Medicare Service Use and Expenditures Across Physician Practice Affiliation Models

Avalere | September 2024

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Funding for this research was provided by the American Independent Medical Practice Association (https://aimpa.us/). Avalere retained full editorial control.

Executive Summary

Background

National trends in physician practice affiliation over the last decade show movement away from unaffiliated private practice toward models in which physicians align with a larger entity that can offer administrative and financial support. In addition to health system or corporate models, physicians may choose to align with an administrative organization, often referred to as a management services organization (MSO). MSOs vary considerably in the services they offer and often have financial capitalization, either from large groups of physicians, insurers, private equity (PE) sponsors, or other entities, such as retailers and distributors. Stakeholders demonstrate a high level of interest in the impact that the continued shift away from unaffiliated private practice has on the healthcare system—particularly the cost, utilization, and quality of healthcare services associated with these trends.

This study provides a more detailed understanding of the relationship between physician affiliation models and healthcare utilization and expenditures by looking at more specific definitions of four physician practice affiliation models: unaffiliated private practice (UPP), private equity-affiliated private practice (PEAPP), corporate, and hospital (Table ES-1). The analysis presented in this work focuses on five specialties: cardiology, gastroenterology, medical oncology, orthopedics, and urology. The specialties were chosen based on several criteria, including Medicare volume and utilization and current or expected PE investment.

These analyses are an important contribution to research on physician practice model affiliation as they consider all four physician practice models in a single study and focus on beneficiary-level measures of healthcare expenditures (total cost of care) and utilization (inpatient (IP) days and emergency department (ED) visits). They also consider differences in these measures (a) across physician affiliation models in a single year and (b) when physicians transition from UPP to an affiliated model. Together, these analyses provide a valuable perspective on the role of practice affiliation and inform an understanding of the evolving physician practice model landscape.

Study Research Questions

This study focuses on the following three research questions:

- What are the trends in physician practice affiliation from 2019 through 2022?
- Are there differences in Medicare utilization and expenditures for beneficiaries treated by physicians practicing under different affiliation models?
- What is the impact of a shift from unaffiliated private practice (UPP) to an affiliated model (PEAPP, corporate, or hospital) on beneficiary utilization and expenditures?

Table ES-1. Physician Practice Affiliation Models

Model	Definition
Unaffiliated Private Practice (UPP)	Practices that are not affiliated with a hospital, corporate entity, or PE-backed management services organization (MSO)
PE-Affiliated Private Practice (PEAPP)	Practices affiliated with a PE-backed MSO (regardless of the size of the PE firm's ownership stake in the MSO)
Corporate	Practices affiliated with insurers or other large corporate entities, including an MSO owned or operated by a corporate entity[1]
Hospital	Practices affiliated with a hospital or hospital system, including an MSO owned or operated by the hospital or health system

Note: The definitions of UPP, corporate, and hospital correspond to categories of the owner type variable in the IQVIA OneKey data set: UPP corresponds to independent, corporate corresponds to corporate-owned practice, and hospital corresponds to integrated health system-owned practice. Because that data set does not distinguish PEAPP from corporate, Avalere performed additional segmentation of PEAPP (see below) in accordance with the definition of PEAPP above.

Analysis

Avalere leveraged several data sources to support the assignment of physicians to the four practice affiliation models. The starting point for this assignment was the IQVIA OneKey data set, which was used to identify UPP, corporate affiliation, and hospital affiliation. As IQVIA and other existing data sources generally recognize PE-backed MSOs as corporate, Avalere conducted a robust review of available financial transaction data from PitchBook (a data source that includes information on financial transactions), as well as press releases, investor websites, and publicly available lists of PE portfolio companies, to identify physician practices affiliated with PE-backed MSOs (PEAPP).

Following physician assignment to practice affiliation models, Medicare beneficiaries were assigned to a practice affiliation model based on analysis of physician claims in the 100% Medicare fee-for-service (FFS) data. Avalere conducted two primary analyses, both risk-adjusted to control for beneficiary and market-level characteristics. The first is a cross-sectional analysis that examines total healthcare expenditures, inpatient days, and emergency department visits for beneficiaries attributed to physicians practicing under the four practice

[1] Examples of corporate entities include Optum, Fresenius, Evolent, Permanente Medical Group Inc., etc.

affiliation models in 2022. The second is a pre-post analysis that examines total healthcare expenditures, inpatient days, and emergency department visits for beneficiaries attributed to physicians transitioning from UPP to one of the other three practice affiliation models: PEAPP, corporate, or hospital.

Key Findings

Trends in Physician Practice Model Affiliation

- The proportion of Medicare-billing physicians in UPP decreased considerably from 2019 through 2022, representing only 12% of physicians in aggregate across the five specialties studied in 2022.
- The share of physicians in UPP across the five specialties ranged from 5% in medical oncology to 16% in urology. In 2022, 6% of physicians across the five specialties were affiliated with the PEAPP model, 37% were affiliated with corporate entities, and 45% were affiliated with hospitals.
- From 2019 through 2022, physicians shifted from UPP into the three other practice affiliation models. Generally, there was an increase in both corporate and hospital affiliation across the five specialties analyzed, except for a slight decrease in corporate affiliation among medical oncologists from 2019 through 2022. The number of physicians affiliated with the PEAPP model remains the lowest among the three types of affiliation in each specialty.

Comparison of Medicare Expenditures Across Affiliation Models

- Beneficiaries attributed to physicians in the hospital affiliation model were generally associated with the highest Medicare expenditures, followed by beneficiaries attributed to corporate physicians, then PEAPP physicians, and finally UPP physicians.
- Medicare expenditures for beneficiaries attributed to hospital-affiliated physicians had the highest percentage of expenditures in the facility setting (64% to 69%, with a weighted average of 67% across the five specialties) compared to other practice affiliation models.
- Beneficiaries attributed to hospital-affiliated physicians had the highest number of IP days and ED visits.

Change in Expenditures Post Transition from UPP to an Affiliated Model

- Compared to beneficiaries attributed to physicians who remained in UPP, total post-transition Medicare expenditures were lower for beneficiaries attributed to physicians who moved from UPP to PEAPP. The reduction in expenditures ranged from $231 to $1,423 across the five specialties assessed (weighted average reduction across the five specialties was $963).
- For beneficiaries attributed to physicians who moved from UPP to corporate or hospital affiliation, the weighted average 12-month expenditures across the five specialties in the post period were $1,140 and $1,327 higher after the transition, respectively.

- In the post period, beneficiaries attributed to physicians who transitioned from UPP to PEAPP utilized fewer IP days compared to the pre period. ED visits varied minimally in the post period across all models.

Discussion

The role of PE affiliation with physician practices has been an area of focus in recent studies and in the media. Our findings document that the share of physicians in PE-affiliated private practices is growing but remains a fraction of the share of physicians affiliated with hospitals or other corporate entities. The changing distribution of physician practice affiliation models will be important to monitor as physicians face ongoing challenges with practice operations and as the proportion of physicians in UPP continues to decrease.

While prior studies have focused on comparing PE, corporate, or hospital models to UPP alone, this study is the first to provide an understanding of the relative differences in expenditures and utilization across the full landscape of physician practice affiliation models, including PEAPP. We find that patients attributed to hospital-affiliated physicians are associated with the highest total Medicare expenditure – followed by beneficiaries attributed to corporate-affiliated physicians, then PEAPP physicians, and finally UPP physicians. Importantly, across all five specialties studied, beneficiaries attributed to physicians who transitioned from the UPP model to either corporate or hospital affiliation had higher 12-month Medicare expenditures when compared to the 12-month period prior to such affiliation. Conversely, expenditures for beneficiaries attributed to physicians who transitioned from UPP to PEAPP were lower in the 12-month period after affiliation when compared to the 12-month period prior to affiliation. Taken together, these results are relevant to policymakers and payers looking to understand potential drivers of expenditure in rapidly changing healthcare markets.

Background

National trends in physician practice affiliation over the last decade show movement away from unaffiliated private practice toward models in which physicians align with a larger entity that can offer administrative support, payer contracting and billing services, and other functions critical to day-to-day practice operations. A 2022 survey found that 41% of physicians belonged to a hospital-owned practice or were directly employed by hospitals, compared to 29% in 2012 (American Medical Association 2023). As of 2023, nearly 80% of all physicians were affiliated with hospitals and health systems (55%) or other corporate entities (23%) (Physicians Advocacy Institute and Avalere 2024). In addition to health system and corporate models, physicians may choose to align with an administrative organization, often referred to as a management services organization (MSO). MSOs vary considerably in operational and financial structure, as well as in the services they offer, and often have financial capitalization from large groups of physicians, insurers, private equity (PE) sponsors, or other entities, such as retailers and distributors. Numerous factors have contributed to the observed changes in physician practice affiliation, including reimbursement pressures, regulatory and administrative requirements and access to capital.

Stakeholders demonstrate a high level of interest in the impact that the continued shift away from unaffiliated private practice has on the healthcare system—particularly the cost, utilization, and quality of healthcare services associated with these trends. Concerns have been raised about costs to both the system and the patient resulting from consolidation among providers, health systems, and health plans (Koch et al. 2017, Scheffler 2023, Sinaiko et al. 2023). More recently, policymakers and the media have focused on the role of PE investment in physician practices. As physician groups continue to move from unaffiliated private practice toward affiliation with PE-backed MSO, corporate, and hospital partners, more research is needed to understand the cost, utilization, and quality differences across these four models.

Research Questions

- What are the trends in physician practice affiliation from 2019 through 2022?
- Are there differences in Medicare utilization and expenditures for beneficiaries treated by physicians practicing under different affiliation models?
- What is the impact of a shift from unaffiliated private practice to an affiliated model (PEAPP, corporate, or hospital) on beneficiary utilization and expenditures?

The lack of data needed to track physician practice affiliation accurately, particularly with PE-backed MSOs, is an overarching limitation to research in this area, which has led researchers to call for greater transparency and reporting (Singh and Brown 2023). A literature review of PE investment in healthcare found that most studies focused on quality of care and that nursing homes were the most frequently studied type of healthcare operator, accounting for over one third of the included studies. The review also found less research on the costs and health

outcomes associated with physician practices in different models (Borsa et al. 2023). By and large, studies examining cost, utilization, and health outcomes for physician practices compare certain physician practice models but do not conduct a comprehensive review across unaffiliated private practice, private practice affiliated with a PE-backed MSO, corporate models, and hospital models. Some studies compare PE-affiliated groups to "all other" groups (Braun et al. 2021, Bruch et al. 2022), while others compare PE-affiliated groups to unaffiliated groups (Scheffler 2023, Singh et al. 2022). In addition, researchers have compared hospital-acquired groups to unaffiliated groups to assess costs and quality of care (Beaulieu et al. 2020, Ho et al. 2020, Scott et al. 2017). Many studies included in the literature review only considered a single or small subset of specialties (Braun et al. 2021, Nie et al. 2022).

This study provides a more detailed understanding of the relationship between physician affiliation models and healthcare utilization and expenditures by looking at more specific definitions of four physician practice affiliation models: unaffiliated private practice (UPP), private equity-affiliated private practice (PEAPP), corporate, and hospital.

The analysis presented in this work focuses on five specialties: cardiology, gastroenterology, medical oncology, orthopedics, and urology. A number of criteria guided the selection of the specialties, the most important of which are (a) Medicare utilization and claims volume, (b) current or expected PE investment, (c) relevance of aggregate claims-based utilization and quality metrics (e.g., total cost of care, inpatient (IP) days, and emergency department (ED) utilization), and (d) relevance to policy discussions, including the existence of site-of-care dynamics – particularly in specialties where imaging and surgical care may be delivered across hospital- and community-based settings.

These analyses are an important contribution to research on physician practice model affiliation. They consider all four physician practice models in a single study for a range of specialties and focus on the Medicare population, the largest single payer for healthcare services in the United States. In addition, these analyses focus on beneficiary-level measures of healthcare expenditures (total cost of care) and utilization (IP days and ED visits). They also consider differences in these measures (a) across physician affiliation models in a single year and (b) when physicians transition from UPP to an affiliated model. Together, these analyses provide a valuable perspective on the role of practice affiliation and inform an understanding of the evolving physician practice model landscape.

Methods

Practice Affiliation Models and Specialties

Avalere's study examined four practice affiliation models – UPP, PEAPP, corporate, and hospital – across five physician specialties. The study leveraged the IQVIA OneKey data set classification with UPP, hospital and corporate models and further refined the categorization using multiple data sources to identify physician practices affiliated with a PE-backed MSO. Descriptions of the four practice affiliation models examined in this work are noted in **Table 1**.

The five specialties studied are cardiology, gastroenterology, medical oncology, orthopedics, and urology. These physician specialties were chosen based on several objective criteria, including 1) the ability to observe utilization in the Medicare population (as Medicare is the source of medical claims data for this study); 2) increases in PE investment interest in the specialty via MSO affiliation, both over the time period of the study (2019 through 2022) and expected in the near term; and 3) the ability to assess site-of-care dynamics for high-cost, high-volume services – for example, specialties with a high proportion of surgical procedures.

Table 1. Physician Practice Affiliation Models

Model	Definition
Unaffiliated Private Practice (UPP)	Practices that are not affiliated with a hospital, corporate entity, or PE-backed management services organization (MSO)
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[2] Examples of corporate entities include Optum, Fresenius, Evolent, Permanente Medical Group Inc., etc.

No single data source includes the practice affiliation data necessary to assign physicians to the PEAPP model. Accordingly, Avalere used several data sources alongside primary research to assign physicians to an affiliation model via the process described below.

Data Sources and Attribution

Avalere leveraged several data sources to support the assignment of physicians to the four practice affiliation models. The starting point for this assignment was the IQVIA OneKey data set, which was used to identify UPP, corporate affiliation, and hospital affiliation. This data set is among the most comprehensive available for tracking physician affiliation and ownership and has been used in a number of studies on these topics (Scheffler 2023, Singh et al. 2022). As IQVIA and other existing data sources generally recognize PE-backed MSOs as corporate, Avalere conducted a robust review of available financial transaction data to identify physician practices affiliated with PEAPP.

Avalere developed a list of PE-backed MSOs sourced from PitchBook (a data source that includes information on financial transactions), as well as press releases, investor websites, and publicly available lists of PE portfolio companies. Avalere reviewed PitchBook data to ensure a complete list of PE-backed MSOs for each specialty and to identify the specific private practices affiliated with each MSO. Through further review of PitchBook and press releases, Avalere also identified and verified the transaction date that indicates the start of each private practice's PE-backed MSO affiliation. Practice names were then mapped to practice identifiers in LexisNexis via character matching and manual review. Physicians in these practices were assigned to PEAPP using National Provider Identifiers (NPIs), which were identified from LexisNexis. See **Appendix A** for a schematic description of the assignment of physicians to practice affiliation models.

Following physician assignment to practice affiliation models, Medicare beneficiaries were assigned to a practice affiliation model based on analysis of physician claims in the 100% Medicare fee-for-service (FFS) data. Medicare beneficiaries were attributed to a single practice affiliation model, separately for each specialty area, based on the presence of at least two claims from physicians in a practice affiliation model. In cases where a beneficiary had more than two claims with physicians in different practice affiliation models, the beneficiary was assigned to the practice affiliation model associated with the highest number of claims. In cases of ties involving PEAPP, beneficiaries were assigned to PEAPP to ensure adequate sample size, as this physician practice model represents the smallest share of physicians.[3] Because the analysis assessed total cost of care based on the affiliation of the attributed provider, all claims and associated costs of care were attributed to that affiliation model, regardless of the affiliation of any other providers who delivered care to that patient. This approach to attribution is similar to that used in population-level value-based care models administered by CMS, such as the Medicare Shared Savings Program (MSSP).

[3] Only 1.6% of beneficiaries in the sample had a tie in highest claim count between PEAPP and another model or models.

The analysis included data from 2019 through 2022. Data from 2022 were the focus of the cross-sectional analysis comparing differences in utilization and expenditures across practice affiliation models. Data from 2019 through 2022 were included in the pre-post analysis to examine differences in utilization and expenditures associated with the transition from UPP to other practice affiliation models. The use of data from 2019 through 2022 maximizes the ability to study the transition from UPP to PEAPP, as PEAPP is the smallest group in the study sample. For the cross-sectional analysis, Medicare beneficiaries were assigned to practice affiliation models based on 2022 claims. For the pre-post analysis, Medicare beneficiaries were assigned to practice affiliation models separately for the 12 months prior to and for the 12 months after the transition in practice affiliation model.

Medicare claims data used in the analysis included claims for all healthcare services—including Medicare Part A (e.g., inpatient hospitalizations), Medicare Part B (e.g., physician office visits and outpatient services), and Medicare Part D Prescription Drug Event (PDE) data. Beneficiaries were required to be continuously enrolled in Medicare Part A and Part B benefits throughout the time period of the analysis.

Table 2 and **Table 3**, respectively, summarize the number of physicians and attributed beneficiaries in each affiliation model in 2022. Figures elaborating upon these results are included in the following section.

Table 2. Number of Physicians by Specialty and Practice Affiliation Model, 2022

Specialty	UPP	PEAPP	Corporate	Hospital
Cardiology	**2,686**	**238**	**4,812**	**12,745**
Gastroenterology	**1,704**	**1,826**	**5,607**	**4,368**
Medical Oncology	**715**	**895**	**5,889**	**8,206**
Orthopedics	**3,139**	**938**	**10,638**	**7,321**
Urology	**1,266**	**843**	**2,498**	**3,394**

Table 3. Number of Attributed Beneficiaries (thousands) by Specialty and Practice Affiliation Model, 2022

Specialty	UPP	PEAPP	Corporate	Hospital
Cardiology	**888**	**97**	**1,779**	**3,800**
Gastroenterology	**309**	**305**	**757**	**422**
Medical Oncology	**105**	**221**	**817**	**845**
Orthopedics	**415**	**155**	**1,564**	**844**
Urology	**336**	**321**	**770**	**534**

Analysis

Avalere conducted two primary analyses, both risk-adjusted to control for beneficiary and market-level characteristics. The first is a cross-sectional analysis that examines total healthcare expenditures, inpatient days, and emergency department visits for beneficiaries attributed to physicians practicing under the four practice affiliation models in 2022. The second is a pre-post analysis that examines total healthcare expenditures, inpatient days, and emergency department visits for beneficiaries attributed to physicians transitioning from UPP to one of the other three practice affiliation models: PEAPP, corporate, or hospital.

Claims for beneficiaries attributed to physicians transitioning from UPP to corporate or hospital affiliation were included for transitions that occurred between 2021 and 2022, as these were the two most recent years of fully available claims data, while claims for beneficiaries attributed to physicians transitioning from UPP to PEAPP were included for transitions occurring from 2019 through 2022. The time period for eligible transitions to PEAPP was expanded to maximize the number of transitions observable in the data, as there were substantially fewer transitions to PEAPP than to corporate or hospital affiliation. Note that the precise date (i.e., the day or month, depending on the source) of change in affiliation was known for physicians transitioning from UPP to PEAPP, but not for physicians transitioning from UPP to corporate or hospital affiliation. Transitions to corporate or hospital affiliation were measured as occurring in the calendar year based on OneKey data from IQVIA; the exact date of transition could be any date within that calendar year.

These two analyses provide different perspectives on the role of practice affiliation model by considering point-in-time differences in utilization and expenditures across practice affiliation

models. They also consider the potential impact of a transition from unaffiliated private practice to an affiliated model on utilization and expenditures.

Dependent Variables

Avalere's analysis focused on four dependent variables calculated at the beneficiary level over a 12-month period:

- Total Medicare expenditures, including Part A, Part B, and Part D
- Proportion of Medicare expenditures in facility setting of care
- Inpatient days
- Emergency department visits

Due to the challenge of separately identifying services directly associated with a given diagnosis or specialty, total Medicare expenditures (rather than specialty-specific expenditures) were chosen as the dependent variable. This choice is consistent with value-based care models that focus on total cost of care, such as CMS's Accountable Care Organizations (ACOs) and Enhancing Oncology Model (EOM). Note that the facility setting of care includes services in the inpatient, hospital outpatient department, emergency department, skilled nursing facility, and hospice settings. For the purpose of this analysis, "community-based" care includes care delivered in all other settings—including ambulatory surgical centers (ASCs), clinician offices, the home, and other non-facility settings of care.

Independent Variables (Risk Adjustors)

Avalere controlled for several beneficiary-level and area-level variables in its multivariate models, including:

- **Demographics:** Age, gender, and race
- **Medicare status:** Eligibility for both Medicare and Medicaid, original reason for Medicare entitlement, ESRD status, and number of months of Part D enrollment
- **Health status:** CMS HCC risk score and death in year
- **Social determinants of health:** ZIP code-level household income
- **Market characteristics:** Rural/urban location, census region, and predominant affiliation model in the county (model with the greatest proportion of attributed beneficiaries)

Statistical Models

Avalere used ordinary least squares (OLS) regression models in the cross-sectional analysis of beneficiaries attributed to physician practice affiliation models in 2022. Multivariate regression models were run for each specialty and each dependent variable while controlling for the independent variables noted above. This analysis estimated the association between physician affiliation and annual Medicare-covered services utilization and expenditures.

Avalere also used OLS models in the pre-post analysis. The dependent variables are identical to those assessed in the cross-sectional analysis. In addition to the independent variables noted above, the pre-post analysis models included a set of indicators[4] to track beneficiary assignment in the pre period versus the post period and with respect to model affiliation. One indicator marks the beneficiary assignation as belonging to the pre or the post period, and three related indicators mark whether the beneficiary remained in UPP or transitioned to PEAPP, corporate affiliation, or hospital affiliation. Additionally, interaction terms[5] were used for the pre-versus-post and post-period affiliation indicators (i.e., remaining in UPP versus transitioning to PEAPP, corporate, or hospital affiliation) to account for interaction between variables.

The results of all multivariate analyses are statistically significant at $p<0.001$. Note that in addition to reporting results for each specialty, weighted averages of the specialty-specific results were calculated to reflect the number of beneficiaries in each practice affiliation model.

[4] An indicator is a binary or dummy variable with possible values of 0 or 1. A value of 0 indicates the absence of the characteristic of interest; the value of 1 indicates its presence. For the pre-versus-post indicator, 0 means that the observation belongs to the pre period, and 1 means that the observation belongs to the post period. For the UPP-to-PEAPP, UPP-to-corporate, and UPP-to-hospital indicators, 1 means that the beneficiary transitioned to the model in question. If all three transition indicators are 0, the beneficiary remained in UPP.

[5] An interaction term is a term in a statistical model that expresses how variation in one variable affects variation in another variable.

Results

Physician Practice Model Affiliation

The proportion of Medicare-billing physicians in UPP decreased considerably from 2019 through 2022. In aggregate across the five specialties studied, just 12% of physicians were in UPP in 2022 (**Figure 1**). The share of physicians in UPP across the five specialties ranged from 5% in medical oncology to 16% in urology. In 2022, 6% of physicians across the five specialties were affiliated with the PEAPP model, 37% were affiliated with corporate entities, and 45% were affiliated with hospitals.

From 2019 through 2022, physicians shifted from UPP into the three other practice affiliation models. Generally, there was an increase in both corporate and hospital affiliation across the five specialties analyzed, except for a slight decrease in corporate affiliation among medical oncologists from 2019 through 2022. The number of physicians affiliated with the PEAPP model remains the lowest among the three types of affiliation in each specialty.

The percentage of beneficiaries attributed to different physician practice affiliation models is shown in **Figure 2**. The patterns in beneficiary shift largely mirror the trends in physician affiliation.

Figure 1. Share of Medicare Physicians by Specialty and Affiliation Model, 2019-2022

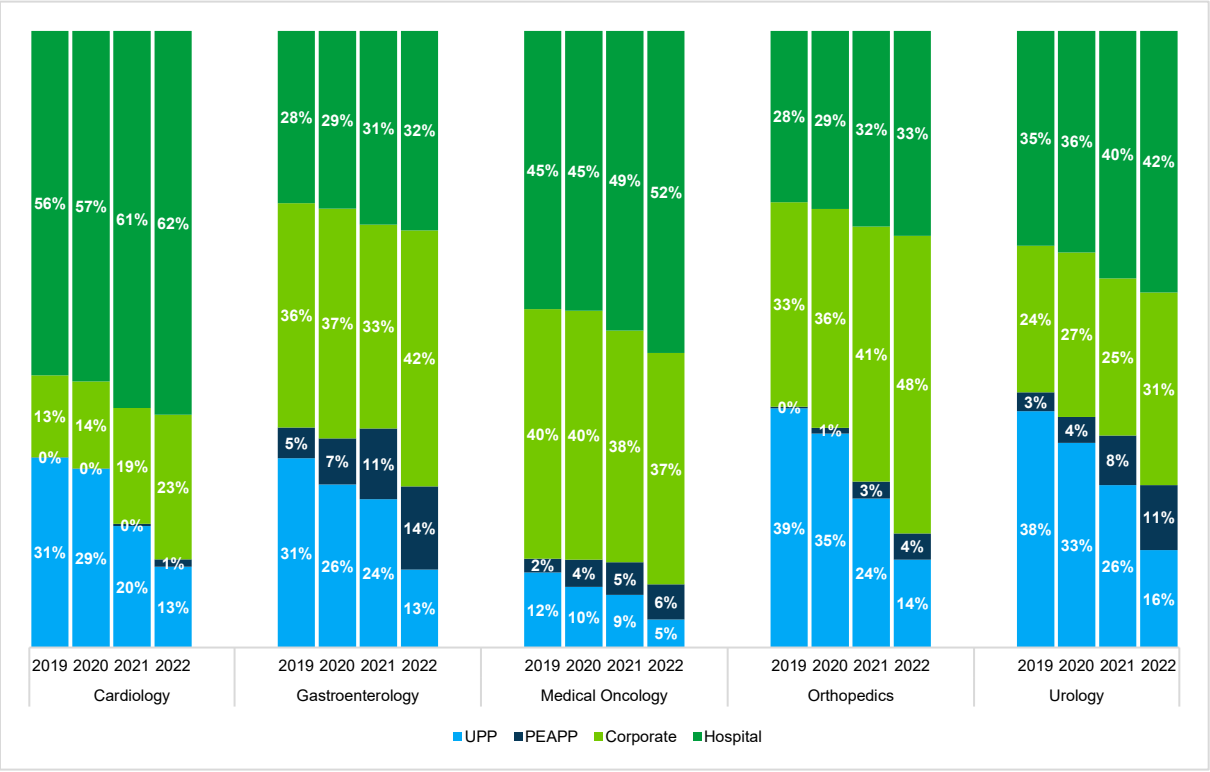
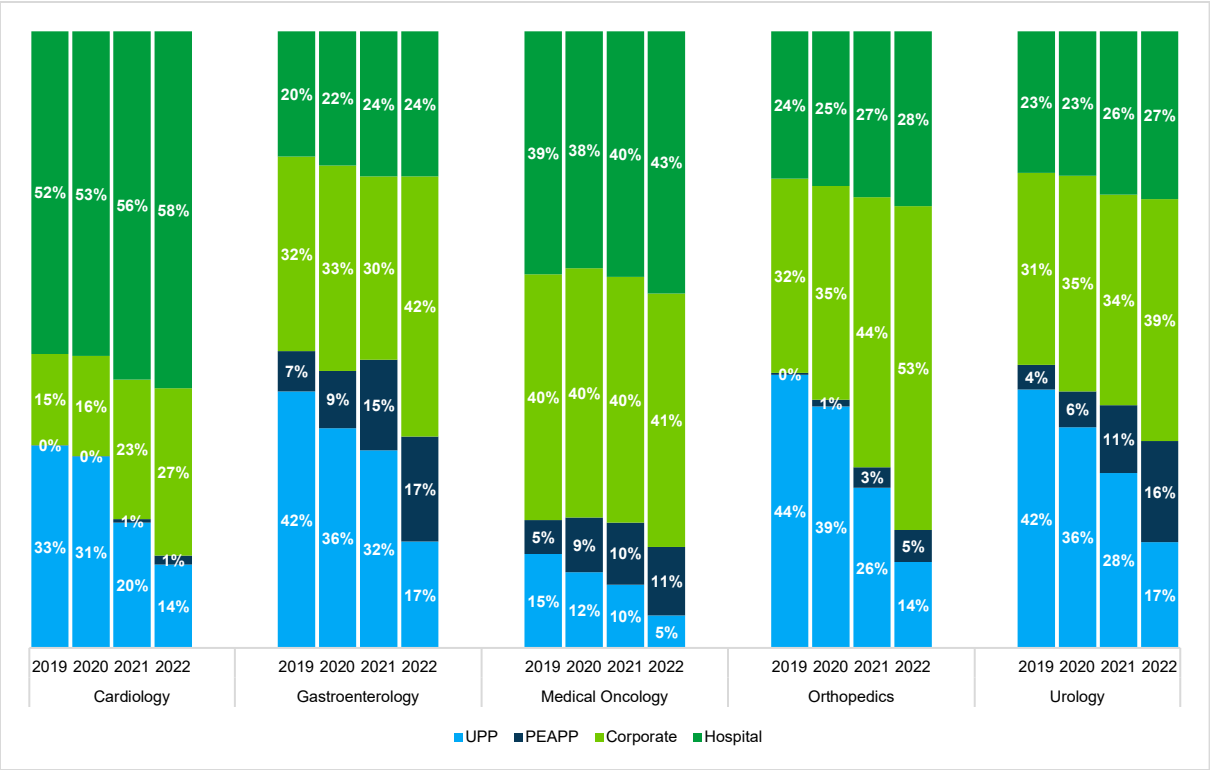


Figure 2. Share of Medicare Beneficiaries Attributed to Physicians by Specialty and Affiliation Model, 2019-2022



Cross-Sectional Analysis: Beneficiary Utilization and Expenditures by Physician Practice Model Affiliation

Avalere compared Medicare utilization and expenditures for beneficiaries attributed to different physician practice affiliation models in 2022. Unadjusted descriptive statistics on the sample and the results of multivariate models controlling for beneficiary and market characteristics are presented below.

Beneficiary Characteristics

Unadjusted descriptive statistics for the beneficiary samples demonstrate differences in practice affiliation model by geography. For example, beneficiary attribution to PEAPP is higher in the South relative to other areas of the country. Demographics and CMS HCC risk score – a measure of health status and comorbidity used to predict Medicare expenditures – were generally similar across samples. Mean CMS HCC risk score was slightly lower in the PEAPP sample relative to the other physician practice model affiliations (0.02 to 0.06 lower than the weighted average for the other three models). The exception was medical oncology, where the

HCC risk score was 0.03 higher in the PEAPP sample. Unadjusted sample descriptive statistics for all dependent variables and independent variables are reported in **Appendix B**.

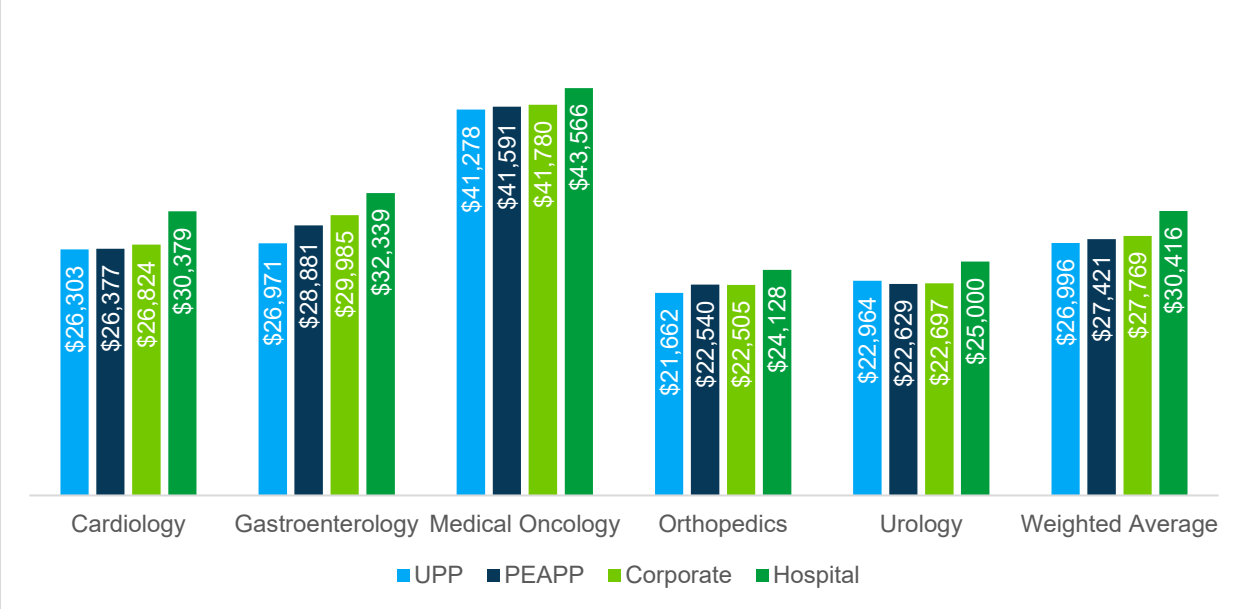
Medicare Expenditures and Setting of Care

The results of multivariate analysis predicting Medicare expenditures indicate that beneficiaries attributed to physicians in the hospital affiliation model were generally associated with the highest Medicare expenditures, followed by beneficiaries attributed to corporate-affiliated physicians, then PEAPP physicians, and finally UPP physicians (**Figure 3**).

Urology was the only specialty studied for which UPP did not have the lowest per beneficiary per year (PBPY) expenditures compared to other practice affiliation models. In this sample, beneficiaries attributed to PEAPP urologists had the lowest PBPY Medicare expenditures: $68 less than beneficiaries attributed to corporate-affiliated urologists, $335 less than beneficiaries attributed to UPP urologists, and $2,371 less than beneficiaries attributed to hospital-affiliated urologists.

Medical oncology was the specialty with the smallest range in total Medicare expenditures across practice affiliation models, with a difference of $2,288 between beneficiaries attributed to UPP versus those attributed to hospital-affiliated medical oncologists. The difference of $2,288 represents 5.5% of total UPP expenditures PBPY. Gastroenterology had the largest range in total Medicare expenditures across practice affiliation models, with a difference of $5,368 (or nearly 20% of total UPP expenditures PBPY) between beneficiaries attributed to UPP versus those attributed to hospital-affiliated gastroenterologists.

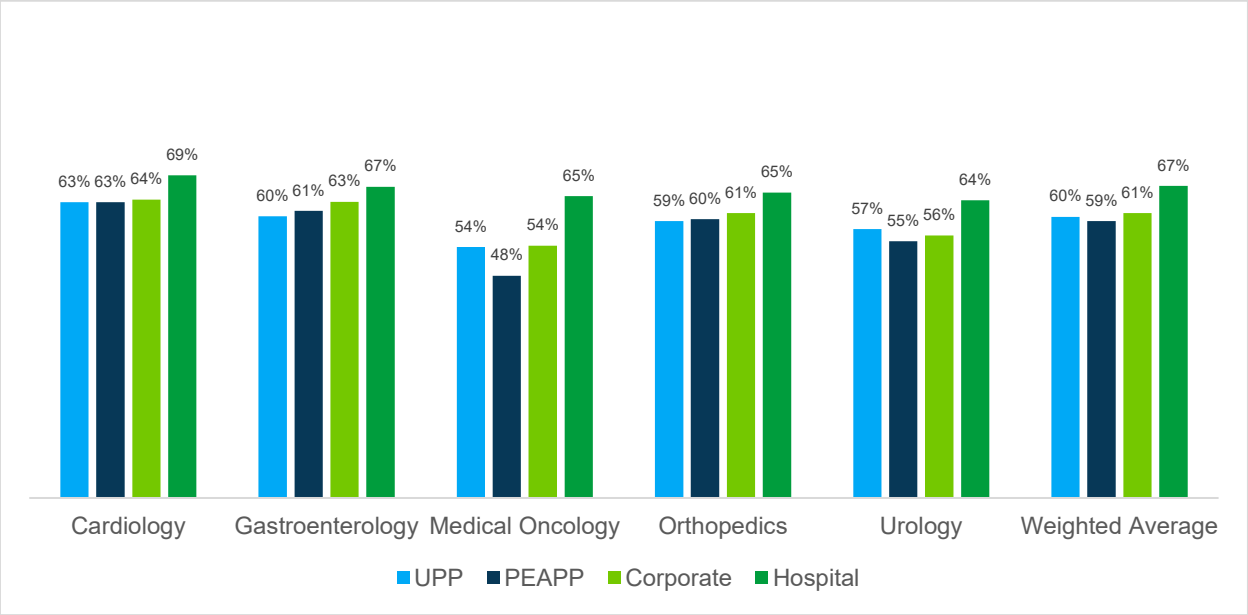
Figure 3. Total Medicare Expenditures PBPY, by Physician Practice Affiliation Model and Specialty, 2022



Avalere also examined the composition of total Medicare expenditures by looking at the cost of care provided in facility versus community settings. Medicare expenditures for beneficiaries attributed to hospital-affiliated physicians had the highest percentage of expenditures in the facility setting (64% to 69%, with a weighted average of 67% across the five specialties) compared to other practice affiliation models (**Figure 4**).

Beneficiaries attributed to UPP, PEAPP, and corporate-affiliated physicians had relatively similar levels of facility-based expenditures across specialties. In cardiology, gastroenterology, and orthopedics, beneficiaries attributed to UPP physicians had the lowest share of Medicare expenditures in the facility, followed by beneficiaries attributed to PEAPP physicians. In medical oncology, beneficiaries attributed to PEAPP physicians had the lowest share of Medicare expenditures in the facility, followed by beneficiaries attributed to UPP physicians and to corporate-affiliated physicians.

Figure 4. Proportion of Total Medicare Expenditures Provided in Facility Settings PBPY, by Physician Practice Affiliation Model and Specialty, 2022



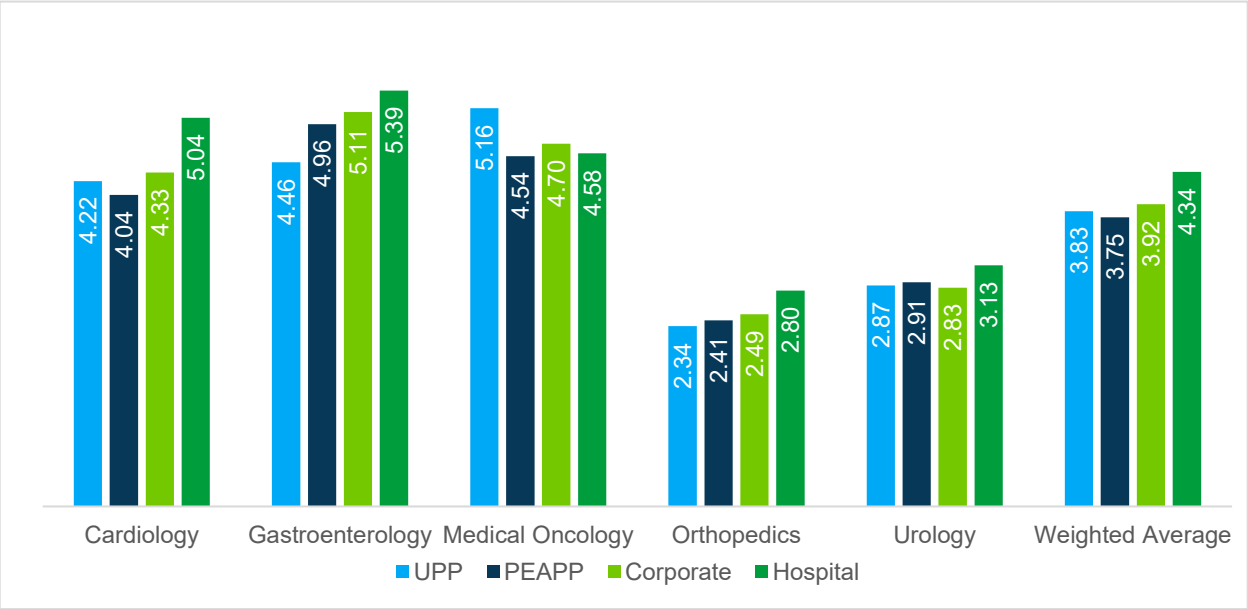
Utilization

Avalere estimated that, on average, Medicare beneficiaries attributed to different physician affiliation models in 2022 had 2.34 to 5.39 IP days (**Figure 5**) and 0.58 to 0.80 ED visits (**Figure 6**) across the five specialties. In general, beneficiaries attributed to hospital-affiliated physicians had the highest number of IP days, followed by beneficiaries attributed to corporate-affiliated, PEAPP, and UPP physicians. Medical oncology was the only specialty for which beneficiaries attributed to hospital-affiliated physicians did not have the most IP days; instead, patients

attributed to UPP physicians had the most IP days (5.16 days), followed by beneficiaries attributed to corporate-affiliated physicians (4.70 days).

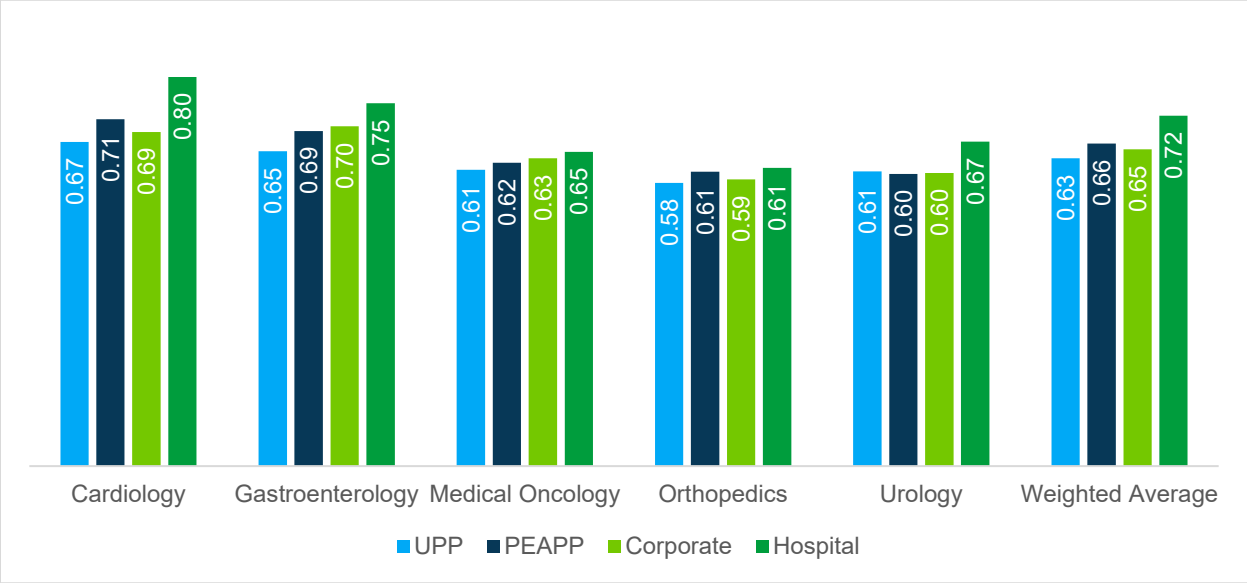
The largest difference between affiliation models was observed in cardiology. Beneficiaries attributed to hospital-affiliated physicians had one additional day, on average, in the IP setting (5.04 days) compared to beneficiaries attributed to PEAPP physicians (4.04 days). The smallest difference was observed in urology, with 0.30 days between beneficiaries attributed hospital-affiliated physicians (3.13 days) and beneficiaries attributed to corporate-affiliated physicians (2.83 days).

Figure 5. Total Inpatient Days per Beneficiary, by Physician Practice Affiliation Model and Specialty, 2022



Beneficiaries attributed to hospital-affiliated physicians had the highest number of ED visits, followed by beneficiaries attributed to PEAPP, corporate-affiliated, and UPP physicians, although the average for all groups was within a small range of 0.58 to 0.80 visits per beneficiary. The largest difference (0.13 visits) was observed in cardiology between beneficiaries attributed to hospital-affiliated physicians (0.80 visits) and those attributed to UPP physicians (0.67 visits).

Figure 6. Total ED Visits per Beneficiary, by Physician Practice Affiliation Model and Specialty, 2022



Pre-Post Analysis: Beneficiary Utilization and Expenditures and Transitions in Physician Practice Affiliation Models

Avalere compared utilization and expenditures among beneficiaries attributed to physician practices before (pre) versus after (post) transition from UPP to another physician practice affiliation model. This pre-post analysis controlled for beneficiary demographic characteristics and health status using the CMS HCC risk score and other variables as noted above. Beneficiaries attributed to physicians remaining in UPP were also analyzed to understand the impact of change in affiliation relative to no change in practice affiliation model during the time period of the study. Unadjusted sample descriptive statistics for all independent and dependent variables are reported in **Appendix C**.

Results reported in this section represent the measures for beneficiaries attributed to physicians who transitioned from UPP to an affiliated model relative to beneficiaries attributed to physicians who remained in UPP. The pre-versus-post differences in outcomes for beneficiaries of physicians who remained in UPP were compared with the pre-versus-post differences for the beneficiaries of physicians who transitioned to each of the three affiliated models in order to express the net impact of each transition (i.e., difference-in-difference).

Medicare Expenditures

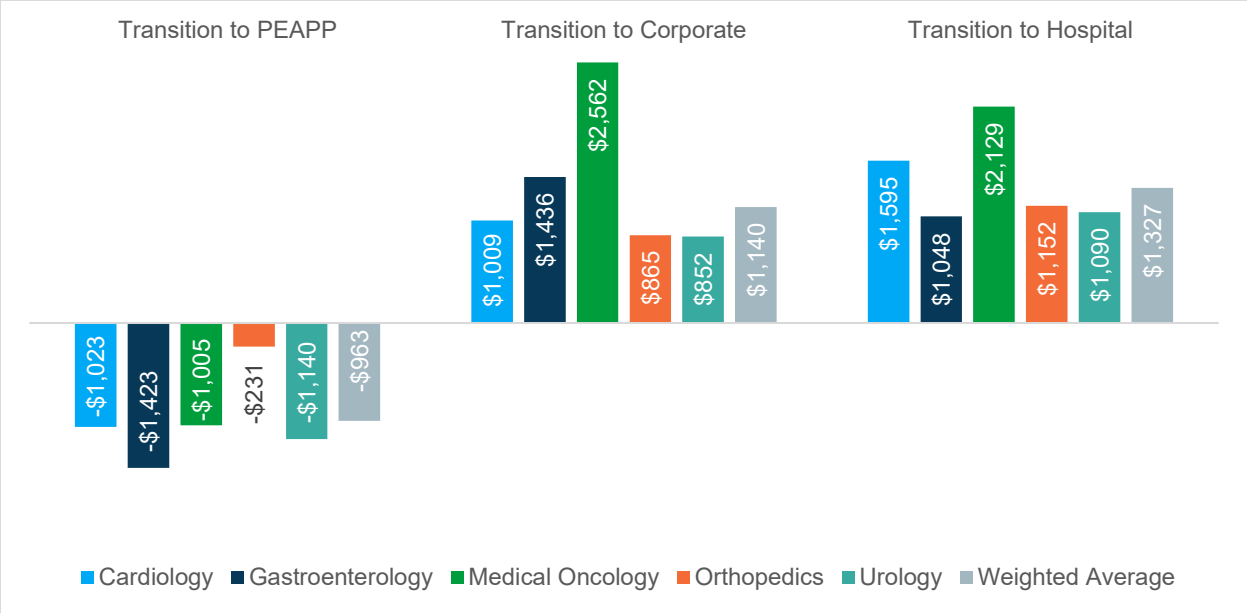
The results of the analyses indicate that total 12-month Medicare expenditures were lower in the post period than in the pre period for beneficiaries attributed to physicians who moved from UPP to PEAPP. Across specialties, beneficiaries of physicians who transitioned from UPP to corporate or hospital affiliation showed higher expenditures.

Compared to beneficiaries attributed to physicians who remained in UPP, total post-transition Medicare expenditures were lower for beneficiaries attributed to physicians who moved from UPP to PEAPP. The reduction in expenditures ranged from $231 to $1,423 across the five specialties assessed, with a weighted average decrease of $963 across the five specialties (**Figure 7**). For beneficiaries attributed to physicians who moved from UPP to corporate the 12-month expenditures in the post period were anywhere from $852 to $2,562 (weighted average of $1,140) higher after the transition. For beneficiaries attributed to physicians who moved from UPP to hospital the 12-month expenditures in the post period were anywhere from $1,048 to $2,129 (weighted average of $1,327) higher after the transition.

The largest relative reduction in Medicare expenditures was observed in gastroenterology. Avalere estimated that total Medicare expenditures in the post period for beneficiaries attributed to physicians in PEAPP were $1,423 lower than in the pre period.

The largest relative increase in Medicare expenditures was observed in medical oncology. Avalere estimated that total Medicare expenditures in the post period for beneficiaries attributed to corporate-affiliated physicians were $2,562 higher than in the pre period.

Figure 7. Change in Total Medicare Expenditures per Beneficiary per Year, by Post-Period Affiliation Model and Specialty



Utilization

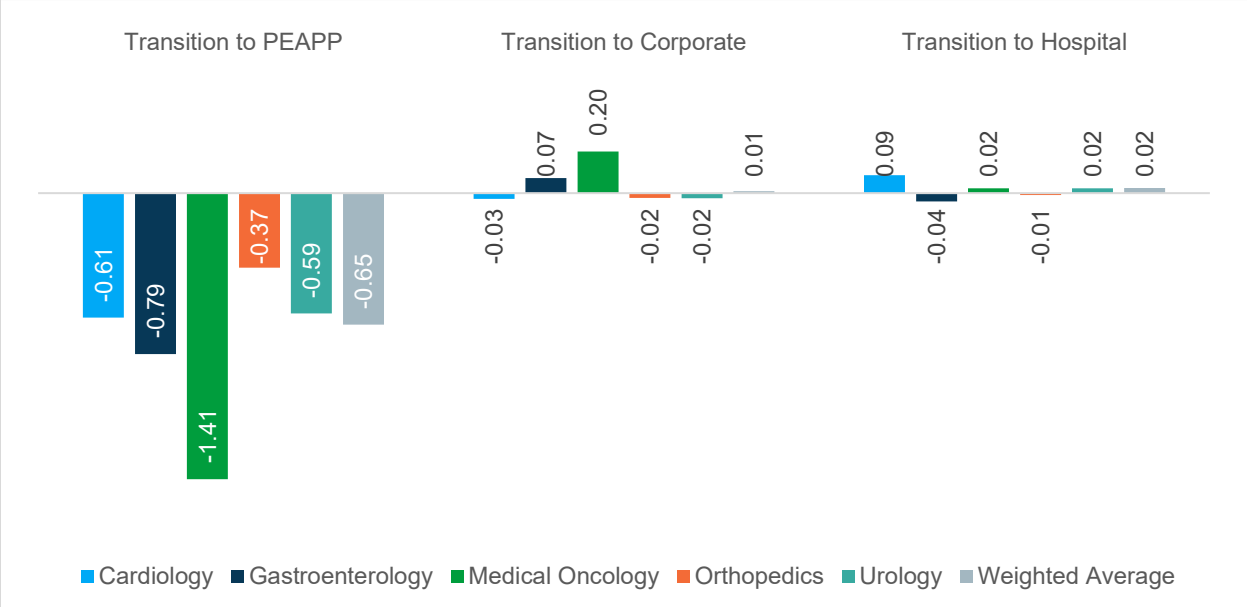
In the post period, beneficiaries attributed to physicians who transitioned from UPP to PEAPP utilized fewer IP days compared to the pre period. Across specialties, results were mixed for beneficiaries attributed to physicians who moved from UPP to corporate or hospital affiliation.

Beneficiaries attributed to physicians who transitioned from UPP to PEAPP utilized fewer IP days (-0.37 to -1.41 days) across all five specialties, with a weighted average of 0.65 fewer days (**Figure 8**). Beneficiaries attributed to physicians who transitioned from UPP to corporate or hospital affiliation in the post period had mixed and minimal changes in IP days (-0.04 to +0.20 days).

The largest relative reduction in IP days was observed in medical oncology. Avalere estimated that beneficiaries attributed to physicians who transitioned from UPP to PEAPP utilized 1.41 fewer inpatient days in the post period versus the pre period.

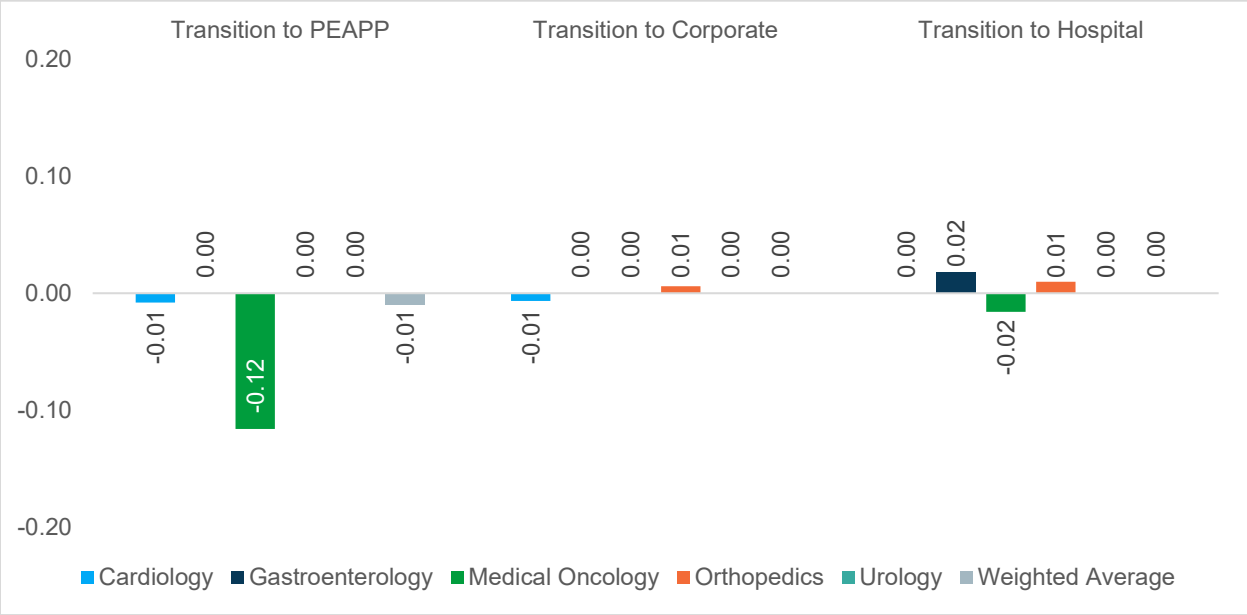
The largest relative increase in IP days was also observed in medical oncology, where beneficiaries attributed to physicians who transitioned from UPP to corporate affiliation utilized 0.20 more IP days in the post period versus the pre period.

Figure 8. Change in Inpatient Days per Beneficiary per Year, by Post-Period Affiliation Model and Specialty



In general, ED visits varied minimally in the post period across all groups. In medical oncology, a slight decrease in ED visits (-0.12 visits) was observed in the post period for beneficiaries attributed to physicians who transitioned from UPP to PEAPP (**Figure 9**).

Figure 9. Change in ED Visits per Beneficiary per Year, by Post-Period Affiliation Model and Specialty



Discussion

Key Findings

A key finding of this work is the substantial shift in the distribution of physician practice affiliation models since 2019 across each of the five specialties examined. The share of physicians in UPP has diminished considerably and represents only 12% of physicians in the five specialties as of 2022. The decrease in physicians in UPP reflects an increase in physicians affiliated with corporate models, hospital models, and, to a lesser extent, PEAPP models.

The role of PE affiliation with physician practices has been an area of focus in recent studies and in the media. Our findings document that the share of physicians in PE-affiliated private practices is growing but remains a fraction of the share of physicians affiliated with hospitals or other corporate entities. The changing distribution of physician practice affiliation models will be important to monitor as physicians face ongoing challenges with practice operations and the proportion of physicians in UPP continues to decrease.

Given the changes in physician practice affiliation in recent years, our findings detailing differences in total Medicare expenditures, IP days, and ED visits by practice model are a novel contribution to the literature. While prior studies have focused on comparing PE, corporate, or hospital models to UPP alone, this study provides an understanding of the relative differences in expenditures and utilization across the full landscape of physician practice affiliation models, including PEAPP. The finding that patients attributed to hospital-affiliated physicians are associated with the highest total Medicare expenditure – followed by corporate, then PEAPP, and finally UPP – is relevant to policymakers and payers looking to understand potential drivers of expenditure in rapidly changing healthcare markets.

In addition to the findings on the relationship between physician practice affiliation and total Medicare expenditures, the findings with respect to IP days and ED visits provide a perspective on beneficiary experience and quality of care. Our findings indicate that, in general, patients attributed to hospital-affiliated physicians had the highest number of IP days, followed by patients attributed to corporate-affiliated and PEAPP physicians, with the order varying by specialty. Similarly, beneficiaries attributed to hospital-affiliated physicians had the highest number of ED visits, followed by beneficiaries attributed to corporate-affiliated and PEAPP physicians, with the order varying by specialty.

Furthermore, the findings of the pre-post analysis provide a valuable and novel addition to the literature that has not been examined previously. They consider changes in expenditures and utilization for patients attributed to physicians who transition from UPP to other affiliation models. The findings indicate that, on average, total Medicare expenditures per beneficiary were lower for beneficiaries attributed to physician practices transitioning from UPP to PEAPP, regardless of specialty. Results were consistent across specialties for beneficiaries attributed to physician practices transitioning from UPP to corporate or hospital affiliation, with total Medicare expenditures per beneficiary higher for beneficiaries attributed to physician practices

transitioning from UPP to either corporate or hospital affiliation. The pre-post findings, together with the cross-sectional findings, provide two perspectives on the association of physician practice affiliation model with Medicare utilization and expenditures.

Limitations

The work presented here is a robust analysis of Medicare beneficiaries attributed to physicians practicing across a range of practice affiliation models identified using several secondary data sources supplemented with primary data collection. Several notes and methodologic limitations are described here for continued consideration of these results.

First, this study focused on the Medicare FFS population only. Similarly, this study was limited to physicians in five different specialty areas. The magnitude and direction of impact of findings may differ for other specialties not included in this analysis, or for payers other than Medicare.

The study has a national perspective. While the analyses are controlled broadly for geography, as well as for local market characteristics, the analyses do not provide a detailed understanding of differences that may occur within smaller markets or regions. Results may differ with increased geographic granularity.

With respect to the pre-post analysis, the time period post-transition was limited to 12 months due to data availability. The effects of transitions in physician practice affiliation models may take place over a period longer than 12 months. Future research that considers longer periods of time can continue to inform policymakers, payers, and other stakeholders about the ongoing impact of different affiliation models on the healthcare system. An additional limitation of the pre-post analysis is the inability to determine the exact date of practice model transition for physicians transitioning from UPP to corporate or hospital affiliation. This limitation is inherent to the data sources and may affect estimates of the impact of transitions to these practice models.

This study was conducted with the beneficiary as the unit of analysis and considers the total cost of care rather than the cost specifically attributable to care provided by the specialty of the affiliated physician. As a result of this methodologic decision, portions of total expenditures may be related to provision of services from physicians in different specialties or under different affiliation models. However, this total-cost-of-care approach is consistent with other payment models and approaches to attribution in the Medicare program, including for ACOs, which take responsibility for the value of care delivered to their entire population. Identifying specialty-specific costs can be a challenge, as secondary complications and comorbidities may or may not be related to a patient's specialty-specific underlying condition, particularly for chronic conditions that require a multidisciplinary care team. Future research that considers specialty-specific expenditures following a specialty-specific procedure could be a valuable contribution to the literature, informing discussions around setting-of-care dynamics across specialties.

This study's more detailed look at physician affiliation models was beyond what is known to be available in secondary data sets, such as IQVIA. The analysis entailed a significant review of PitchBook and publicly available information from practice and MSO websites. To the extent that these relationships were identifiable via PitchBook and website review, they are reflected in

these analyses. Information on organizational relationships and arrangements not documented in the identified data sources is not reflected in the analyses.

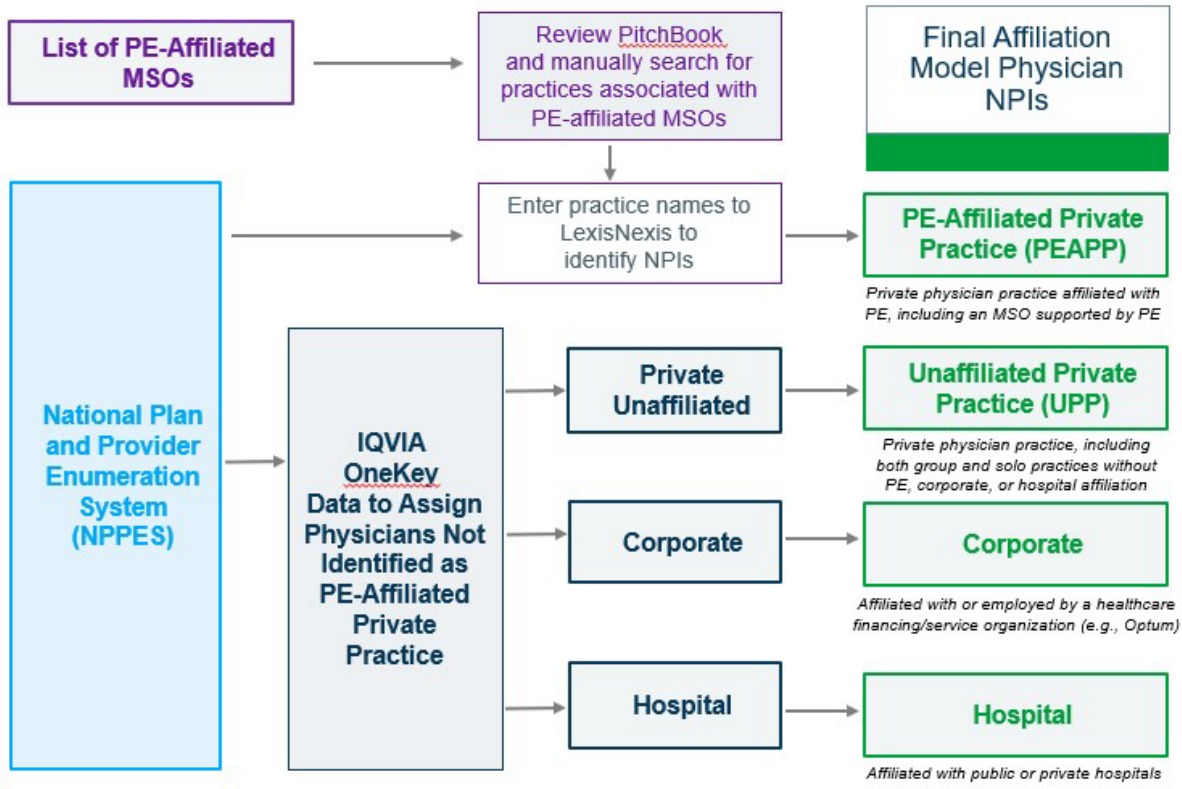
Contribution of this Work to Policy Discussions

This study offers an important contribution to ongoing policy discussion around physician consolidation through its analysis of the broader landscape of physician practice affiliation. Notably, this work's combination of secondary data sources and primary data collection to define practice models and identify physician affiliations allows for a more detailed understanding of the physician practice affiliation landscape nationally.

Our findings suggest differences in care delivery patterns across physician practice affiliation models. The focus on utilization and total cost of care complements the literature base, some of which has been focused on the unit prices of individual services. Given the absence of dynamic unit pricing in traditional Medicare, observed differences in total cost of care in this population are to some extent driven by site of care rather than by payer contracting dynamics only present in managed care markets.

Appendix A – Physician Assignment

Appendix Figure 1. Assignment of Physicians to Practice Affiliation Models



Appendix B – Patient Demographics and Unadjusted Outcomes, Cross-Sectional Analysis

Appendix Table 1a. Cross-Sectional Analysis: Patient Demographics of Beneficiaries Attributed to Cardiologists, by Affiliation Model, 2022

Demographic Measure	UPP	PEAPP	Corporate	Hospital
Age				
<65	5%	5%	6%	8%
65-74	46%	47%	49%	49%
75-84	37%	36%	35%	34%
85+	12%	11%	10%	10%
Sex				
Female	25%	25%	25%	26%
Male	75%	75%	75%	74%
Race/Ethnicity				
White	80%	83%	84%	84%
Black	6%	7%	6%	6%
Hispanic or Latino	6%	3%	4%	4%
Asian	3%	2%	2%	2%
Other/Unknown	4%	4%	4%	4%
Region*				
North	16%	39%	14%	25%
South	46%	29%	52%	36%
West	28%	9%	15%	18%
Midwest	10%	23%	19%	21%
Location*				
Rural	18%	5%	14%	23%
Not Rural	82%	95%	86%	77%
OREC				
Age	86%	87%	86%	83%
Disability	14%	13%	13%	16%
ESRD	0%	0%	0%	1%
Disability & ESRD	0%	0%	0%	0%
Dual Eligibility				
Dual-Eligible	13%	8%	8%	12%
Not Dual-Eligible	87%	92%	92%	88%

Part D				
Months of Part D Enrollment	8.9	9.0	8.7	8.8
Comorbidities				
HCC Score	1.41	1.39	1.38	1.44
Market Characteristics**				
Average Household Income	$68,745	$80,085	$70,789	$68,770
Average % of Households Below the Poverty Level	12%	9%	11%	11%
Average % of Households with First Individual Completed College	19%	21%	19%	18%
Average % of Households with First Individual Completed High School or Less	66%	60%	65%	65%
Average % of Households with English as Their Only Language	79%	81%	84%	85%

Appendix Table 1b. Cross-Sectional Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Cardiologists, by Affiliation Model, 2022

Outcome Measure PBPY	UPP	PEAPP	Corporate	Hospital
Total Medicare Expenditures	$27,148	$25,329	$27,675	$32,243
IP Days	4.05	3.73	4.37	5.38
ED Visits	0.63	0.69	0.67	0.82

Appendix Table 2a. Cross-Sectional Analysis: Patient Demographics of Beneficiaries Attributed to Gastroenterologists, by Affiliation Model, 2022

Demographic Measure	UPP	PEAPP	Corporate	Hospital
Age				
<65	10%	13%	10%	8%
65-74	53%	50%	53%	53%
75-84	30%	30%	30%	32%
85+	8%	8%	7%	8%

Sex				
Female	58%	58%	58%	59%
Male	42%	42%	42%	41%
Race/Ethnicity				
White	76%	80%	80%	81%
Black	8%	8%	8%	7%
Hispanic or Latino	7%	5%	6%	6%
Asian	5%	3%	3%	3%
Other/Unknown	4%	3%	4%	3%
Region*				
North	22%	24%	23%	22%
South	40%	36%	46%	47%
West	25%	16%	17%	18%
Midwest	14%	24%	14%	12%
Location*				
Rural	13%	17%	11%	8%
Not Rural	87%	83%	89%	92%
OREC				
Age	80%	76%	81%	83%
Disability	19%	22%	18%	16%
ESRD	1%	1%	1%	1%
Disability & ESRD	0%	0%	0%	0%
Dual Eligibility				
Dual-Eligible	18%	16%	14%	11%
Not Dual-Eligible	82%	84%	86%	89%
Part D				
Months of Part D Enrollment	9.1	9.0	8.9	9.1
Comorbidities				
HCC Score	1.38	1.43	1.36	1.33
Market Characteristics**				
Average Household Income	$69,157	$70,409	$72,313	$76,505
Average % of Households Below the Poverty Level	12%	11%	11%	10%
Average % of Households with First Individual Completed College	18%	19%	19%	20%

Average % of Households with First Individual Completed High School or Less	67%	65%	64%	62%
Average % of Households with English as Their Only Language	78%	83%	82%	80%

Appendix Table 2b. Cross-Sectional Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Gastroenterologists, by Affiliation Model, 2022

Outcome Measure PBPY	UPP	PEAPP	Corporate	Hospital
Total Medicare Expenditures	$27,313	$28,687	$30,478	$37,592
IP Days	4.24	4.78	5.22	6.61
ED Visits	0.62	0.65	0.69	0.84

Appendix Table 3a. Cross-Sectional Analysis: Patient Demographics of Beneficiaries Attributed to Medical Oncologists, by Affiliation Model, 2022

Demographic Measure	UPP	PEAPP	Corporate	Hospital
Age				
<65	8%	9%	8%	7%
65-74	44%	47%	47%	43%
75-84	35%	34%	35%	37%
85+	12%	10%	11%	12%
Sex				
Female	62%	59%	60%	60%
Male	38%	41%	40%	40%
Race/Ethnicity				
White	77%	83%	82%	84%
Black	10%	7%	8%	6%
Hispanic or Latino	6%	4%	5%	5%
Asian	4%	2%	2%	2%
Other/Unknown	3%	3%	3%	3%
Region*				
North	26%	23%	15%	19%
South	37%	34%	46%	64%
West	23%	20%	18%	13%

Midwest	15%	24%	21%	4%
Location*				
Rural	15%	19%	16%	9%
Not Rural	85%	81%	84%	91%
OREC				
Age	81%	82%	83%	83%
Disability	18%	17%	16%	16%
ESRD	1%	1%	1%	1%
Disability & ESRD	0%	0%	0%	0%
Dual Eligibility				
Dual-Eligible	17%	13%	12%	12%
Not Dual-Eligible	83%	87%	88%	88%
Part D				
Months of Part D Enrollment	8.9	8.7	8.6	8.9
Comorbidities				
HCC Score	1.88	1.99	1.94	1.99
Market Characteristics**				
Average Household Income	$67,042	$70,324	$70,084	$69,615
Average % of Households Below the Poverty Level	12%	11%	11%	11%
Average % of Households with First Individual Completed College	18%	19%	18%	19%
Average % of Households with First Individual Completed High School or Less	68%	65%	66%	66%
Average % of Households with English as Their Only Language	79%	83%	83%	82%

Appendix Table 3b. Cross-Sectional Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Medical Oncologists, by Affiliation Model, 2022

Outcome Measure PBPY	UPP	PEAPP	Corporate	Hospital
Total Medicare Expenditures	$41,915	$39,673	$40,998	$47,924
IP Days	5.34	4.51	4.66	4.96
ED Visits	0.60	0.57	0.63	0.66

Appendix Table 4a. Cross-Sectional Analysis: Patient Demographics of Beneficiaries Attributed to Orthopedics, by Affiliation Model, 2022

Demographic Measure	UPP	PEAPP	Corporate	Hospital
Age				
<65	8%	9%	7%	6%
65-74	51%	52%	53%	54%
75-84	32%	30%	31%	31%
85+	9%	9%	9%	8%
Sex				
Female	61%	62%	62%	62%
Male	39%	38%	38%	38%
Race/Ethnicity				
White	86%	86%	87%	88%
Black	4%	6%	5%	4%
Hispanic or Latino	5%	3%	3%	3%
Asian	2%	1%	2%	1%
Other/Unknown	3%	3%	3%	4%
Region*				
North	13%	20%	20%	17%
South	42%	39%	43%	47%
West	30%	15%	16%	16%
Midwest	15%	26%	21%	19%
Location*				
Rural	22%	23%	16%	13%
Not Rural	78%	77%	84%	87%
OREC				
Age	84%	82%	84%	86%
Disability	16%	18%	15%	14%
ESRD	0%	0%	0%	0%
Disability & ESRD	0%	0%	0%	0%
Dual Eligibility				
Dual-Eligible	10%	11%	9%	7%
Not Dual-Eligible	90%	89%	91%	93%
Part D				
Months of Part D Enrollment	9.0	8.8	9.0	9.1
Comorbidities				
HCC Score	1.23	1.28	1.22	1.21
Market Characteristics**				

Average Household Income	$68,564	$68,342	$72,225	$73,709
Average % of Households Below the Poverty Level	11%	11%	10%	10%
Average % of Households with First Individual Completed College	18%	18%	19%	19%
Average % of Households with First Individual Completed High School or Less	67%	66%	64%	63%
Average % of Households with English as Their Only Language	82%	86%	85%	85%

Appendix Table 4b. Cross-Sectional Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Orthopedics, by Affiliation Model, 2022

Outcome Measure PBPY	UPP	PEAPP	Corporate	Hospital
Total Medicare Expenditures	$22,410	$21,809	$22,642	$25,675
IP Days	2.40	2.31	2.49	3.02
ED Visits	0.58	0.56	0.57	0.64

Appendix Table 5a. Cross-Sectional Analysis: Patient Demographics of Beneficiaries Attributed to Urologists, by Affiliation Model, 2022

Demographic Measure	UPP	PEAPP	Corporate	Hospital
Age				
<65	5%	8%	6%	5%
65-74	46%	49%	49%	47%
75-84	37%	34%	35%	36%
85+	12%	10%	10%	11%
Sex				
Female	25%	26%	25%	25%
Male	75%	74%	75%	75%
Race/Ethnicity				
White	80%	84%	84%	83%
Black	6%	6%	6%	7%

Hispanic or Latino	6%	4%	4%	3%
Asian	3%	2%	2%	2%
Other/Unknown	4%	4%	4%	4%
Region*				
North	16%	25%	14%	39%
South	46%	36%	52%	29%
West	28%	18%	15%	9%
Midwest	10%	21%	19%	23%
Location*				
Rural	18%	23%	14%	5%
Not Rural	82%	77%	86%	95%
OREC				
Age	86%	83%	86%	87%
Disability	14%	16%	13%	13%
ESRD	0%	1%	0%	0%
Disability & ESRD	0%	0%	0%	0%
Dual Eligibility				
Dual-Eligible	13%	12%	8%	8%
Not Dual-Eligible	87%	88%	92%	92%
Part D				
Months of Part D Enrollment	8.9	9.1	8.8	9.0
Comorbidities				
HCC Score	1.41	1.44	1.38	1.39
Market Characteristics**				
Average Household Income	$68,745	$68,770	$70,789	$80,085
Average % of Households Below the Poverty Level	12%	11%	11%	9%
Average % of Households with First Individual Completed College	19%	18%	19%	21%
Average % of Households with First Individual Completed High School or Less	66%	65%	65%	60%
Average % of Households with English as Their Only Language	79%	85%	84%	81%

Appendix Table 5b. Cross-Sectional Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Urologists, by Affiliation Model, 2022

Outcome Measure PBPY	UPP	PEAPP	Corporate	Hospital
Total Medicare Expenditures	$24,647	$23,910	$22,635	$26,967
IP Days	3.03	2.93	2.82	3.44
ED Visits	0.59	0.52	0.60	0.71

Appendix C – Patient Demographics and Unadjusted Outcomes, Pre-Post Analysis

Appendix Table 6a. Pre-Post Analysis: Patient Demographics of Beneficiaries Attributed to Cardiologists, by Post-Period Affiliation Model, 2022

Demographics	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Age								
<65	8%	7%	6%	6%	9%	8%	9%	8%
65-74	41%	42%	43%	47%	43%	43%	43%	43%
75-84	36%	37%	37%	35%	33%	34%	33%	35%
85+	15%	15%	15%	12%	15%	15%	14%	15%
Sex								
Female	51%	51%	52%	52%	52%	52%	52%	52%
Male	49%	49%	48%	48%	48%	48%	48%	48%
Race/Ethnicity								
White	77%	78%	87%	86%	79%	80%	84%	84%
Black	8%	8%	6%	5%	9%	8%	7%	7%
Hispanic or Latino	7%	7%	4%	4%	7%	7%	4%	4%
Asian	4%	4%	1%	1%	3%	3%	2%	2%
Other/Unknown	3%	3%	3%	3%	3%	3%	3%	3%
Region*								
North	17%	17%	22%	21%	18%	17%	16%	20%
South	50%	51%	49%	51%	39%	42%	48%	40%
West	23%	23%	4%	3%	22%	26%	16%	18%
Midwest	10%	9%	25%	24%	21%	16%	21%	22%
Location*								
Rural	16%	16%	19%	17%	16%	15%	25%	22%
Not Rural	84%	84%	81%	83%	84%	85%	75%	78%
OREC								
Age	82%	83%	85%	86%	80%	82%	80%	80%
Disability	17%	15%	14%	13%	18%	17%	18%	19%
ESRD	1%	1%	1%	1%	1%	1%	1%	1%
Disability & ESRD	0%	0%	0%	0%	0%	0%	0%	0%
Dual Eligibility								
Dual-Eligible	17%	16%	9%	8%	18%	16%	15%	15%
Not Dual-Eligible	83%	84%	91%	92%	82%	84%	85%	85%

Comorbidities								
HCC Score	1.52	1.55	1.41	1.44	1.57	1.57	1.49	1.55
Market Characteristics**								
Average Household Income	$67,461	$68,219	$67,064	$68,772	$67,087	$68,134	$65,376	$67,077
Average % of Households Below the Poverty Level	13%	13%	11%	11%	13%	12%	13%	12%
Average % of Households with First Individual Completed College	18%	18%	17%	18%	18%	18%	18%	18%
Average % of Households with First Individual Completed High School or Less	68%	68%	69%	68%	68%	68%	69%	68%
Average % of Households with English as Their Only Language	79%	78%	85%	84%	81%	81%	86%	85%

Appendix Table 6b. Pre-Post Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Cardiologists, by Post-Period Affiliation Model, 2022

Outcome Measure PBPY	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Total Medicare Expenditures	$27,500	$26,035	$21,499	$ 21,516	$27,859	$27,633	$25,773	$26,512
IP Days	4.03	3.80	2.92	2.92	4.63	4.36	4.27	4.19
ED Visits	0.60	0.61	0.59	0.60	0.71	0.70	0.75	0.76

Appendix Table 7a. Pre-Post Analysis: Patient Demographics of Beneficiaries Attributed to Gastroenterologists, by Post-Period Affiliation Model, 2022

Demographic Measure	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Age								
<65	11%	10%	8%	8%	10%	9%	12%	10%

65-74	53%	53%	51%	57%	54%	54%	53%	53%
75-84	29%	30%	32%	28%	28%	30%	27%	29%
85+	7%	7%	8%	6%	8%	8%	8%	8%
Sex								
Female	58%	57%	58%	58%	57%	57%	57%	57%
Male	42%	43%	42%	42%	43%	43%	43%	43%
Race/Ethnicity								
White	76%	76%	83%	85%	79%	79%	78%	80%
Black	9%	8%	6%	6%	8%	7%	11%	9%
Hispanic or Latino	7%	7%	6%	4%	6%	6%	5%	4%
Asian	5%	5%	2%	2%	3%	3%	3%	3%
Other/Unknown	4%	4%	3%	4%	3%	4%	4%	3%
Region*								
North	21%	22%	18%	22%	22%	22%	30%	25%
South	42%	40%	37%	35%	42%	42%	37%	40%
West	23%	25%	27%	22%	20%	20%	17%	16%
Midwest	14%	14%	18%	21%	16%	17%	16%	19%
Location*								
Rural	15%	13%	8%	7%	12%	12%	18%	18%
Not Rural	85%	87%	92%	93%	88%	88%	82%	82%
OREC								
Age	79%	80%	83%	84%	81%	82%	78%	79%
Disability	20%	19%	16%	15%	18%	17%	20%	20%
ESRD	1%	1%	1%	1%	1%	1%	1%	1%
Disability & ESRD	0%	0%	0%	0%	0%	0%	0%	0%
Dual Eligibility								
Dual-Eligible	19%	18%	11%	8%	15%	14%	15%	15%
Not Dual-Eligible	81%	82%	89%	92%	85%	86%	85%	85%
Comorbidities								
HCC Score	1.36	1.39	1.35	1.30	1.38	1.40	1.42	1.43
Market Characteristics**								
Average Household Income	$68,353	$69,132	$75,602	$76,493	$70,989	$71,717	$69,239	$68,413
Average % of Households Below the Poverty Level	13%	12%	10%	10%	12%	11%	12%	12%

Average % of Households with First Individual Completed College	18%	18%	19%	19%	19%	19%	18%	19%
Average % of Households with First Individual Completed High School or Less	67%	67%	63%	62%	65%	65%	65%	66%
Average % of Households with English as Their Only Language	78%	78%	81%	84%	81%	81%	83%	84%

Appendix Table 7b. Pre-Post Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Gastroenterologists, by Post-Period Affiliation Model, 2022

Outcome Measure PBPY	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Total Medicare Expenditures	$27,824	$26,653	$22,687	$21,211	$25,650	$25,903	$28,607	$28,469
IP Days	4.24	4.11	3.41	3.14	4.23	4.16	5.08	4.90
ED Visits	0.61	0.61	0.57	0.56	0.60	0.61	0.66	0.68

Appendix Table 8a. Pre-Post Analysis: Patient Demographics of Beneficiaries Attributed to Medical Oncologists, by Post-Period Affiliation Model, 2022

Demographic Measure	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Age								
<65	10%	9%	9%	9%	10%	9%	10%	9%
65-74	44%	44%	43%	46%	45%	45%	47%	47%
75-84	34%	35%	35%	34%	33%	34%	32%	33%
85+	12%	12%	13%	11%	12%	12%	11%	11%
Sex								
Female	61%	62%	62%	62%	62%	62%	62%	62%
Male	39%	38%	38%	38%	38%	38%	38%	38%
Race/Ethnicity								
White	75%	77%	82%	82%	78%	78%	79%	81%

Black	11%	10%	7%	7%	10%	9%	8%	7%
Hispanic or Latino	8%	6%	6%	6%	6%	6%	4%	5%
Asian	4%	4%	2%	3%	3%	4%	5%	4%
Other/Unknown	3%	3%	3%	3%	3%	3%	3%	3%
Region*								
North	24%	25%	29%	35%	17%	17%	23%	25%
South	40%	37%	44%	42%	40%	41%	24%	26%
West	22%	23%	22%	20%	18%	22%	26%	25%
Midwest	15%	15%	5%	4%	25%	20%	27%	24%
Location*								
Rural	16%	15%	11%	10%	18%	17%	21%	23%
Not Rural	84%	85%	89%	90%	82%	83%	79%	77%
OREC								
Age	78%	81%	80%	81%	80%	80%	81%	81%
Disability	21%	18%	19%	18%	19%	19%	18%	18%
ESRD	1%	1%	1%	1%	1%	1%	1%	1%
Disability & ESRD	0%	0%	0%	0%	0%	0%	0%	0%
Dual Eligibility								
Dual-Eligible	21%	18%	16%	14%	17%	17%	15%	14%
Not Dual-Eligible	79%	82%	84%	86%	83%	83%	85%	86%
Comorbidities								
HCC Score	2.05	1.97	1.86	1.84	1.92	1.97	1.94	1.95
Market Characteristics**								
Average Household Income	$65,266	$66,940	$71,205	$72,877	$67,246	$67,867	$68,849	$68,481
Average % of Households Below the Poverty Level	13%	13%	11%	11%	13%	12%	12%	12%
Average % of Households with First Individual Completed College	17%	18%	19%	19%	18%	18%	18%	19%
Average % of Households with First Individual Completed High School or Less	69%	68%	67%	66%	68%	68%	66%	66%

Average % of Households with English as Their Only Language	79%	79%	81%	81%	82%	82%	85%	84%

Appendix Table 8b. Pre-Post Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Medical Oncologists, by Post-Period Affiliation Model, 2022

Outcome Measure PBPY	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Total Medicare Expenditures	$42,807	$41,638	$34,480	$ 34,736	$ 37,454	$39,020	$38,232	$39,726
IP Days	5.46	5.35	4.03	3.66	5.14	5.22	4.77	4.74
ED Visits	0.58	0.61	0.56	0.48	0.61	0.65	0.61	0.62

Appendix Table 9a. Pre-Post Analysis: Patient Demographics of Beneficiaries Attributed to Orthopedics, by Post-Period Affiliation Model, 2022

Demographic Measure	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Age								
<65	9%	8%	6%	6%	8%	7%	10%	9%
65-74	52%	52%	50%	54%	52%	52%	50%	51%
75-84	30%	32%	33%	32%	30%	32%	29%	30%
85+	9%	9%	10%	8%	10%	9%	10%	10%
Sex								
Female	61%	61%	61%	61%	61%	61%	61%	61%
Male	39%	39%	39%	39%	39%	39%	39%	39%
Race/Ethnicity								
White	85%	86%	89%	89%	86%	87%	86%	85%
Black	5%	4%	4%	4%	5%	5%	6%	6%
Hispanic or Latino	5%	5%	3%	3%	4%	3%	4%	4%
Asian	2%	2%	1%	1%	2%	2%	1%	1%
Other/Unknown	3%	3%	3%	3%	3%	3%	3%	3%
Region*								
North	15%	13%	20%	20%	21%	18%	30%	23%
South	43%	42%	56%	55%	41%	44%	39%	41%

West	25%	30%	14%	15%	18%	17%	12%	13%
Midwest	17%	15%	10%	10%	21%	21%	19%	23%
Location*								
Rural	22%	22%	10%	9%	16%	18%	18%	22%
Not Rural	78%	78%	90%	91%	84%	82%	82%	78%
OREC								
Age	80%	84%	85%	87%	83%	84%	81%	81%
Disability	19%	16%	15%	13%	16%	16%	18%	18%
ESRD	1%	0%	0%	0%	0%	0%	1%	1%
Disability & ESRD	0%	0%	0%	0%	0%	0%	0%	0%
Dual Eligibility								
Dual-Eligible	13%	11%	7%	6%	10%	9%	12%	12%
Not Dual-Eligible	87%	89%	93%	94%	90%	91%	88%	88%
Comorbidities								
HCC Score	1.24	1.21	1.20	1.19	1.20	1.21	1.26	1.29
Market Characteristics**								
Average Household Income	$67,673	$68,318	$72,027	$73,237	$73,047	$71,389	$69,668	$67,829
Average % of Households Below the Poverty Level	12%	12%	11%	11%	11%	11%	12%	12%
Average % of Households with First Individual Completed College	18%	18%	18%	18%	19%	19%	19%	18%
Average % of Households with First Individual Completed High School or Less	67%	67%	64%	63%	63%	64%	65%	66%
Average % of Households with English as Their Only Language	84%	83%	86%	86%	83%	85%	85%	86%

Appendix Table 9b. Pre-Post Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Orthopedics, by Post-Period Affiliation Model, 2022

Outcome Measure PBPY	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Total Medicare Expenditures	$22,817	$22,009	$18,385	$18,248	$20,405	$20,604	$22,525	$23,089
IP Days	2.41	2.37	2.14	2.01	2.34	2.29	2.89	2.87
ED Visits	0.57	0.58	0.51	0.52	0.54	0.55	0.58	0.60

Appendix Table 10a. Pre-Post Analysis: Patient Demographics of Beneficiaries Attributed to Urologists, by Post-Period Affiliation Model, 2022

Demographic Measure	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Age								
<65	6%	5%	6%	6%	7%	6%	8%	7%
65-74	47%	46%	44%	48%	48%	48%	47%	47%
75-84	35%	36%	38%	36%	35%	36%	34%	36%
85+	12%	12%	13%	11%	11%	11%	11%	11%
Sex								
Female	26%	25%	27%	27%	25%	25%	26%	26%
Male	74%	75%	73%	73%	75%	75%	74%	74%
Race/Ethnicity								
White	81%	80%	83%	84%	84%	84%	86%	84%
Black	7%	6%	8%	8%	6%	6%	4%	5%
Hispanic or Latino	6%	6%	3%	3%	4%	4%	4%	5%
Asian	3%	3%	2%	2%	2%	2%	2%	1%
Other/Unknown	3%	4%	4%	4%	4%	4%	4%	4%
Region*								
North	17%	16%	42%	31%	18%	19%	24%	23%
South	47%	46%	34%	41%	47%	46%	34%	42%
West	23%	28%	10%	13%	16%	18%	26%	20%
Midwest	12%	10%	14%	16%	19%	18%	16%	14%
Location*								
Rural	20%	18%	5%	5%	18%	18%	21%	24%
Not Rural	80%	82%	95%	95%	82%	82%	79%	76%

OREC								
Age	83%	86%	85%	86%	85%	85%	83%	83%
Disability	16%	14%	14%	13%	15%	14%	16%	16%
ESRD	1%	0%	0%	0%	1%	0%	1%	1%
Disability & ESRD	0%	0%	0%	0%	0%	0%	0%	0%
Dual Eligibility								
Dual-Eligible	14%	13%	8%	7%	10%	9%	11%	12%
Not Dual-Eligible	86%	87%	92%	93%	90%	91%	89%	88%
Comorbidities								
HCC Score	1.44	1.43	1.37	1.40	1.37	1.38	1.39	1.42
Market Characteristics**								
Average Household Income	$67,324	$68,728	$79,023	$78,472	$69,249	$69,537	$69,722	$67,358
Average % of Households Below the Poverty Level	13%	13%	9%	9%	12%	11%	12%	13%
Average % of Households with First Individual Completed College	18%	19%	20%	20%	18%	19%	19%	18%
Average % of Households with First Individual Completed High School or Less	67%	66%	62%	62%	66%	66%	65%	67%
Average % of Households with English as Their Only Language	81%	79%	82%	83%	84%	85%	84%	84%

Appendix Table 10b. Pre-Post Analysis: Unadjusted Mean Outcomes of Beneficiaries Attributed to Urologists, by Post-Period Affiliation Model, 2022

Outcome Measure PBPY	Remain UPP		UPP to PEAPP		UPP to Corporate		UPP to Hospital	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Total Medicare Expenditures	$24,679	$24,331	$21,360	$ 21,537	$21,270	$21,659	$23,013	$23,866
IP Days	2.99	2.99	2.65	2.59	2.79	2.75	2.81	2.88
ED Visits	0.57	0.59	0.46	0.49	0.56	0.57	0.60	0.61

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