

# Productivity Assessment of Physician Assistants and Nurse Practitioners in Oncology in an Academic Medical Center

By Marc Moote, MS, PA-C, Ron Nelson, PA, Robin Veltkamp, BS, and Darrell Campbell Jr, MD

University of Michigan Hospitals and Health Centers, Ann Arbor; and Health Services Associates, Fremont, MI

## Abstract

**Purpose:** Demand for oncologists will increase dramatically over the next 15 years. Physician assistants (PAs) and Nurse practitioners (NPs) have been identified as one solution to meet the projected shortages in oncology. It has previously been reported that 56% of oncologists work with PAs and NPs, more than two thirds of whom believe it benefits their practice with some noted productivity advantages. The purpose of this study was to quantify the productivity of PAs and NPs working in oncology in an academic medical center.

**Methods:** A 2-week self-reported time study was performed in a single large academic medical center. Services were categorized as billable, bundled, care facilitation, administrative, and other based on time spent performing services in each category.

Current procedural terminology codes were used to determine the economic value of services provided.

**Results:** A total of 54 PAs and NPs were included in the final analysis. PAs and NPs reported similar clinical activities. Overall, there was high variability noted in terms of productivity, notably with PA/NP direct billable revenue. Opportunities were identified to improve utilization of oncology PAs and NPs, with suggestions for future research related to PA and NP productivity tracking.

**Conclusion:** Productivity measurement for PAs and NPs can be challenging. To our knowledge, this is the first study that quantifies PA and NP productivity in oncology according to known economic indicators such as charges and work relative value units.

## Introduction

Demand for oncologists will increase over the next 15 years, driven by the aging population, increasing cancer rates, increased cancer survivorship, and the aging oncology workforce.<sup>1</sup> Even with conservative projections that assume no change in cancer incidence or utilization, demand for oncology visits is projected to increase 48% by 2020.<sup>2</sup> Less conservative projections estimate a shortage of 15 million visits, translating to a shortage of 4,080 oncologists.<sup>2</sup>

It has been reported that 56% of oncologists work with physician assistants (PAs) and nurse practitioners (NPs), more than two thirds of whom believe it benefits their practice by increasing efficiency, improving overall patient care, increasing physician satisfaction, increasing physician time for more complex cases, and increasing physician time for clinical research.<sup>2</sup> Productivity advantages have been noted among physicians working with PAs and NPs, as measured by total visits.<sup>2</sup> However, this increase in productivity has not translated to the academic setting; weekly visit rates among private practice physicians working with PAs and NPs are nearly double that of academic physicians working with PAs and NPs.

PAs and NPs have been identified as one solution to meet the projected shortages in oncology. However, at present, it is estimated that only 2.4% of PAs and 1% of NPs currently practice within oncology.<sup>3</sup> Understanding that other specialties face similar provider shortages, competition for PAs and NPs will likely intensify, underscoring the importance of optimizing utilization and productivity for this limited supply of providers. Currently, however, there are few benchmarking data available for PAs and NPs within oncology. Two prior studies have ex-

amined PA and NP productivity in oncology.<sup>4,5</sup> The purpose of this study was to assess the productivity of oncology PAs and NPs working in an academic medical center (AMC).

## Methods

In November 2009, the University of Michigan Health System (UMHS) contracted with Health Services Associates to implement a 2-week point-in-time productivity study of PAs and NPs in oncology. Oncology services included in the study are listed in Table 1. Each participant completed a logging form daily, and Health Services Associates analysts aggregated and evaluated the data in accordance with the Centers for Medicare and Medicaid Services Medicare Claims Processing Manual, Publication 100-04.<sup>6</sup> Services were categorized as billable, bundled, care facilitation, administrative, and other. Current procedural terminology (CPT) codes were used to determine the economic value for services provided. A certified professional coder assigned CPT codes based on service description, location where services were rendered (ie, inpatient *v* outpatient), and time logged by the provider. The CPT codes contributing to the calculation of value of these services is provided in Table 2. Clinical full-time equivalent (cFTE) was calculated by removing nonpatient care activities such as research and administration. Data were then annualized for 48 weeks of production, based on average paid time off used by UMHS PAs and NPs over the prior 4 years.

Direct billable services represented direct patient care services performed by PAs and NPs billed out using the PA/NP national provider identification number. Bundled services represented direct patient care services that would normally be

**Table 1.** Time Allocation by Service Category

Department	Oncology Team Specialty	No. of PAs and NPs			Service Category (%)						
		PAs	NPs	Total	Billable	Bundled	Care Facilitation	Funded	Administrative	Other	Total
Infusion		2	0	2	2.8	39.7	36.2	15.7		5.6	100
Inpatient hematology	Hematology	4	0	4	2.8	28.6	58.1	2.9		7.6	100
Oncology team											
1	Outpatient hematology	5	3	8	5.4	31.4	54.1	1.6		7.5	100
2	GI, lung, head and neck, sarcoma	8	5	13	8.3	23.0	51.9	7.7		9.1	100
3	Urologic Cancer	0	1	1	0.0	41.1	37.1	0.0		21.8	100
4	BMT, pediatric hem/onc	6	7	13	3.7	30.4	49.8	4.5		11.6	100
5	Breast cancer	0	10	10	2.8	28.7	56.7	0.4		11.4	100
6	Melanoma, skin cancer	1	0	1	0.0	24.8	61.4	0.0		13.8	100
7	Neurologic, endocrine, and adrenal	2	0	2	16.1	32.0	37.9	0.0		14.0	100
Total		28	26	54	4.7	31.1	49.2	3.6		11.4	100

Abbreviations: BMT, bone marrow transplantation; NP, nurse practitioner; PA, physician assistant.

**Table 2.** CPT Codes

CPT Code	Description	Medicare Charge	Medicare wRVU
10060	Incision and drainage of abscess	\$106.41	1.19
38221	Bone marrow: biopsy, needle, or trocar	\$164.90	1.37
38240	Bone marrow or blood-derived peripheral stem-cell transplantation, allogeneic	\$131.10	2.24
62270	Spinal puncture, lumbar, diagnostic	\$153.15	1.37
99202	Outpatient new patient visit level 2	\$71.17	0.88
99203	Outpatient new patient visit level 3	\$103.44	1.34
99204	Outpatient new patient visit level 4	\$161.02	2.3
99205	Outpatient new patient visit level 5	\$202.76	3
99212	Outpatient established patient visit level 2	\$40.91	0.45
99213	Outpatient established patient visit level 3	\$69.41	0.92
99214	Outpatient established patient visit level 4	\$104.28	1.42
99215	Outpatient established patient visit level 5	\$140.84	2
99231	Subsequent hospital care level 1	\$41.07	0.76
99232	Subsequent hospital care level 2	\$74.05	1.39
99233	Subsequent hospital care level 3	\$106.24	2
99238	Hospital discharge day management ≤ 30 minutes	\$72.57	1.28
99239	Hospital discharge day management > 30 minutes	\$105.82	1.96
99244	Office consultation level 2	\$196.02	3.02
99245	Office consultation level 3	\$241.16	3.77

Abbreviations: CPT, current procedural terminology; wRVU, work relative value unit.

bundled into a physician service for billing purposes. For the purposes of assigning an economic value, outpatient shared services were credited in full to the PA or NP. Inpatient bundled services were unbundled using CPT codes to create economic value for the services provided by the PA or NP. Because global period services have no assigned CPT code, charges were imputed for global period surgical services (ie, preoperative histories and physicals and postoperative visits) based on description, location, and time logged.

Care facilitation services represented clinical services facilitating care that would have otherwise required a physician. Key

duties in this category included assisting with rounds, patient education, progress notes, medical record reviews, discharge summaries, patient documentation, orders maintenance, and medication reconciliation. At the time of this study, the Centers for Medicare and Medicaid Services did not recognize consultations as shared services for billing purposes. Therefore, for the purposes of this study, shared service consultations were included as care facilitation activities. Although consultations represent a billable service, they could not be placed in the billable or bundled service category because they were not performed in total by the PAs/NPs; they were partially performed

by the PA/NP, then completed by the physician and billed under the physician's national provider identification number in accordance with Medicare regulations. Consequently, there was no mechanism to parse out the portions of the consultation provided by PAs and NPs in terms of billable/bundled revenue.

Administrative services represented funded administrative duties such as supervising other PA/NP members of the team, administrative paperwork, meetings, and discussions with administrative staff. Other services represented time spent that was not related to patient care and not categorized in one of the previously defined categories.

## Results

### Demographics

A total of 70 PAs and NPs were selected to participate in the study: 28 PAs (40%) and 42 NPs (60%). Of the 28 PAs invited to participate, 28 (100%) responded; of the 42 NPs invited, 26 (62%) responded (Table 1). Twenty-one PAs (75%) and 18 NPs (69%) were employed full time. Six PAs (22%) and one NP (4%) reported working exclusively in the inpatient setting, 15 PAs (54%) and 18 NPs (69%) reported working exclusively in the outpatient setting, and seven PAs (25%) and seven NPs (27%) reported working in both settings. Oncology teams 1 to 7 accounted for 22 PAs (79%) and 26 NPs (100%) in the study and consisted of primarily outpatient roles. The average number of years on service was 5.2 years for oncology PAs and 7.3 years for oncology NPs. The most experienced nonphysician providers in oncology belonged to team 3, with an average of 15 years experience. No PAs or NPs reported taking calls, although several reported leaving their pagers on or taking calls during attending physician absences.

### Duties

Variability was noted in terms of time spent on clinical duties, ranging from 74% to 100% (mean, 89%) for PAs in oncology and 64% to 89% (mean, 82%) for NPs in oncology. Only one PA (4%) and one NP (4%) had funded research time. Conversely, three PAs (11%) and five NPs (19%) spent a portion of their time on unfunded research activities, accounting for 2.4% of the total time for PAs and NPs combined. Telephone time varied, ranging from 1.5% to 6.8% (mean, 3.4%) for PAs and 2.3% to 10% (mean, 6.1%) for NPs. Team 3 NPs were the only group spending 10% of total time on telephone duties, with the remainder of oncology teams spending less than 10% of total time on telephone duties.

### Time Allocation by Service Category

Table 1 shows the percentage of time allocation by service category. Time spent in direct billable services ranged from 0% to 16% (mean, 5%). Time spent on bundled services ranged from 23% to 41% (mean, 31%). Care facilitation time ranged from 36% to 61% (mean, 49%). Funded administrative time ranged from 0% to 16% (mean, 4%). Funded administrative duties were reported by seven PAs (25%) and three NPs (12%). Other services accounted for 6% to 22% (mean, 11%) of time. With

the exception of infusion (6%), inpatient hematology (7%), and team 1 (8%), the remainder of oncology services was at or above the average time for all services (9%). Team 3, with 22% of time spent on other services, had the highest percentage of time spent on these activities, representing the largest opportunity for work redesign. Appendix Figures A1A-A1C (online only) illustrate the differences between outpatient teams with the highest and lowest revenue generation and how they compare with the mean time allocation by service category for all oncology services combined.

### Direct Billable Services

Annualized direct billable revenue per cFTE ranged from \$0 to \$55,272 (mean, \$18,145; Fig 1A). Team 7 generated the most revenue in direct billable services (\$55,272), which was 44% above the next closest oncology team. Notably, teams 3 and 6 spent 0% of total time on direct billable services and consequently generated \$0 in direct billable services. Billable work relative value units (wRVUs) in oncology ranged from 0 to 771 (mean, 224; Fig 1B).

### Bundled Services

Bundled revenue in oncology ranged from \$67,526 to \$118,883 (mean, \$94,026). Bundled wRVUs in oncology ranged from 1,162 to 1,469 (mean, 1,388).

### Combined (Direct Billable Plus Bundled) Services

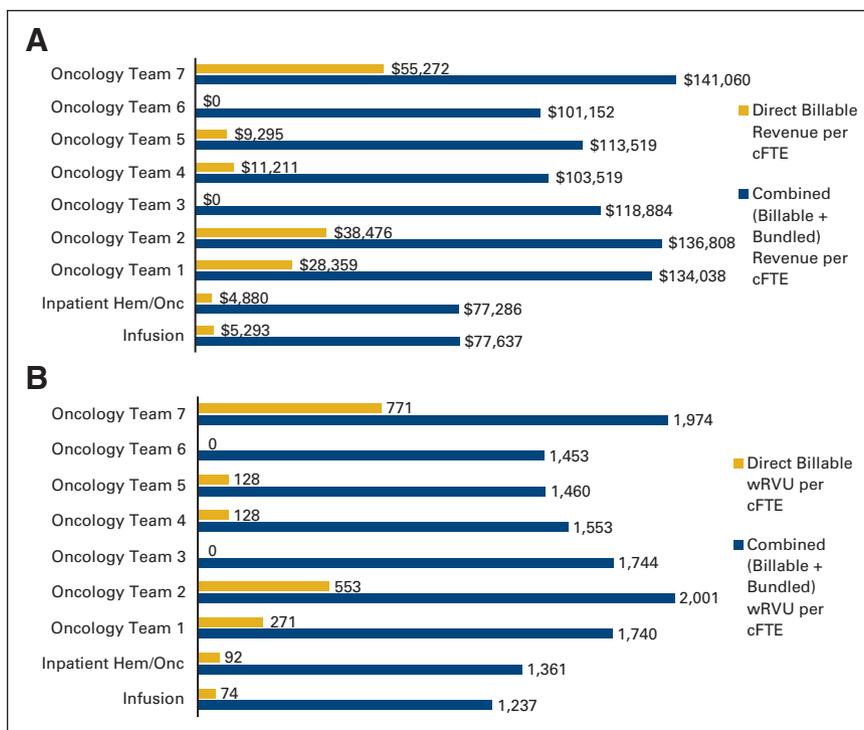
Combined revenue ranged from \$77,637 to \$141,060 (mean, \$111,545) in oncology (Fig 1A). For teams 1 to 7, combined revenue ranged from \$103,519 to \$141,060 (mean, \$121,283) per cFTE. Combined wRVUs for oncology ranged from 1,273 to 2,001 (mean, 1,618; Fig 1B). For teams 1 to 7 (primarily outpatient roles), combined wRVUs ranged from 1,453 to 2,001 (mean, 1,704).

### Discussion

According to our study, PAs and NPs in academic oncology were spending on average 36% of their time in direct patient care (billable plus bundled services), representing a significant opportunity for role enhancement. By contrast, academic oncology physicians spend on average 53.8% of their time on direct patient care, compared with their private practice counterparts, who spend 90.1% of their time.<sup>2</sup>

No PAs or NPs in our study reported compensated on-call time, but qualitative comments indicated that oncology PAs and NPs were handling some calls from home, notably during physician absences, while others stated that they kept their pagers on at all times to address as-needed issues. On average, 19% of PAs nationally take some calls, for a median of 72 hours per month.<sup>7</sup> In a recent national survey, the percentage of oncology PAs taking calls was slightly higher at 22%.<sup>8</sup> This represents an additional opportunity for PA and NP role enhancement within UMHS.

Hinkel et al<sup>4</sup> reported that 62% of oncology NPs and 36% of oncology PAs spend more than 10% of clinical time on



**Figure 1.** (A) Direct billable revenue per clinical full-time equivalent (cFTE) versus combined (billable plus bundled) revenue per cFTE. (B) Direct billable work relative value units (wRVUs) per cFTE versus combined (billable plus bundled) wRVUs per cFTE. Hem/Onc, hematology/oncology.

telephone triage. Encouragingly, PAs and NPs in our study reported far lower percentages of telephone time, with all but one team logging less than 10% of time spent on telephone duties. However, this still represents an area for role enhancement, with a goal of eliminating or reducing telephone duties to free up PA and NP time for direct patient care. At minimum, careful assessment of telephone time is warranted to ensure that these telephone calls are those that would otherwise require a physician if not performed by a PA or NP.

More than two thirds of physicians have previously reported that employing PAs and NPs in oncology benefits their practice by increasing efficiency, improving overall patient care, increasing physician satisfaction, increasing physician time for more complex cases, and increasing physician time for clinical research.<sup>2</sup> Additional research is required to properly quantify PA and NP contribution toward these outcomes in oncology. It has previously been reported that a predominately shared service model of oncology care delivery has resulted in equal overall team productivity when compared with teams with more independently delivered PA and NP oncology care.<sup>5</sup> Although this study attempted to collect data documenting the time spent by PAs and NPs directly interacting with physicians, inconsistencies in the data reported, suspected to be the result of confusion regarding how to record this time, made it impossible to report data or draw conclusions regarding the amount of time spent working directly with physicians. However, the data suggest that PAs and NPs in academic oncology spent a majority of time providing bundled or care facilitation services. Given that many of these services require physician time if not performed by PAs or NPs, an assumption can be made that use of these

providers increases overall team productivity and frees up physician time for direct patient care or research. A study comparing a common indicator for productivity (such as wRVUs) between a team using PAs and NPs in oncology with a control group using only physicians could confirm this assumption.

This study revealed significant variability with regard to productivity across all oncology services, notably with direct billable services. However, when analysis was expanded to include bundled revenue, total PA and NP productivity increased substantially. Importantly, our study revealed clear examples of underutilization of both PAs and NPs, highlighting opportunities to enhance their roles within our AMC. It is clear in some teams that measurable economic productivity was limited. It is necessary to re-evaluate the roles of these individuals to ensure maximum production and contribution to quality outcomes.

Variability in utilization and productivity is multifactorial. Experience, or specifically lack of experience, is known to affect productivity.<sup>9</sup> Our results were not related to inexperience, because PAs and NPs in our study averaged 5.2 and 7.3 years of experience, respectively. External practice level variables such as resource availability, availability of supervising physician when needed, patient acuity/case mix, reimbursement rates, and payer mix can also have an impact on measurable productivity. Physician attitudes may also play a role. Interviews have shown that physicians have inherent biases about the abilities of non-physician clinicians to perform functions usually performed by residents in an AMC,<sup>10</sup> potentially exacerbating utilization issues in academic settings. Equally likely is that the educational mission of an academic practice, in contrast to that of a com-

munity practice, may result in inherently different roles for PAs and NPs. There may be duties and responsibilities that PAs and NPs are qualified to perform, but physicians in training may need to perform these tasks to learn properly.

The academic model, it seems, uses a strong team approach to care with significant bundled activity. Increased time spent on direct billable services and a corresponding decrease in care facilitation services correlated with higher overall productivity. AMC's looking to increase PA/NP productivity in oncology should therefore increase PA and NP time spent on direct billable services and reduce care facilitation services. In addition, care should be taken to ensure that PA/NP assigned roles, tasks, and functions represent services that would otherwise require a physician. In instances in which this is determined not to be the case, those tasks should be shifted to lower-cost alternative personnel to allow PAs and NPs more time to provide direct patient care, thereby increasing overall productivity. Alternatively, if a shared service model is employed, AMC's should ensure that overall combined PA/NP plus physician revenue is net positive, with total collections more than compensating for the costs plus overhead associated with the team. Attention should also be directed toward ensuring that PAs and NPs have proper knowledge of billing and coding to maximize productivity for services rendered.

It is known that productivity of PAs varies significantly across practice specialty and location, with generalist PAs performing more visits than their specialist counterparts.<sup>11</sup> Currently, however, there are few benchmarking data available for PAs and NPs across most specialties and roles, and oncology is no exception. Potential external benchmarking sources include the Medical Group Management Association (MGMA), American Group Management Association, and University Health-System Consortium (UHC) Faculty Practice Solution Center (FPSC).

In our opinion, the best national benchmarking source currently available, albeit with limitations, is from the MGMA, which provides the richest PA and NP data over time. A limitation to use of MGMA is that it does not directly reflect the academic environment. Additionally, MGMA provides PA and NP metrics according to broad groupings such as primary care, surgery, and nonsurgery/nonprimary care, often without further specialty-level detail. That said, according to the most recent report, medical specialty PAs generated a median of 2,445 wRVUs, and medical specialty NPs generated a median of 1,819 wRVUs.<sup>12</sup> MGMA median for oncology NPs was 2,082 wRVUs, but this was based on a small sample size of only 18 NPs. No PA oncology data were provided in the report. By any of these standards, which do not include measures of bundled revenue, our oncology PAs and NPs were well below target. When factoring in the bundled component of care, our UMHS median in oncology reached 1,715 for PAs and 1,668 for NPs, much closer to these external benchmarks but still below. A potential benchmark for combined services wRVUs in academic settings could be the median collected in this study. At minimum, these data could be used for

interinstitutional comparison with other AMC's using a database such as the UHC FPSC. External benchmark sources such as MGMA, American Group Management Association, and UHC FPSC must continue to refine the PA and NP productivity data they are collecting and publishing to provide better guidance for hospitals, administrators, physicians, and individual PAs and NPs seeking to evaluate clinical performance of PA- and NP-provided care.

The ability to generalize these study results may be limited. Data were self-reported and limited to a 2-week timeframe, which may not be representative of the full year. It is possible that formal medical record reviews could have resulted in different CPT codes. There were small sample sizes by service in this single-center study. Interinstitutional comparison is warranted. Ours is a teaching hospital with significant resident presence; it is possible that assigned duties and reported productivity differ from those seen in other nonacademic settings, private practices, and community health centers. Shared service revenue generated by consults was not captured, resulting in an underestimation of measureable value for PAs and NPs while simultaneously increasing the percentage of time spent in care facilitation. PAs and NPs working in both medical and surgical oncology specialties were included in this study; it is possible that the assigned roles may differ between medical and surgical specialties. Lastly, we did not track physician productivity, which limits the ability to calculate the total economic impact of PA/NP integration into physician-led teams. Future analyses should include the overall revenue of the physician-PA or physician-NP team.

Productivity measurement of PAs and NPs is challenging. This is exacerbated in the academic environment with significant amounts of bundled services and global period care. This study highlights the importance of collecting productivity data to allow for evaluation of PA/NP performance in terms of economic benefit, efficiency, and outcomes, which can guide efforts in role enhancement. It also highlights some of the pitfalls and opportunities for future research. At first glance, it may seem that PAs and NPs are not generating much economic productivity, but when bundled activity is accounted for, these positions generate significant economic value.

*Accepted for publication on October 17, 2011.*

#### **Acknowledgment**

*Supported by the University of Michigan Health System Office of Clinical Affairs.*

#### **Authors' Disclosures of Potential Conflicts of Interest**

*The authors indicated no potential conflicts of interest.*

#### **Author Contributions**

**Conception and design:** Marc Moote, Ron Nelson, Darrell Campbell Jr

**Financial support:** Marc Moote, Darrell Campbell Jr

**Administrative support:** Marc Moote, Ron Nelson, Robin Veltkamp

**Provision of study materials or patients:** Marc Moote, Ron Nelson

**Collection and assembly of data:** Marc Moote, Ron Nelson, Robin Veltkamp

**Data analysis and interpretation:** Marc Moote, Ron Nelson, Robin Veltkamp

**Manuscript writing:** All authors

**Final approval of manuscript:** All authors

Corresponding author: Marc Moote, MS, PA-C, Chief Physician Assistant, University of Michigan Hospitals and Health Centers, Office of

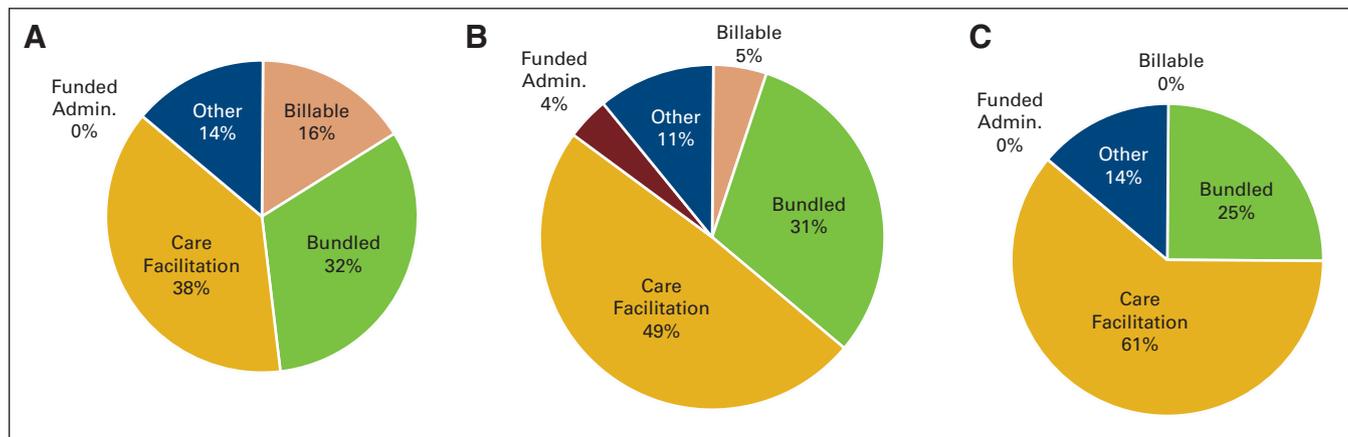
Clinical Affairs, C201 Med Inn Building/0825, 1500 E. Medical Center Dr, Ann Arbor, MI 48109-0825; e-mail: mmoote@umich.edu.

DOI: 10.1200/JOP.2011.000395; published online ahead of print at jop.ascopubs.org March 13, 2012.

**References**

- Erikson C, Salsberg E, Gaetano F, et al: Future supply and demand for oncologists: Challenges to assuring access to oncology services. *J Oncol Pract* 3:79-86, 2007
- Association of American Medical Colleges: Forecasting the supply and demand of oncologists: A report to the American Society of Clinical Oncology (ASCO) from the AAMC Center for Workforce Studies. <http://www.asco.org/ASCO/Downloads/Cancer%20Research/Oncology%20Workforce%20Report%20FINAL.pdf>
- Polansky M, Ross AC, Coniglio D: Physician assistant perspective on the ASCO Workforce Study regarding the use of physician assistants and nurse practitioners. *J Oncol Pract* 6:31-33, 2010
- Hinkel JM, Vandergriff JL, Perkel SJ, et al: Practice and productivity of physician assistants and nurse practitioners in outpatient oncology clinics at National Comprehensive Cancer Network institutions. *J Oncol Pract* 6:182-187, 2010
- Buswell LA, Ponte PR, Shulman LN: Provider practice models in ambulatory oncology practice: Analysis of productivity, revenue, and provider and patient satisfaction. *J Oncol Pract* 5:188-192, 2009
- Centers for Medicare & Medicaid Services: Medicare Claims Manual, Publication 100-04. <http://www.cms.gov/Manuals/LOM/itemdetail.asp?filterType=none&filterByDID=-99&sortByDID=1&sortOrder=ascending&itemID=CMS018912>
- American Academy of Physician Assistants: 2009 National Physician Assistant Census Report. [http://www.aapa.org/uploadedFiles/content/Common/Files/National\\_Final\\_with\\_Graphics.pdf](http://www.aapa.org/uploadedFiles/content/Common/Files/National_Final_with_Graphics.pdf)
- Ross AC, Polansky M, Parker PA, et al: Understanding the role of physician assistants in oncology. *J Oncol Pract* 6:26-30, 2010
- Record JC, McCally M, Schweitzer SO, et al: New health professions after a decade and a half: Delegation, productivity and costs in primary care. *J Health Polit Policy Law* 5:470-497, 1980
- Abbrass CK, Ballweg R, Gilshannon M, et al: A process for reducing workload and enhancing residents' education at an academic medical center. *Acad Med* 76:788-805, 2001
- Larson EH, Hart LG, Ballweg R: National estimates of physician assistant productivity. *J Allied Health* 30:146-152, 2001
- Medical Group Management Association: Physician Compensation and Productivity Report, 2010. Englewood, CO, Medical Group Management Association, 2010

**Appendix**



**Figure A1.** Time allocation by service category for (A) highest revenue–generating oncology team versus (B) mean time allocation for all services and (C) lowest revenue–generating oncology team. Admin., administrative.

Information downloaded from jop.ascopubs.org and provided by at ASCO on March 22, 2012 from 206.205.123.242  
Copyright © 2012 American Society of Clinical Oncology. All rights reserved.