Clinical Oncology Practice 2015: Preparing for the Future

Michael P. Kosty, MD, FACP, FASCO, Anupama Kurup Acheson, MD, and Eric D. Tetzlaff, PA-C

OVERVIEW

The clinical practice of oncology has become increasingly complex. An explosion of medical knowledge, increased demands on provider time, and involved patients have changed the way many oncologists practice. What was an acceptable practice model in the past may now be relatively inefficient. This review covers three areas that address these changes. The American Society of Clinical Oncology (ASCO) National Oncology Census defines who the U.S. oncology community is, and their perceptions of how practice patterns may be changing. The National Cancer Institute (NCI)-ASCO Teams in Cancer Care Project explores how best to employ team science to improve the efficiency and quality of cancer care in the United States. Finally, how physician assistants (PAs) and nurse practitioners (NPs) might be best integrated into team-based care in oncology and the barriers to integration are reviewed.

The ASCO National Oncology Census was originally launched in 2012.[1] The goals of the National Oncology Census were to help ASCO understand where oncologists were providing services, their practice characteristics, and their challenges. Before the launch of the census, some members of ASCO voiced concerns about substantial shifts in oncology care from private practices to university- or hospital-based practices. Also, it is projected that there will be increases in the number of patients and decreases in the supply of oncologists.[2] Therefore, it was important for ASCO to try to clarify if the apparent shifts were actually occurring throughout the nation and, ultimately, whether this was affecting delivery of cancer care in United States.

For the 2014 census, there were 1,252 respondents comprised of 974 practices, representing more than 10,000 oncologists in the United States. The number of practices and oncologists represented in the 2014 National Oncology Census were much greater than the 530 practices and nearly 8,000 oncologists responding in 2013.[3]

More practices from the South and West regions of the United States responded in 2014 (Fig. 1). The largest number of respondents was from physician-owned practices, with the second highest being from hospital/health-system– owned practices, and the third being from academic practices. There were respondents from industry and those in international and government settings, as well as retired practitioners. For the purposes of analysis, we focused on the physician-owned, hospital/health-system– owned, and academic practices.

As would be expected, a majority of the practices focused on hematology and oncology services with many also providing radiation oncology, gynecology oncology, and surgical oncology. Fewer respondents were part of multidisciplinary practices that included internal medicine, gynecology, or pediatrics.

The census survey tool asked the respondents questions about plans for their practice in the next 12 months, including selling/merging their practice or buying another practice. More than 70% of respondents were unlikely to plan any major shifts in the upcoming 12 months, with only about 4% of practices planning to close or sell their practice and only about 5% planning to purchase another practice. With regards to physician-owned groups, about 6% planned to close or merge, about 7% planned to sell, and about 4% planned to purchase another practice.

Hospital/health-system– owned practices and physician-owned practices were more likely to indicate that financial pressures were because of payers, costs, competition, and drug pricing issues. Meanwhile, academic practices cited research issues, staffing issues, and competitive pressures as their most important concerns. Overall, the pressures cited by practices responding to the National Oncology Census during the past 3 years seem to focus around payer issues, cost pressures, competitive pressures, and drug pricing. The overall payer mix remains the same, with a trend toward an increasing percentage of patients on Medicaid and Medicare in 2014 compared with 2013 and 2012. The majority of the practices are still not participating in accountable care organizations. Academic practices, by far, use more advanced practice nurses and PAs (Fig. 2). Respondents also indicated that for potential layoff considerations, that administrative staff and other clinical staff are more likely to be affected in their practices (Fig. 3).

From the Division of Hematology/Oncology, Scripps Clinic, La Jolla, CA; Providence Oncology and Hematology Care, Providence Cancer Center, Portland, OR; Department of Hematology/Oncology, Fox Chase Cancer Center, Philadelphia, PA.

Disclosures of potential conflicts of interest are found at the end of this article.

Corresponding author: Michael P. Kosty, MD, FACP, FASCO; Division of Hematology/Oncology, Scripps Clinic, 10666 N. Torrey Pines Rd., La Jolla, CA 92037; email: mkosty@scripps.edu.

FIGURE 1. Practices by Census Region and Practice Setting (971 patients)

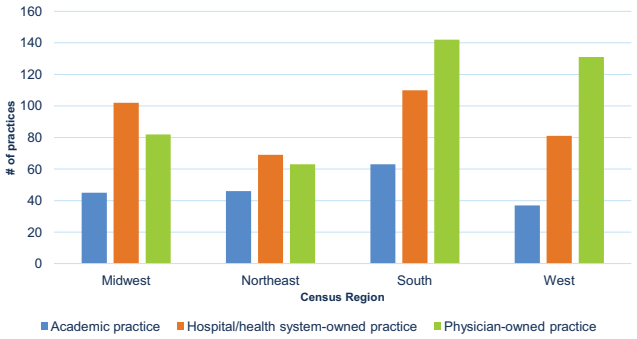
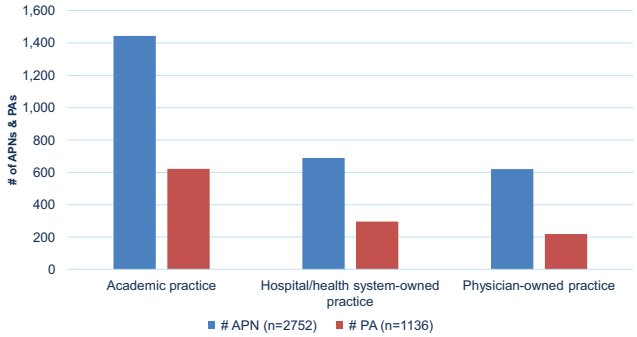


FIGURE 2. Number of Advanced Practice Nurses and Physician Assistants by Practice Setting



With each successive year of the ASCO National Oncology Census, it is clear that the shifts away from private practice to more alignment/consolidation or moves to hospital-based practices has occurred.[1,3] These findings seem consistent with other studies that note size growth of oncology practices.[4] Ultimately, it is unclear whether the pendulum has come to a rest or whether there will be further consolidation or shift. ASCO has already begun preparing for the 2015 census, with plans to identify additional data or sources to support and validate this census process. The information from this effort informs ASCO's work in supporting its membership, including policy efforts and shaping legislation and regulation, payment reform, and workforce needs. Ultimately, understanding the practice environment surrounding the providers who care for patients with cancer is important to ensure increasingly complex therapies are delivered to some of our most vulnerable patient populations in the United States and that all patients have access to high-quality cancer care.

KEY POINTS

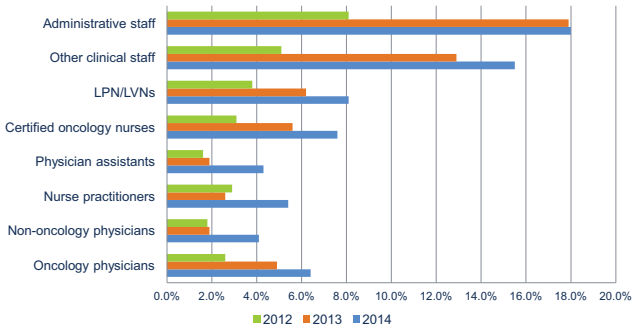
- ASCO Oncology Census continues to show shifts away from private practice to more alignment/consolidation.
- Practices are concerned about payer issues, cost pressures, competitive pressures, and drug pricing.
- True team-based approaches to oncology care may provide a means of optimizing resource utilization and improving the quality of care.
- Utilization of advanced practice providers in oncology will help meet workforce needs, although significant importunities still exist to improve the engagement of providers, national organizations, and policy makers.
- Restrictive barriers in legislation, reimbursement, provider bias, and educational infrastructure reduce the benefits of utilizing advanced practice providers in oncology and inhibit the ability to expand and effectively employ advanced practice providers in the workforce.

TEAM-BASED CARE IN ONCOLOGY

At the risk of sounding trite, high-quality cancer care takes a village. Multimodality therapy requires coordinated care delivery among several groups of clinicians as patients move along the continuum of cancer care—from risk assessment, prevention, diagnosis, treatment, and surveillance to survivorship and advanced cancer. Within any given clinic, increasingly complex therapies require clinicians with advanced, specialized training. Clear communication and transparent, defined roles and responsibilities help ensure that care needs are addressed and timely decisions are made. Placing prompts in electronic health records, sending reminders to patients, and requiring detailed notes at transfers of care are important strategies to improve communication. Embedding tools in the process helps address issues in the immediate, but more lasting change can come from explicitly helping to transform individual clinicians and separate groups into a team that works together.

In March 2015, the *Journal of Oncology Practice* presented an overview of cancer care team effectiveness[5] and used a case-based vignette[6] to discuss the importance of delivering cancer care as a team. These manuscripts marked the beginning of collaboration between NCI and ASCO bringing clinicians, patient advocates, and researchers together to explore application of the evidence of team effectiveness to clin-

FIGURE 3. Potential for Staff Layoffs by Year



ical practice. The NCI-ASCO Teams in Cancer Care Project will unfold at a 2016 workshop.

Teams are defined as two or more people who "interact dynamically, interdependently, and adaptively" to accomplish a shared goal.[6] Weaver et al assessed the role of interprofessional teams in an inpatient oncology setting and concluded that nurses and oncologists have disparate perceptions of the effectiveness of their collaboration and work as a team.[7] In an editorial to accompany the article, Childress questioned the need for additional studies to demonstrate "significant and well-documented" differences in perception of communication.[8] Taplin et al note that communication is one of the eight hallmark traits of effective teams. The hypothesis the NCI-ASCO project will discuss is that deliberately identifying and enhancing team interactions in oncology care will help improve cancer care delivery.

This project fits in the larger context of the transformation of health care delivery and payment models. The field of primary care has actively engaged in reinventing care to form a patient-centered medical home. Experiments are underway to apply the same concepts to specialty care delivery. At the same time, public and private payers and ASCO are proposing payment models that would move away from payment based on specific procedures and physician contributions and toward an approach that provides bundled payments for comprehensive care and allows greater flexibility in how care is organized and delivered. A team-based approach has potential to leverage these changes, provide an opportunity to reexamine clinician roles and responsibilities, and may enable the most efficient delivery of high-quality health care services.

Clinicians in oncology care may believe that their practice already involves working in teams. People with cancer often view their care as a seamless experience and most likely desire this approach from the many clinicians they engage across the care continuum—from diagnosis to surgery to therapeutic radiation to chemotherapy to palliation to rehabilitation. Do clinicians meet this standard or is the responsibility more often on the patient or their caregivers to connect the dots? If clinicians saw themselves through the patient's eyes as members of a single team coordinating care, could quality, access, efficiency, and clinical outcomes improve? Should the person with cancer have an explicit role and set of responsibilities within the treatment team? If clinicians approach patients with this question, would they embrace a role in the team or believe the clinician is trying to avoid responsibility? Could working in teams with well-recognized and valued roles for all members of the team improve job satisfaction and reduce provider burnout?[9,10] These questions have many possible answers.

The literature in health care and many other fields demonstrates that effective teamwork takes time and intentional focus to nurture, develop, and sustain. To this end, it is the hope that a collaboration of clinicians involved in cancer care, advocates who have been patients, and researchers engaged in studying teams will highlight successful models and identify areas for future research. Leaders of the initiative will invite applicants to serve on writing groups to apply principles of team-based care to specific case scenarios. The writing groups will meet in person and work by conference call and email to develop a presentation for an NCI-ASCO workshop in February 2016 at the ASCO Quality Care Symposium. Presenters will engage in discussion with workshop attendees to enrich their work and submit final manuscripts for publication in the *Journal of Oncology Practice*.

ADVANCED PRACTICE PROVIDERS WORKFORCE IN ONCOLOGY

As a key member of team-based care in oncology, the use of advanced practice providers (APPs) to help meet the workforce demands has been one of the proposed solutions since the initial workforce strategic plan was approved by the ASCO Board of Directors in 2008. The utilization of APPs in oncology practices can increase practice efficiency and productivity as well as the professional satisfaction of collaborating oncologists.[11] However, the degree to which the use of APPs will help meet future demand is unclear, as the current and projected workforce of APPs in oncology has been challenging to report. Based on census data from 2013, the American Academy of Physician Assistants (AAPA) reported that there were an estimated 2,140 clinically practicing PAs in adult medical, surgical, and radiation oncology subspecialties.[12] This represented a 25% increase compared with 2010 census data.[13] However, important characteristics such as age, geographic distribution, education, years of experience, and years to expected retirement are unknown. Similar challenges are faced when trying to describe the NP workforce in oncology. The American Association of Nurse Practitioners (AANP) also publically reports survey data for licensed NPs. In 2013, of the more than 205,000 licensed NPs, approximately 2,050 worked in oncology and had been in practice for an average of 7.7 years with a median age of 48.[14]

MODELS OF APP INTEGRATION INTO TEAM-BASED CARE

There are three models of care utilizing APPs in the team-based care setting: (1) the independent-visit model (IVM) in which APPs predominantly see patients independently in clinic but still under the collaborative practice agreement with their physicians, (2) the shared-visit model (SVM), for which patients are seen by both the APP and the physician during the clinical encounter, and (3) the mixed-visit model (MVM) in which both the independent and shared visit model is utilized to manage the clinical volume but neither is the predominant encounter used.

To examine the differences between the different models, Buswell et al reported the effect of the practice models on productivity, fees, and provider and patient satisfaction in an academic cancer center.[15] They found that productivity for the IVM, MVM, and SVM, as measured by the number of new and established patients, was similar between the models

(6.8, 6.7, and 7.0 patients seen per 4-hour session, respectively). Both physician and APPs were very satisfied with the IVM and reported patient-centered and productivity-based reasons influencing the decision to use their chosen model. For the SVM, physicians were still very satisfied with the model, whereas, APPs were only moderately satisfied. Reasons for utilizing the SVM were more physician-centered, focusing on physician preferences and perceptions. Importantly, there were extremely high levels of patient satisfaction for both models (100% satisfaction with care received from either model).

In a much larger study of the private practice setting, the results of the ASCO study of collaborative practice arrangements also noted high levels of patient and provider satisfaction with the APP models.[11] The most common model in the survey was the independent model. The IVM was also 19% more productive (based on relative value units, [RVUs]) when the APP worked with the entire group of physicians as compared with an IVM when the APP worked exclusively with a limited number of physicians. However, one should be cautious to conclude that the more productive RVU model is the ideal model to utilize APPs. Further insight into measures of quality and continuity of care of the two models would be important to distinguish. In addition, RVUs as the sole productivity measure is a limited assessment of the value an APP adds to a practice. The study did not take into account the non-revenue generating activity performed for each model, which would be important in defining the preferred models.

BARRIERS TO INTEGRATION

Provider and Patient

ASCO's study of the collaborative practice arrangements of APPs identified physician lack of interest in working with APPs as the most common reason not to utilize them in their practice.[11] To determine how to best motivate attitudinal change, it is important to explore the reasons for lack of interest. As the ASCO report was primarily physician-owned private practices (73%) with only 8% surveyed in academic practice, it is possible that the lack of interest is based on the fear of decreased personal compensation for the physician. It has been shown that the private-practice model has significantly more oncologists compensated on an incentive-based model compared with academic models (39.3% vs. 3.1%; $p < 0.001$).[16] Therefore, it may be important to focus on the increased practice productivity when using APPs to encourage utilization in private practice. Furthermore, as a pure incentive-based model is associated with the highest rate of burnout, the increased professional satisfaction when working with APPs can be another educational point to change perceptions.

There are other challenges to incorporating APPs into clinical practice that are largely historic or based more on personal bias than fact.[17] For example, the belief that utilizing APPs will negatively affect the physician/provider relationship or that patients will not accept APPs as part of the care team is not founded. Studies have demonstrated high levels of patient and provider satisfaction with the collaborative practice model with increased utilization nationally.[11,15,18,19] It is likely that a portion of the workforce that is nearing retirement is also the same group that has less experience and understanding of the PA and NP profession and, therefore, more perceived bias. This barrier, however, is likely to end as oncologists entering the workforce develop experience working with PAs and NPs during their fellowship. In a survey of fellowship program directors in 2011, 90% of medical directors reported that their fellows work with NPs or PAs.[20] What is not well known is how well prepared oncologists entering the workforce will be to lead a medical team that incorporates APPs. It will be important moving forward for oncologists to understand the different models for APP utilization, as well as the regulatory and reimbursement requirements to effectively lead the medical team. Ideally, this educational need could be incorporated into the fellowship training programs before entering the workforce and then further refined at the practice level based on state laws and institutional policies.

Legislative

With modern medicine should come modern legislation. Unfortunately, despite widespread acceptance of PAs and NPs, there remain substantial historic and dated legislative barriers that limit the effect that APPs have in providing quality care. Despite differences in regulations between PAs and NPs, there is common ground in the interest to ensure that PAs and NP are practicing to the highest level of their degree and professional training. Both the AANP and AAPA have written position statements and established policy priorities to improve access to health care through removing barriers in federal and state regulations. Specifically, some of the shared priorities nationally for APPs that will directly affect oncologic care include authorizing APPs to provide hospice care and allowing APPs to certify home care services and order durable medical equipment. At the state level, limitations on the prescriptive authority and scope of practice are also shared concerns between PAs and NPs. For example, 14 states still prohibit PAs from prescribing schedule II narcotics. Practice productivity is highest when APPs are used for advanced activities.[21] Therefore, by expanding the prescriptive privileges and allowing APPs to practice at the highest level of their scope of practice will help ensure that quality and efficient care will continue for patients with cancer.

To highlight the benefits of improving legislation for APPs, a study was conducted to simulate the effect that enacting policy changes would have on the supply of PAs and NPs in primary care in Alabama.[22] This simulation was based on policy changes that facilitated obtaining licensure, expanded prescriptive privileges, and removed several limitations on scope of practice. The results demonstrated the potential for substantial health care savings and increased access to care in Alabama with simple policy changes. The specific results of this study cannot be directly applied to the current and projected work demands in oncology. However, the proof of principle should be helpful to policymakers and advocacy

groups in further examining the role of utilization of APPs in oncology.

Productivity and Reimbursement

It is generally accepted that practices that incorporate APPs are more productive and efficient in providing quality care to patients than practices that do not. However, as practices work to integrate APPs into clinical practice they have been challenged with accurately assessing the productivity and value of individual APPs. Practices that utilize a system strictly based on RVUs will likely underestimate the productivity and value of APPs because of the inability to accurately measure RVUs. For example, global surgical visits and the SVM will render the time and effort of the APP invisible.[23] Even in the IVM, all incident-to visits as well as visits for many commercial payers are billed under the physician's National Provider Identifier, despite all care being provided by the APP. In addition, there are numerous activities in clinical care that APPs provide that are not billable encounters but bring quality and value to the practice. Importantly, these nonrevenue generating activities, if not completed by the APP, would have to be completed by the physician. The challenges in assessing the productivity of APPs and the limited benchmarking data available affects the ability to not only improve productivity of the APPs but will hinder the ability to increase utilization. Practices will struggle to determine when to hire new APPs and how their time should be allocated to support the clinical enterprise. Also, practice managers will inherently be unable to determine equitable compensation, comparison, and accountability of APPs within a practice.

Moving forward, it will be important for administrators and APPs to work together to ensure that productivity assessments accurately reflect the overall value that the APP brings to the care team. Options should include continued use of claims data, but also use of practice management and health records software to measure care rendered by an APP. Using a team-based approach to productivity where the physician and APP RVU are combined may be a reasonable alternative to the independent model of assessment. To augment the measurement of productivity, time and effort studies can be completed on a regular basis to track both the billable and nonbillable effort. This exercise will not only provide a greater understanding of the value of the APP, but it may highlight opportunities to improve practice efficiency and ensure that APPs are working up to the level of their degree.

In regard to reimbursement, there are several common myths and misconceptions that can stymie the expansion of APPs in oncology. Several myths such as "APPs cannot see new patients" or "APPs cannot bill above a certain level" are easily debunked with a little education and, if needed, support from the national advocacy organizations. However, one of the more challenging misconceptions is the over estimation that the 85% reimbursement rate of the APPs compared with the physician rate will have on the cost-effectiveness of APPs. Numerous studies on PAs and NPs have demonstrated that APPs are cost-effective health care providers. This can be explained by physician salaries being consistently 30% to 50% higher than APPs, incident-to billing reimbursed at 100%, and the savings on reduced recruitment and retention costs of APPs.

Educational Systems

One of the biggest barriers to utilizing APPs to help meet the oncologic workforce demands may be in the educational infrastructure in place for the education of APPs. The education of APPs generally provides a general medical education with limited time dedicated to oncology in the curriculum. In a survey of PA programs, cancer prevention and diagnosis were the primary focus of the oncologic curriculum with no or little focus on acute management, oncologic emergencies, and supportive and survivorship care.[24] In addition, although nearly all PA programs offer locally available, elective rotations in oncology, less than 15% of students participate in such opportunities. Similarly, in a survey of the educational experience of oncology NPs, most reported being poorly prepared to provide cancer care and not at all prepared to perform oncologic procedures or manage oncologic emergencies.[25] Once APPs enter the oncologic workforce, the majority report on-the-job training through mentorship with supervising/collaborating physicians, as well as, self-study as the means to obtaining the core competencies for their position.

To overcome the educational barriers to expanding the APP workforce will require efforts both during and immediately after the graduate training of APPs. With less than 15% of students pursuing elective rotations in oncology, the current workforce of APPs in oncology should help engage students during their didactic year to increase participation. This could be done by developing relationships with local APP programs and educating students about a career in oncology. The national organizations that represent APPs in oncology should also engage new student members to help increase interest in the field. As an example, the Association of Physician Assistants in Oncology has created a student day seminar at the annual continuing medication education (CME) meeting that offers students a free day of participation in the conference, as well as seminars for students about pursuing a career in oncology.

To help APPs gain the knowledge they need to meet the demands of caring for patients with cancer will require improvements in the core curriculum in graduate education. Unfortunately, it will be hard to expand the curriculum given the limited time available during the didactic year. It is possible that a flipped-curriculum model may be helpful to meet this challenge. In this model, standardized lectures can be viewed outside of the classroom and time spent in the classroom can be used for more active learning opportunities such as teamed-based learning and skills training.[24] The active classroom time would also be another opportunity for clinical preceptors and other APPs in oncology to engage students in oncology. The core curriculum for the flipped-curriculum model could be provided through standardized programs similar to ASCO's Curricula for Advanced Practice

Provider's (ACAPP), but with a focus on expanding the core curriculum of students in current APP programs.

Once an APP enters the oncologic workforce, the majority of education occurs during on-the-job training and self-study. To help meet the educational needs of APPs, programs such as ACAPP were developed and annual CME meetings for APPs in oncology are offered. These programs help offset the burden of individual practices in onboarding new graduates and provide ongoing education to APPs in oncology. As the number of APPs in oncology continues to increase, educational providers and industry have become increasingly interested in engaging this emerging market. Certainly, programs that provide certificates of completion and educational credits will be welcomed. However, educational programming for the intent of certification in oncology should be met with caution. Utilization of APPs in oncology is variable and differs in practice setting, discipline, and patient population. An individualized approach to ensuring the competency of APPs in oncology is, therefore, the best approach. Promoting the certification of APPs in oncology could be a substantial barrier to increasing the APP workforce and should not be endorsed as a requirement to practice.

Disclosures of Potential Conflicts of Interest

Relationships are considered self-held and compensated unless otherwise noted. Relationships marked "L" indicate leadership positions. Relationships marked "I" are those held by an immediate family member; those marked "B" are held by the author and an immediate family member. Institutional relationships are marked "Inst." Relationships marked "U" are uncompensated.

Employment: None. **Leadership Position:** None. **Stock or Other Ownership Interests:** None. **Honoraria:** None. **Consulting or Advisory Role:** Eric D. Tetzlaff, Novartis. **Speakers' Bureau:** Michael P. Kosty, Astellas Pharma, Genentech/Roche, Sanofi, Lilly, Bayer. **Research Funding:** Michael P. Kosty, Genentech/Roche (Inst), Merck Serono (Inst). **Patents, Royalties, or Other Intellectual Property:** None. **Expert Testimony:** None. **Travel, Accommodations, Expenses:** None. **Other Relationships:** None.

References

1. Forte GJ, Hanley A, Hagerty K, et al. American Society of Clinical Oncology National Census of Oncology Practices: preliminary report. *J Oncol Pract.* 2013;9:9-19.
2. Yang W, Williams JH, Hogan PF, et al. Projected supply of and demand for oncologists and radiation oncologists through 2025: an aging, better-insured population will result in shortage. *J Oncol Pract*. 2014;10: 39-45.
3. Hanley A, Hagerty K, Towle EL, et al. Results of 2013 American Society of Clinical Oncology National Oncology Census. *J Oncol Pract*. 2014;10: 143-148.
4. Welch WP, Cuellar AE, Stearns SC, et al. Proportion of physicians in large group practices continue to grow in 2009-11. *Health Aff (Millwood)*. 2013;32:1659-1666.
5. Taplin SH, Weaver S, Salas E, et al. Reviewing cancer care team effectiveness. *J Oncol Pract*. In press.
6. Taplin SH, Weaver SJ, Chollette VC, et al. Teams and teamwork during a cancer diagnosis: Interdependency within and between teams. *J Oncol Pract*. In press.
7. Weaver AC, Callaghan M, Cooper AL, et al. Assessing interprofessional teamwork in inpatient medical oncology units. *J Oncol Pract*. Epub 2014 Oct 28.
8. Childress SB. Team communication: it's about patient safety. *J Oncol Pract*. 2015;11:23-25.
9. Manojlovich M. Linking the practice environment to nurses' job satisfaction through nurse-physician communication. *J Nurs Scholarsh*. 2005;37:367-373.
10. Larrabee JH, Janney MA, Ostrow CL, et al. Predicting registered nurse job satisfaction and intent to leave. *J Nurs Adm*. 2003;33:271-283.
11. Towle EL, Barr TR, Hanley A, et al. Results of the ASCO Study of Collaborative Practice Arrangements. *J Oncol Pract*. 2011;7:278-282.
12. American Academy of Physician Assistants. *2013 AAPA Annual Survey Report*. American Academy of Physician Assistants: Alexandria, VA. 2014.
13. American Academy of Physician Assistants. *2010 Physician Assistant Census*. American Academy of Physician Assistants: Alexandria, VA. 2011.
14. American Association of Nurse Practitioners. *2013 NP Fact Sheet*. http://www.aanp.org/all-about-nps/np-fact-sheet. Accessed March 11, 2015.
15. 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*. 2009;5:188-192.
16. Shanafelt TD, Gradishar WJ, Kosty M, et al. Burnout and career satisfaction among US oncologists. *J Clin Oncol*. 2014;32:678-686.
17. Tetzlaff E, Polansky M, Carr K, et al. Physician assistants in oncology. *J Oncol Pract*. 2007;3:283.
18. Oliver DR, Conboy JE, Donahue WJ, et al. Patients' satisfaction with physician assistant services. *Physician Assist*. 1986;10:51-54, 57-60.
19. Moote M, Krsek C, Kleinpell R, et al. Physician assistant and nurse practitioner utilization in academic medical centers. *Am J Med Qual*. 2011; 26:452-460.
20. Kosty MP. Informational Items-WAG, Classic References, QOPI for Fellows. Presented at: 2011 ASCO Annual Meeting; 2011; Chicago, IL.
21. Erikson C, Salsberg E, Forte G, et al. Future supply and demand for oncologists: challenges to assuring access to oncology services. *J Oncol Pract*. 2007;3:79-86.
22. Hooker RS, Muchow AN. Modifying State Laws for Nurse Practitioners and Physician Assistants Can Reduce Cost of Medical Services. http://www.nursingeconomics.net/necfiles/14ND/Hooker.pdf. Accessed on March 11, 2015.
23. Pickard T. Calculating your worth: understanding productivity and value. *J Adv Pract Oncol*. 2014;5:128-133.
24. Polansky M, Ross AC, Coniglio D, et al. Cancer education in physician assistant programs. *J Physician Assist Educ*. 2014;25:4-11.
25. Nevidjon B, Rieger P, Miller Murphy C, et al. Filling the gap: development of the oncology nurse practitioner workforce. *J Oncol Pract*. 2010; 6:2-6.