model Year based on trends in Clinical Episode spending during the baseline period within each ACH's peer group

Component	Standardized Baseline Spending (SBS)	Patient Case Mix Adjustment (PCMA)	Peer Adjusted Trend (PAT) Factor
Derivation	The SBS is constructed by multiplying the average predicted baseline period spending for all ACHs (Dollar Amount) by a measure of ACH h-specific efficiency. The efficiency measure is ACH $h's$ average ratio of observed to predicted baseline period spending where predicted spending is constructed by multiplying the predicted spending from the compound lognormal model using only the patient case mix parameters and the predicted ratio from the peer group factor regression	The PCMA numerator is constructed from the predicted spending of the first stage of the risk adjustment model, omitting the peer group and quarter-year dummies. This numerator is divided by the Dollar Amount.	The PAT Factor is constructed by taking the per-ACH-quarter average of the ratio of realized spending to predicted spending, omitting the peer group characteristics and quarter-year dummy estimates from the first stage of the risk adjustment model. This ratio is then regressed on peer group characteristics, time trends, and interactions. The predicted ratio from the regression is then projected to the Model Year.

4.3.2 Formulation of the Preliminary PGP-ACH Benchmark Price

The PGP-ACH Benchmark Price takes the following form:

$$PGP\text{-}ACH\ Benchmark\ Price_{p,h,t} = HBP_{h,t} * PGP\ Offset_{p,h} * Relative\ Case\ Mix_{p,h,t}$$

PGPs receive Benchmark Prices for each of the eligible ACHs at which they initiate Clinical Episodes. Each PGP-ACH Benchmark Price accounts for (i) the PGP's overall efficiency relative to each specific ACH's efficiency (the PGP Offset) and (ii) differences in the case mix of the PGP's Clinical Episodes relative to the average case mix at each specific ACH (their Relative Case Mix).

The remainder of this section describes the steps used to derive each component of the PGP-ACH Benchmark Price using the risk adjustment model estimates described in Section 4.2 and the HBP described in Section 4.3.1. These steps are further illustrated in the numerical example shown in Table 10.

- **Step 13: Calculate the PGP Efficiency Measure:** Calculate the PGP Efficiency Measure as the average (across all ACHs at which the PGP initiates Clinical Episodes) of observed Clinical Episode spending to predicted Clinical Episode spending **(Step 5)**.

- **Step 14: Calculate the PGP Offset:** Calculate a measure of a PGP's efficiency relative to each ACH at which it initiates Clinical Episodes in the baseline period. Only calculate the PGP Offset for PGPs that have more than 40 Clinical Episodes in the baseline period. If a PGP has less than 40 Clinical Episodes in the baseline period, do not calculate the PGP Offset. In other words, set the PGP Offset to 1 for such cases.

  - **Step 14a:** Divide PGP-level Efficiency Measure **(Step 13)** by Efficiency Measure of the ACH at which it initiates Clinical Episodes **(Step 8)**.

  - **Step 14b:** If the PGP Offset is less than 1, then the PGP Offset is increased by half its distance from 1 and is calculated as:

  $$\left(\frac{1 + PGP\ Offset}{2} \right)$$

  - This is referred to as the *adjustment* in Table 10.

- **Step 15: Calculate the Preliminary PGP Relative Case Mix:** Calculate measure of PGP's Relative Case Mix to determine whether the overall case mix of PGP *p*'s Clinical Episodes at ACH *h* is more or less costly than the overall case mix of all Clinical Episodes initiated at ACH *h*.

  - **Step 15a:** Calculate average Preliminary PCMA at the PGP-ACH level by taking the average patient case mix adjusted Clinical Episode spending for each PGP-ACH combination and dividing by the Dollar Amount **(Step 7)**.

  - **Step 15b:** Calculate Preliminary Relative Case Mix as the ratio of PGP-ACH Preliminary PCMA over the ACH Preliminary PCMA **(Step 10).**

    - **Note:** Similar to Final PCMA, construct Final PGP Relative Case Mix using realized case mix of Performance Period Clinical Episodes.

- **Step 16: Calculate Preliminary PGP-ACH Benchmark Price:** Calculate Preliminary PGP-ACH Benchmark Price as the product of the Preliminary HBP **(Step 12)**, PGP Offset with Adjustment (**Step 14b**), and the Preliminary Relative Case mix (**Step 15**).

Table 10: Preliminary PGP-ACH Benchmark Price Calculation

		PGP-ACH Benchmark Price Construction Steps						
		Step 13	Step 14a	Step 14b	Step 15a	Step 15b	Step 12	Step 16
PGP ID	ACH	PGP Efficiency Measure	PGP Offset (w/o adjustment)	PGP Offset (w/ adjustment)	PGP-ACH Preliminary PCMA	Preliminary Relative Case Mix	Preliminary HBP	Preliminary PGP-ACH Benchmark Price
P001	H1001	1.05	0.99	1.00	0.86	1.06	$47,327	$50,167
P001	H1002	1.05	1.06	1.06	0.70	0.88	$36,915	$34,434
P002	H1001	0.98	0.92	0.96	0.75	0.93	$47,327	$42,254
P002	H1002	0.98	0.99	1.00	0.92	1.15	$36,915	$42,452

Note: All spending is expressed in standardized dollars. All dollar values are rounded to the nearest dollar. Ratios are rounded to two decimal places.

The three components that comprise the PGP-ACH Benchmark Price are summarized in Table 11.

Table 11: Components of the PGP-ACH Benchmark Price

Component	HBP	PGP Offset	Relative Case Mix
Purpose	Provides the baseline dollar value of PGP *p*'s Benchmark Price for Clinical Episodes initiated at ACH *h*	Measures PGP *p*'s historical efficiency relative to ACH *h* in the baseline period	Measures whether the overall case mix of PGP *p*'s Clinical Episodes at ACH *h* is more or less costly than the overall case mix of all Clinical Episodes at ACH *h*
Derivation	For a complete description of the construction of the HBP, see Table 8	The PGP Offset is constructed as the ratio of the observed/expected spending at PGP *p* where expected spending is constructed from the product of the predicted spending from the compound lognormal model using only the patient case mix parameters and the predicted ratio from the peer group factor regression., This is then divided by the observed/expected ratio at ACH *h*.	The relative case mix is the ratio of PGP *p*'s case mix at ACH *h* ($PCMA_{p,h}$) to the case mix of all Clinical Episodes initiated at ACH *h* ($PCMA_h$).

4.3.3 Create Preliminary and Final Target Prices

The following section describes the steps to convert HBPs and PGP-ACH Benchmark Prices into the Preliminary Target Prices that are disseminated to Participants. These steps are further illustrated in Table 12 (for ACH Target Prices) and Table 13 (for PGP-ACH Target Prices).

- **Step 17. Apply CMS Discount Factor:** Apply a 3% discount factor, the CMS Discount, to HBPs and PGP-ACH Benchmark Prices to calculate the Target Prices for ACHs and PGPs, respectively.

- **Step 18. Convert Preliminary Target Prices into real dollars**: Because all calculations are conducted using official CMS standardized allowed amounts, convert standardized allowed amounts into 2018 real dollars by creating a ratio (from baseline period Clinical Episodes) of the sum of real Clinical Episode spending to standardized allowed amount spending at the Episode Initiator-Clinical Episode category level. Multiply the Target Price by this ratio.

  - **Note**: The Final Target Prices are constructed from a ratio of real Clinical Episode payments to standardized payments, using realized Performance Period Clinical Episodes.

Table 12: Preliminary ACH Target Price Calculation

ACH	Step 12 Preliminary HBP	Step 17 Preliminary ACH Target Price	Step 18 Preliminary Ratio of Real Dollars to Payment Standardized Dollars	Preliminary Target Price in 2018 Real Dollars
H1001	$47,327	$45,907	1.01	$46,366
H1002	$36,915	$35,808	1.01	$36,166

Note: All spending is expressed in standardized dollars. All dollar values are rounded to the nearest dollar. Ratios are rounded to two decimal places.

Table 13: Preliminary PGP-ACH Target Price Calculation

PGP ID	ACH	Step 16 Preliminary PGP-ACH Benchmark Price	Step 17 Preliminary Target Price	Step 18 Preliminary Ratio of Real Dollars to Payment Standardized Dollars	Preliminary Target Price in 2018 Real Dollars
P001	H1001	$50,167	$48,662	1.02	$49,635
P001	H1002	$34,434	$33,401	1.02	$34,069
P002	H1001	$42,254	$40,986	1.02	$41,806
P002	H1002	$42,452	$41,178	1.02	$42,002

Note: All spending is expressed in standardized dollars. All dollar values are rounded to the nearest dollar. Ratios are rounded to two decimal places.

- **Step 19. Adjust Preliminary Target Price:** During the Model Year, adjust the Preliminary Target Prices to account for the most recently available Medicare payment rates released in the Federal Register.

- **Step 20. Create Final Target Price**: Convert Preliminary Target Price into Final Target Price by:

  o Updating the patient case mix adjusted Clinical Episode spending term to account for realized case mix of Model Year Clinical Episodes.

  o Updating the ratio of real dollars to standardized dollars using realized Model Year Clinical Episodes.