Perspective

Building Better Oncology Data Systems and Workforce Models in a Rapidly Changing Health Care System

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This issue of *Journal of Oncology Practice* includes numerous articles that address the critical, but difficult to answer, question of whether the oncology workforce supply will be adequate to meet the population demand for cancer care in the years to come. The articles in this issue underscore the limitations of existing data sources, methodologies, and models in answering fundamental questions like how many practitioners currently provide oncology care and how many oncologists will be needed in 10 years. Reading between the lines of these articles, the reader is left with the sense that although there are many known factors shaping the workforce, including increasing feminization and the growing demand for better work-life balance among younger generations of physicians, there are far more unknowns about how the rapid pace of health system transformation and the changing demographic and practice characteristics of providers will affect the workforce.

What is clear is that the aging of the US population is resulting in an increased incidence of cancer, and improved cancer survival means a rising prevalence of patients with ongoing needs for cancer care. The resulting increase in demand is converging with intense health system pressures to improve the quality of care and lower costs.

Still larger forces will shape the workforce in ways that are poorly understood. Health reform, with the introduction of accountable care organizations and new payment policies, such as bundling, will have an impact on the organization of cancer care. Other health system changes are also changing the way cancer care is delivered. These changes include the consolidation of care and rapid integration of private practices into larger health care systems, the centralization of complex care at higher volume centers, and the increased adoption of electronic health records.

The system is undergoing change even as we are developing new data and methods to understand and model it. As a consequence, we must develop flexible models that do not provide a single, static point estimate of oncology workforce needs.[1] Static models create a false sense of precision and do not acknowledge that workforce projections are based on assumptions that may prove wrong as the health system and workforce evolve. As Kirkwood et al identify in their article, the projections from the American Society for Clinical Oncology (ASCO) 2007 workforce model[2] need to be recalibrated to incorporate better data and update assumptions to produce more robust estimates of future workforce needs.

A model is a simplification of reality and cannot fully accommodate yet-unknown workforce trends, policy interventions, technologic developments, or changes to the organization and payment structure of health care. However, future oncology workforce models need to better incorporate uncertainty about the future in at least two ways. Rather than provide point estimates of workforce shortfalls, they should include confidence intervals around the projections. Similar to how we predict the path of a hurricane, the confidence interval widens farther out into the future.[3] The second way that a model can accommodate uncertainty is to develop projections that allow the user to calculate the effects that different workforce and health system scenarios will have on oncologist supply and demand. Such a model enables the user to adjust key parameters to account for differing assumptions, for example, about rates of use of other physician specialties and nonphysician clinicians, increases in productivity, differing workforce participation and full-time equivalent rates for male versus female oncologists in different generations, and changes to enrollment in medical school or changes to graduate medical education residency and fellowship positions.

Good models are built from good data. However, robust, timely, and comprehensive data on oncologist supply and demand are difficult to collect and assemble, as Kirkwood et al discuss in their description of ASCO's work with the Association of American Medical Colleges to develop a workforce information system. The workforce information system begins to provide some baseline data on supply and demand for providers in three related specialties: hematology, hematology-oncology, and medical oncology. Although the data provide basic descriptive information about trends in the demographic, practice, and geographic characteristics of the oncologist workforce, the authors acknowledge significant limitations of the data for determining whether an oncologist is in active practice and quantifying the amount of time a provider spends in clinical care.

One limitation to which the authors allude, but do not discuss in detail, is the problem of using self-reported primary specialties in the American Medical Association Physician Masterfile to identify who is providing oncology care. This so-called counting noses approach of quantifying numbers of providers in just three specialties does not acknowledge the overlap in cancer care provided by medical oncologists and other types of physicians such as hospitalists, gynecologists, radiation oncologists, surgeons, and primary care providers. It is also important to note that not all medical oncologists have interchangeable practices. As cancer therapies become more advanced with personalized medicine and newer technologies, medical oncologists, like surgeons and other specialists, are becoming increasingly subspecialized. Our ability to answer the question of how many providers will be needed hinges on our understanding of the volume, breadth, and content of services provided by medical oncologists as well as other types of physicians. To make workforce projections more accurate, we need to move beyond silo-based projection methods that forecast physician supply and demand by specialty to an approach that assesses the population's use of cancer care services and the adequacy of

different skill mixes of physicians (and nonphysician clinicians [NPCs]) in various specialties to provide care.

The role of NPCs in the workforce is expanding rapidly. Future projection models need to be interdisciplinary, assessing the numbers and types of NPCs who provide cancer services over the patient's trajectory of care. Although there is a high degree of heterogeneity in the ways in which NPCs complement, substitute, and/or supplement physician-provided oncology care, their role is likely to increase as pressures mount for oncology practices to lower costs, increase care coordination, and improve patients' care experience.

Because of the wide range of health professionals providing oncology services, traditional physician-level workforce databases are increasingly inadequate[4] to measure the supply of cancer care services. The National Census of Oncology Practices, described in this issue by Forte et al, takes an innovative approach and provides information that has been woefully lacking in the literature—a practice-level view of oncology workforce supply and demand. Despite the relatively low response rate in the first round of the survey, the oncology census promises to be an invaluable data source and contribute significantly to our understanding of skill-mix configurations in oncology practices. In addition to asking about numbers of full-time equivalents of physicians in different specialties, the oncology census also asks questions about full-time equivalents of nurse practitioners, physician assistants, registered nurses, licensed practical nurses, pharmacists, medical assistants, and other health professionals. When linked with other data in the survey about patient and payer mix, practice size and ownership, oncology services provided, geographic location, and so on, this information will facilitate modeling of the factors that affect variation in how oncology practices deploy nonphysician staff to meet the local demands for care. Ultimately, the potential exists to link the oncology census data with other data sources to assess the comparative effectiveness of different practice arrangements in terms of cost, quality, and patient experience of care.

Although most researchers would agree that current methods for measuring oncology workforce supply are lacking, the study by Ward et al raises the question of whether we even understand the demand for cancer care. Oncology care is about more than simply administering chemotherapy. Surgery and radiation therapy have always been important components of cancer care, and Ward et al found that in 12% of incident cases of cancer in Iowa, no traditional cancer therapy is administered. Although cancer registry–based studies are known to underestimate use of cancer therapies (chemotherapy in particular),[5-7] it is clear that a portion of patients do not receive any surgery, radiation therapy, or chemotherapy. But what about complementary treatments or palliative care services? Supportive oncology is a growing field within cancer care. It is now recognized that supportive care for those forgoing treatment, as well as for patients receiving treatment, is a critical component of state-of-the-art oncology care.[8] As the population ages, more older and very old adults will be diagnosed with cancer, and the proportion of patients who do not receive any chemotherapy, radiation therapy, or surgery will grow, as will the need for effective supportive and palliative care. Meanwhile, as our understanding of and treatments for cancer improve, the numbers of cancer survivors in the United States are also growing. This trend, while exciting, is increasing the need for ongoing survivorship care to address the wide variety of post-treatment needs of patients with cancer.[9] As cancer care evolves, supportive care and survivorship will be growing parts of the demand for care that cannot be ignored in workforce planning and modeling.

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