A State Medical Board's Assessment of its Physician Workforce Capacity: Purpose, Process, Perspective and Lessons Learned

By Jacqueline A. Watson, DO, MBA; Deniz Soyer, MBA

ABSTRACT: The District of Columbia Board of Medicine (D.C. Board), a division within the District of Columbia Department of Health, Health Regulation and Licensing Administration, regulates more than 12,000 health care professionals — physicians, physician assistants, acupuncturists, anesthesiologist assistants, naturopathic physicians, polysomnographers, and surgical assistants — licensed in the District of Columbia.

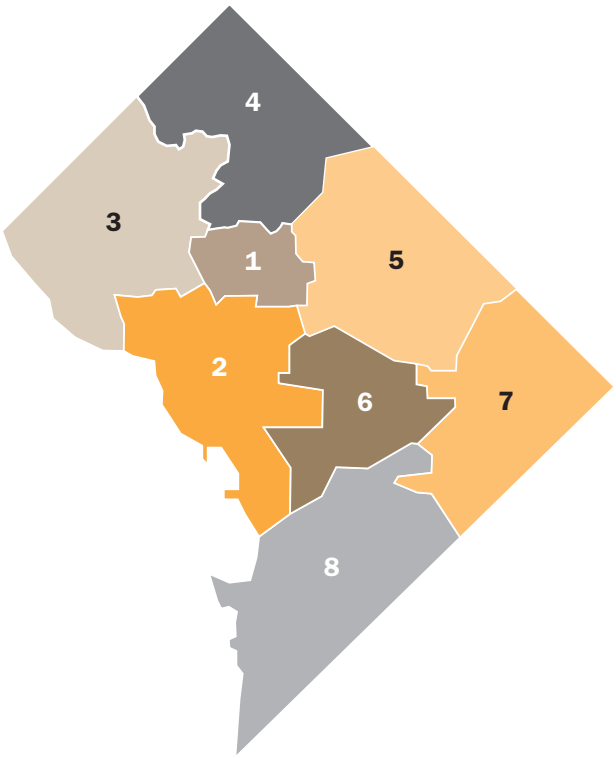
Recognizing that the licensure renewal period, conducted every two years on even numbered years, presented a unique opportunity to collect data for workforce research and analysis, the D.C. Board embarked in 2010 upon a three-phased project designed to collect demographic and practice characteristic information on licensed physicians and physician assistants under the Board's purview.

A multidisciplinary workforce workgroup was assembled by the D.C. Board and tasked with developing survey questions and a method of data collection. The Health Resources and Services Administration's National Center for Workforce Analysis Minimum Data Set was used as a guide in developing the survey. The surveys were voluntary, and elicited a 78% response rate and a 58% response rate for physicians in 2010 and 2012, respectively.

This article summarizes the results of the District's Physician Workforce Reports, focusing on the physician data collected. The article outlines the process the D.C. Board used in compiling the reports, and offers perspective on the project for other state medical boards as they consider launching their own workforce data-gathering efforts. The article does not examine or draw conclusions about data for physician assistants.

Keywords: D.C. Board of Medicine, health care workforce capacity, actively practicing physician, primary care physician, specialty care physician, health professional shortage areas (HPSAs)

Map of District of Columbia by Wards



Introduction

The implementation of the Patient Protection and Affordable Care Act (ACA), though off to a rocky start, will transform the health care marketplace in the United States. The new health care system will undoubtedly result in an increased demand for health care services and access to health care providers.

The mission of the D.C. Board is "to protect and enhance the health, safety, and well-being of District of Columbia residents by promoting evidence-based best practices in health regulation, high standards of quality care and implementing policies that prevent adverse events." The D.C. Board understands that the ability to effectively protect the health, safety and well-being of the public requires, in large part, that there be a sufficient supply of qualified health care professionals that are accessible to the roughly 600,000 individuals residing in the eight wards in the nation's capital.

Policy experts indicate that there will be a national shortage of both primary care and specialty care

physicians by 2020 and these gap projections have caused renewed interest in enumerating the health care workforce. As a result, some states have begun to critically examine their current health care workforce capacity, and identify gaps, in order to effectively prepare for, and manage, the supply and demand challenges ahead in the new health care marketplace.

For state medical boards, the anticipated increase in demand for health care services has a wide range of implications. With the increased volume of patients, the need to maintain vigilant oversight of health care delivery to ensure patient safety will be greater than ever. As the challenges of care delivery increase, new questions are likely to emerge about the roles and responsibilities of members of the health care team; new models for delivery will emerge that may impact scope-of-practice and the boundaries of oversight that currently apply to nurses, physician assistants, chiropractors and other health care professionals.

AS THE CHALLENGES OF CARE DELIVERY INCREASE, NEW QUESTIONS ARE LIKELY TO EMERGE ABOUT THE ROLES AND RESPONSIBILITIES OF MEMBERS OF THE HEALTH CARE TEAM.

Past reports conducted by the D.C. Department of Health indicate that the District of Columbia has not only a shortage of primary care physicians, but also a maldistribution of primary and specialty care physicians, with the most vulnerable wards in the District (Wards 7 and 8) devoid of access to qualified health care professionals.

With the looming changes in the health care environment and reported lack of access to providers in the District, the D.C. Board of Medicine saw the role it could play in facilitating and collecting the workforce data that could be used to inform decision makers.

In 2010, the D.C. Board's survey focused on collecting general demographic information, such as race/ethnicity, languages spoken, and education and training. However, after obtaining feedback from the 2010 report, the survey in 2012 sought to more critically examine the primary care workforce capacity, provider practice location, and number of clinical/patient care hours provided in the District. Primary care physicians were defined as those who practiced general internal medicine, family medicine, general pediatrics, and obstetrics and gynecology (OB/GYN). In addition, those physicians who were considered actively practicing medicine in the District were defined as those engaging in clinical patient care for 20 or more hours per week. The survey also tried to capture behaviors around special topics such as telemedicine/telehealth, electronic health records and social media use, and personal views on the implementation of the Affordable Care Act.

Results from both surveys yielded data that has already had a profound impact on policy makers in the District of Columbia. Of the more than 8,000 physicians eligible to renew their District medical license in 2012, 4,790 (58%) of physicians completed the survey. Further, the survey revealed that only 453 (9.5%) of the physician survey respondents are primary care physicians who spend more than 20 hours a week in the District treating patients. The D.C. Board's release of its data precipitated media coverage and renewed discussion of the lack of primary care physicians and the maldistribution of physicians in the District — bringing greater public awareness to the issue.

The experience of the D.C. Board in creating a comprehensive workforce data gathering process may be instructive for other boards. The collection of this data not only provides information that can be useful on many levels for licensure and discipline, but it can also provide valuable information for other health care policy makers. It offers an opportunity for boards to make a significant contribution in helping address health care issues in the states they serve.

Methods and Survey Response Rate

The D.C. Board assessed both the District's physician and physician assistant workforce in its 2010 and 2012 Workforce Capacity Reports. However, for the purpose of this article, only the findings from the physician data sets are reported.

All physicians licensed to practice medicine in the District are required to renew their license with the D.C. Board on a biennial basis. The data for the reports was obtained from surveys administered to eligible physicians who were renewing their license in the District during the 2010 and 2012 renewal cycles.[1] Participants completed the survey documents online or by paper.

The physician survey was accessible to physicians that met the following eligibility criteria:

- M.D. or D.O.
- Current license with D.C. Board of Medicine, in good standing, at the time of renewal.

Table 1
Respondents Compared to D.C. Physicians Eligible for License Renewal

	Sample N=9,917 (2010)	Respondents N=6,945 (2010)	Sample N=10,071 (2012)	Respondents N=4,790 (2012)
Gender				
Male	60.0%	60.0%	57.9%	57.0%
Female	40.0%	40.0%	42.1%	43.0%
Age				
30 & Under	0.6%	1.9%	1.5%	2.1%
31–40	24.3%	25.7%	26.5%	24.1%
41–50	24.4%	24.3%	24.0%	25.0%
51–60	23.4%	24.5%	22.2%	24.4%
Over 60	27.3%	23.7%	25.8%	24.4%

*Sample includes everyone that was eligible to renew their license in the 2010 and 2012 renewal, as indicated

Table 2
Demographic Comparison of Survey Respondents to 2008 AMA Masterfile Data

	2008 AMA Masterfile Sample of All D.C. Physicians N=5,076	Total 2010 Survey Respondents N=6,945	Total 2012 Survey Respondents N=4,790
Gender			
Male	62.27%	60.00%	56.99%
Female	37.73%	40.00%	43.01%
Age			
30 & Under	1.54%	1.90%	2.13%
31–40	24.29%	25.72%	24.11%
41–50	24.29%	24.26%	24.97%
51–60	24.96%	24.50%	24.36%
Over 60	24.92%	23.70%	24.43%

The workforce survey reports are based on data collected from physician survey respondents, who were among those who elected to have their District license remain in active status.

A comparison of the survey respondents to the District's entire eligible population of renewing physicians shows that the survey respondents and the eligible population were similar in age and gender distribution (see Table 1).

Physician survey respondents were also similar to a sample of District providers using the 2008 AMA Masterfile (see Table 2).[2,3]

Our survey response rates of 78% (2010) and 58% (2012) were similar to other reported response rates for large sample surveys.[4,5] Based on our survey response rates, which meet similar established thresholds for validity, we believe that our data set will enable us to draw a variety of workforce conclusions in the future. Our preliminary analysis of our 2012 sample of 4,790 respondents indicates, with 95% confidence, that our margin of error is ±1.4%. Statistical testing of survey variables will be conducted at the end of the third phase of this project, which will allow us to draw informed conclusions about long-term trends.

Whenever possible, an attempt was made to find reliable responses to questions that were not fully answered on the survey by respondents. The current D.C. Health Regulation and Licensing Administration

(HRLA) database was used to supply any missing basic demographic information among our survey respondents. Integrating the survey with our online renewal process helped to facilitate a high response rate, but the process had limitations. As a result, the licensing database was used to supply answers for gender, age, and address.

Among our survey respondents, primary practice locations were analyzed using Geographic Information Systems (GIS). GIS is a technology that

THE D.C. BOARD'S MAIN GOAL IN THIS MULTI-YEAR PROJECT HAS BEEN TO COMPREHENSIVELY QUANTIFY THE DISTRICT'S PHYSICIAN HEALTH CARE WORKFORCE IN ORDER TO SUPPORT MORE INFORMED POLICY DECISION-MAKING.

allows policy makers, planners, and managers in many fields, including health care, to process and visualize data based on spatial location. Between 2010 and 2012, improvements were made to the survey instrument to capture complete physician-practice addresses. As a result, GIS mapping for the 2012 report was performed with far greater accuracy.

Results

Age & Gender Distribution

The majority of physician survey respondents were between the ages of 31 and 60 in both 2010 (75%) and 2012 (74%). Overall, the age distribution in both 2010 and 2012 was relatively equal. The majority of physician respondents were male in both years (see Table 3).

Both the 2010 and 2012 Workforce Capacity Reports looked at characteristics of all District-licensed physicians, but focused more on actively practicing physicians. Actively practicing physicians were defined as those who reported that they were involved in clinical practice in the District for more than 20 hours per week.

Table 3
Comparison of Physician Survey Respondent Gender Distribution, 2010 v. 2012

	2010 N=6,045	2012 N=4,790
Male	60.00%	57.00%
Female	40.00%	43.00%

Figure 1
Percent Change in Two-year Actively Practicing Physicians, Future Plans Between 2010 v. 2012

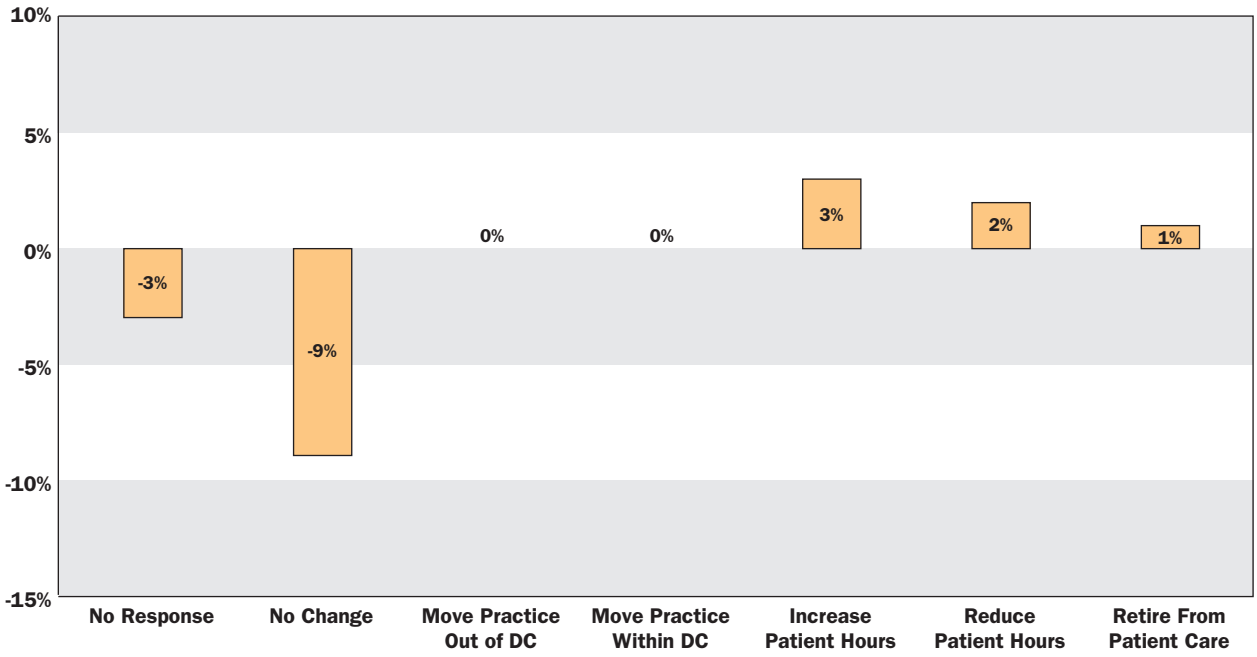


Table 4

Comparison of Top Specialties Among Actively Practicing Physicians, 2010 v. 2012

	2010 N=2,821	2010 Distribution	2012 N=1,487	2012 Distribution
1	Internal Medicine (General)	13.54%	Internal Medicine (General)	15.27%
2	Pediatrics (General)	10.88%	Psychiatry	8.27%
3	Psychiatry	8.97%	Anesthesiology	5.92%
4	Anesthesiology	6.24%	Obstetrics & Gynecology	5.65%
5	Radiology	4.61%	Pediatrics (General)	5.25%

Workforce Reduction & Retirement

In 2010, 78% of actively practicing physicians and 69% of 2012 actively practicing physicians within our surveys had no future plans to change their practice hours or location within the next two years (see Figure 1). Although the majority of actively practicing physicians indicated no change, there was a slight increase in physicians who will be increasing patient hours (+3%), reducing patient hours (+2%) or retiring from patient care (+1%).

Actively Practicing Physicians by Specialty

For the purpose of the workforce capacity reports, primary care physicians were defined as those that were practicing general internal medicine, general pediatrics, family medicine, or obstetrics and gynecology. Specialty care physicians were defined as those practicing medicine in specialties other than the four primary care specialties.

Since 2010, general internal medicine remained the top specialty among actively practicing physicians (see Table 4). The distribution of general pediatricians among the actively practicing physician population shifted from 10.88% (2010) to 5.25% (2012). In both years, rates of actively practicing internal medicine physicians were comparable to 2007 national averages (14%).[6]

Between 2010 and 2012, there was minimal change in the rates of actively practicing primary care versus specialty care physicians. The composition of the actively practicing specialty care physicians was close to seventy percent (70%) in both years (see Table 5).

Table 5

Comparison of Actively Practicing Primary Care & Specialty Care Physician Rates, 2010 v. 2012

Physician Specialty Information	2010 N=2,821	2012 N=1,487
Primary Care	32.54%	30.46%
Specialty Care	67.46%	69.54%

The District's Primary Care Workforce

The 2012 survey sought to accurately quantify and critically assess the primary care workforce capacity in the District. Over a quarter (28%) of physician survey respondents identified themselves as primary care physicians. Thirty-three percent (453) of primary care physicians indicated that they have at least one practice location in the District and spend 20 hours or more providing patient care in the District. These primary care physicians were defined as actively practicing primary care physicians. In general, actively practicing primary care physicians were roughly equally distributed by age. The most common age range (28%) for actively practicing primary care physicians was between the ages of 31 and 40. The population was also predominantly female.

> THE REPORTS HAVE BROUGHT AWARENESS OF THE BOARD'S PRESENCE AND EDUCATED THE PUBLIC ABOUT ITS ACTIVITIES.

Most actively practicing primary care physicians (66%) did not plan to change their clinical hours or locations of their practices over the next two years. Eleven percent of actively practicing primary care physicians had plans to reduce their patient hours and 2% indicated plans to retire in the next two years.

Between 2010 and 2012, there were significant shifts among actively practicing primary care physician specialties (see Figure 2). In 2010, the proportion of actively practicing general internal medicine

physicians increased from roughly 42% (2010) to just over 50% (2012) of the actively practicing primary care physician population. General pediatricians displayed the greatest shift among actively practicing primary care physicians. Between 2010 and 2012, the presence of general pediatricians declined by roughly 16% percent.

Actively practicing primary care physicians were mostly located in Wards 1, 2, 3, and 5. Practice locations were clustered around the major hospitals in the area.[7] Hospital/medical system based practices were the most common practice setting for actively practicing primary care physicians (38%). An additional 22% of actively practicing primary care physicians indicated that they were based in a group practice. The remainder of the population worked in an ambulatory clinic-based practice (14%), solo practice (11%), or federally qualified health center (10%).

Access to care and insurance coverage

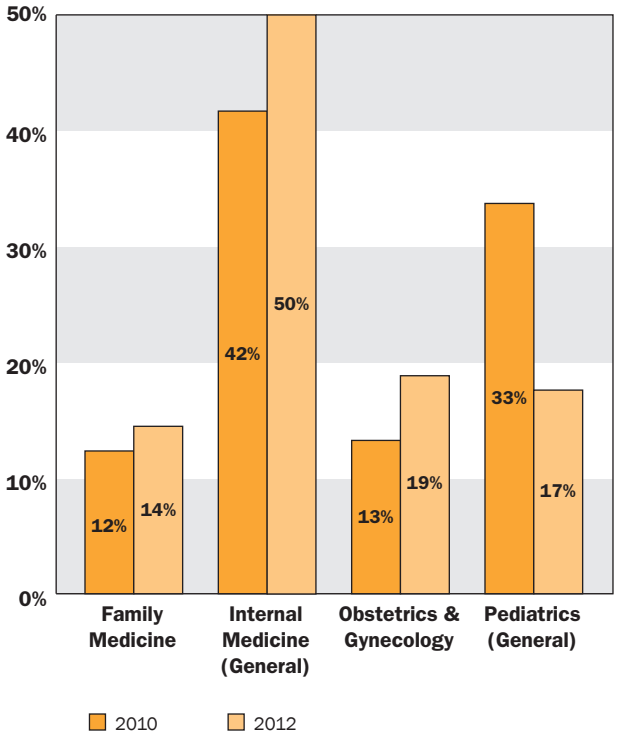
A section of the 2012 report was dedicated to examining the location of Health Professional Shortage Areas (HPSA), as designated by the D.C. Department of Health's Community Health Administration, in relation to the distribution of actively practicing physicians in the District.[8] The District has six designated primary (health) care HPSAs. The majority of actively practicing primary care physicians (70%) accept or participate with Medicaid and are heavily concentrated in Wards 1, 2, and 5. Wards 2 and 5 are home to eight of the 10 major hospitals and academic centers in the District.

THE LICENSE RENEWAL PROCESS IS A TIME WHEN ANY STATE MEDICAL BOARD HAS A CAPTIVE AUDIENCE. SURVEY COMPLETION DURING A RENEWAL IS ALSO MORE CONVENIENT FOR LICENSEES.

Nearly all of Wards 7 and 8, which have some of the lowest numbers of actively practicing primary care physicians, are located in an HPSA region. Only 7% of actively practicing primary care physicians practice in the HPSA designated areas of Anacostia and East Capitol Southeast[9] (located in Wards 7 & 8). The United Medical Center, located in Ward 8, is a non-profit, full-service community hospital serving Southeast D.C. Based on our survey, less than 2% of surveyed actively practicing primary care physicians were located near this hospital.

The ability to fully assess access to care issues is complex. The D.C. Board was not able to obtain information on the exact location of the District's Medicaid recipients. In the third phase of this project, the D.C. Board of Medicine will be seeking to obtain this information, which would allow for a more comprehensive assessment of the District's access-to-care issues.

Figure 2
Comparison of Actively Practicing Primary Care Physician Rates, 2010 v. 2012



Special Topics

In 2010 and 2012, a portion of the workforce surveys were dedicated to special topic areas.

Changes in the health care environment, particularly the development of new technologies and an increased demand for access to health care providers, served as catalysts for examining special topics, including use of telemedicine, social media, and electronic health records.

The 2010 survey asked a question related to social media use and electronic health record use. The subsequent survey featured more specific questions related to these two topics, but also included questions on telemedicine and the Patient Protection

and Affordable Care Act. The special topics section of the 2012 physician survey experienced a decline in response rate compared to other questions on the survey. Survey response in this section declined from 4,790 to roughly 2,600. The report clearly indicated non-response rates to each question as applicable.

Social Media

The D.C. Board has recognized the important and growing use of social media in modern medical practice. The Board has created a Facebook page as another venue for connecting and communicating with District health care providers and the public.

In 2010 and 2012 physicians were asked to indicate the type of social media used in their practice of medicine. In both surveys, Facebook was the most commonly used form of social media, followed by other forms of social media, such as LinkedIn and Twitter.

In 2012, physicians were also asked whether they believe social media added communicative value to the physician-patient relationship. Of the physicians responding to this question, 51% indicated that they believed social media has communicative value within a physician-patient relationship (see Figure 3).

Electronic Medical Records

In 2010, 61% of physicians indicated that they use some form of an Electronic Health Record (EHR). Among the physicians responding to this section of the survey in 2012, 73% indicated that they use electronic health records in their practice of medicine (see Figure 4).

The 2012 survey explored this area further, asking physicians about e-prescribing use and EHR patient access. Of the physicians responding to this survey section, 49% indicated that they use e-prescribing. Among the physicians who use electronic health records, 42% indicated that their EHRs allow patient access. Asking survey questions of this kind allowed the Board to examine how physicians in the District are utilizing technology and progressing towards achieving meaningful use.

Telemedicine

Among the physicians responding to this survey section, 74% indicated that they believed telemedicine is the practice of medicine. Only 27% of these physicians indicated that they currently use telemedicine. Among the 1,615 physician survey respondents who indicated that they do not currently use telemedicine in their practice, 27% indicated that they anticipate incorporating telemedicine in their practice within the next five years.

Figure 3
Do You Believe That Social Media Use Has Communicative Value Within a Physician-patient Relationship?

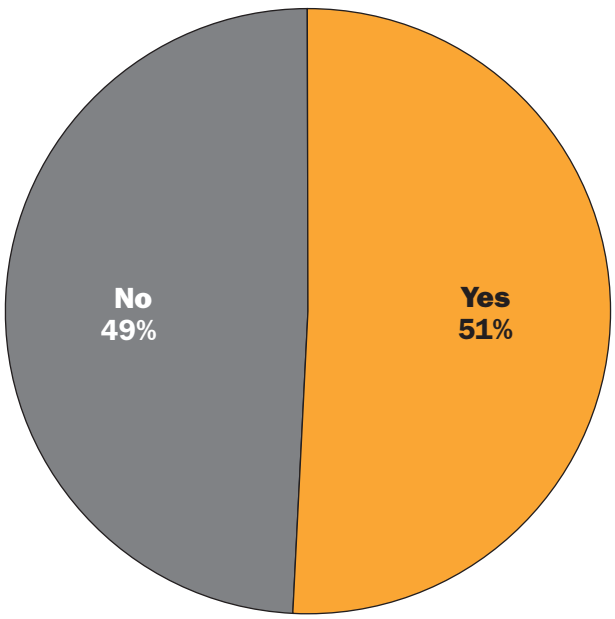
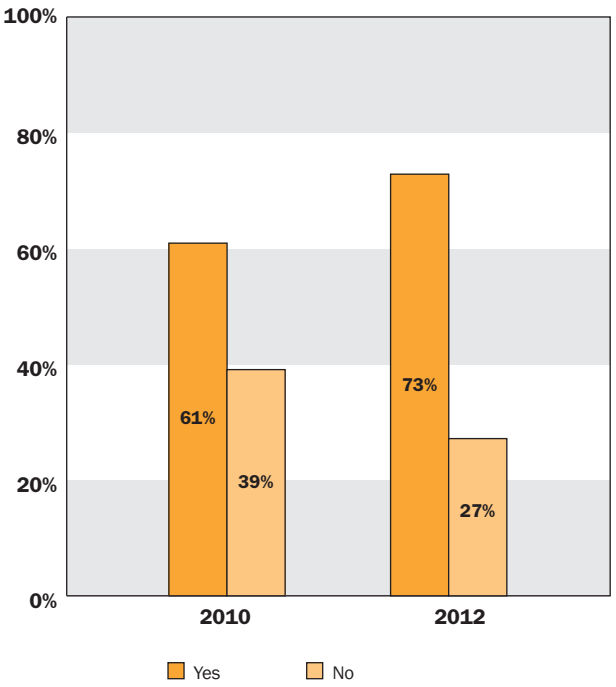


Figure 4
Do You Use Electronic Health Records (EHR)? – 2010 v. 2012



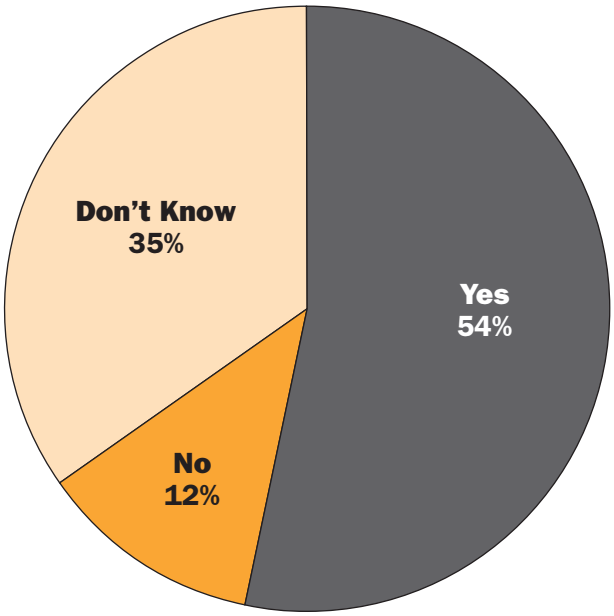
Affordable Care Act

Physicians were asked whether they believed that the Patient Protection and Affordable Care Act (ACA) would have a positive effect on health care in the District. Among the physicians who responded to this question, 54% indicated that they believed the ACA would have a positive effect on health care in the District (see Figure 5).

Physicians who indicated that the ACA would have a positive effect in the District (1,181) were asked to indicate why. Physicians were allowed to select from five options and were able to select more than one option (see Table 6). Ninety percent (1,059) of these physicians believed that the ACA would have a positive effect because it would increase patient access to care.

Figure 5

Do You Believe That the Patient Protection and Affordable Care Act Will Have a Positive Effect on Health Care in the District?



Discussion

In 2009, the D.C. Board decided to initiate the workforce survey project in the midst of the health care reform debate. Projections of a national shortage of more than 90,000 physicians by the year 2020 motivated the Board to capture accurate demographic and practice information for the District to better inform health policy decisions for public and private stakeholders at the local and federal level.

The D.C. Board recognized that the licensure renewal period, conducted every two years on even numbered years, presented a unique opportunity to collect data for workforce research and analysis. In 2010, the Board embarked upon a three-phased project designed to collect demographic and practice characteristic information on licensees under its purview.

The D.C. Board divided this project into three parts, with the intention that possessing data spanning multiple years would help facilitate the examination of changes in the workforce over time. Multi-year data sets will enable detailed analysis of the District's health care workforce. Data spanning several years will enable decision makers to closely examine changes over time, research correlation and causation between variables to identify key factors impacting supply, demand, and distribution, as well as predict and forecast important aspects of District health professionals.

Developing three different surveys also allows the Board to focus on different aspects of physician practice in different years. In 2010, the survey focused on collecting general demographic information, such as race-ethnicity and languages spoken, as well as education and training. The 2012 survey sought to more critically examine the primary care workforce capacity, provider practice location, and number of clinical/patient care hours being provided

Table 6

Physician Opinion on Potential Impact of Patient Protection and Affordable Care Act, 2012

	Number of Respondents N=1,181	Distribution of Respondents
It will increase patient access to care	1,059	90%
It will improve the overall quality of healthcare delivered	643	54%
It will provide more autonomy for physicians in their delivery of patient care	218	18%
It will enhance the financial viability of my practice	168	14%
Other	19	2%

in the District. In addition, the survey was designed to examine behaviors around special topics such as telemedicine/telehealth, electronic health records and social media use.

Both of the D.C. Board's reports of survey results have been well-received by the District's legislative and executive branches, as well as stakeholders and members of the public. Feedback to the D.C. Board has been very positive, and the reports attracted local media attention, including coverage in *The Washington Post* and from other media outlets.

The D.C. Board's main goal in this multi-year project has been to comprehensively quantify the District's physician health care workforce in order to support more informed policy decision-making and enable effective health care workforce planning. The Board also sought to collaborate with other agencies in the Department of Health, including Healthcare Finance and the Community Health Administration, to develop the surveys and reports. In addition, through publishing formal reports on the District's physician workforce capacity, the D.C. Board sought to promote the importance of data collection and analysis by health licensing boards.

The reports have benefitted the D.C. Board in several ways. The Board is viewed by legislators and policy makers as an essential source for obtaining reliable and credible data on physicians in the District. The reports have brought awareness of the Board's presence and educated the public about its activities. The Board is seen as an entity that is closely in tune with the pulse of the District's health care environment and is proactively seeking out innovative ways to inform policy and protect the public.

The D.C. Board will begin gathering data for the third report during the 2014 renewal period and will publish its findings in September 2015. The third report will build upon the information collected from the previous two reports, incorporate lessons learned, and present a comprehensive data set that reflects an assessment of the District's physician workforce spanning six years. Furthermore, the report will also include analyses of other sectors of the health care workforce, which are being conducted by the District's other health professional licensing boards.

Based on the experiences of the D.C. Board, other state medical boards who are considering launching their own workforce data-gathering efforts should keep the following elements in mind as they organize their process:

- ***Establish a taskforce.*** Bring together a multidisciplinary group of internal and external stakeholders to the table during the development and implementation of a survey of this scope and magnitude.
- ***Collaborate with knowledge experts and utilize survey development tools***. Work closely with organizations such as the Health Resources and Services Administration's (HRSA) National Center for Health Workforce Analysis. Using their minimum data sets (MDS) as a survey development guide will ensure that essential questions are asked, such as basic demographic information (race, gender, languages spoken, age, etc.). This will also allow boards to design questions with the intention of building on data for each subsequent year that a survey is distributed.
- ***Integrate the survey with the board's license renewal process***. The license renewal process is a time when any state medical board has a captive audience. Survey completion during a renewal is also more convenient for licensees. The survey appears to the licensee as merely another step in the renewal process that must be completed, along with answering screening questions and submitting payment.
- ***If laws allow for it, make the survey mandatory***. Capturing 100% of the workforce would be ideal.
- ***Have a dynamic and committed group of board members and staff***. The D.C. Board views its role of protecting the public in a very broad sense, beyond merely overseeing the licensing and disciplinary process. Board members played a hands-on role during the development of both reports.
- ***Solid communication and outreach is essential.*** Board members played a hands-on role during the development of both reports. The D.C. Board used email blasts, newsletters and various forums — including social media — to introduce the concept and importance of the workforce survey in 2010 and thereafter. Licensees received communication from the Board to reinforce the notion that all information collected was used for data-gathering purposes only. All unique identifying information was kept confidential. As a result of continuous communication, the survey received a high response rate in both years. After publishing its findings, the D.C. Board held a symposium in 2011 and 2013, which garnered public attention.

Limitations

The D.C. Board's workforce capacity reports were an analysis of the responses of the workforce survey respondents only. Although our respondent population was demographically similar to the entire licensee population, the reports do not characterize all physicians within the District.

The surveys were voluntary and the survey respondents did not answer every question within our surveys. Therefore, some questions had a significant level of non-responders. Non-response rates were indicated if applicable within the reports. For example, in the 2012 survey, the special topics section of the physician survey experienced a decline in response rate compared to other sections of the survey. In the future, the entire survey should be made a mandatory part of the renewal process in order to capture further information about the supply of physicians.

Physicians who obtained a new license during the licensing renewal period were not part of the renewal process and therefore were not included.

Because data is still being gathered in this three-phase project, it is premature to draw conclusions about long-term trends, such as increased or decreased work hours or projected retirement among physicians in the Washington, D.C. area. More detailed analysis of data will be completed at the end of the third phase of the project, which will begin with the next D.C. Board license renewal period in October 2014.

The reports published by the D.C. Board focused only on the medical workforce in the District. However, the Board recognizes that there are other health care professionals in the workforce that are essential to the District workforce capacity. Data from other professions must also be collected by the respective regulatory boards in order to comprehensively analyze the District's health care workforce capacity and needs. ■

About the Authors

Jacqueline A. Watson, DO, MBA, is Executive Director of the D.C. Board of Medicine.

Deniz Soyer, MBA, is Health Licensing Specialist for the D.C. Board of Medicine.

References

1. The District of Columbia Board of Medicine's 2010 renewal cycle took place from October 1, 2010 through December 31, 2010. Its 2012 renewal cycle took place from October 1, 2012 through December 31, 2012.
2. Characteristics of D.C. Physicians. Prepared by the Center for Health Workforce Analysis from the 2008 AMA Physician Masterfile. June 2010.
3. The AMA Physician Masterfile was established by the American Medical Association. The Masterfile contains current and historical data for more than 1.4 million physicians, residents, and medical students in the United States. It includes significant demographic, educational, training and professional certification information on virtually all physicians in the United States.
4. Cummings, S. et al. "Reported Response Rates to Mailed Physician Questionnaires." *HSR: Health Services Research,* February 2001; 35(6): 1347–55.
5. Creavina, S. et al. "Do GPs Respond to Postal Questionnaire Surveys? A Comprehensive Review of Primary Care Literature" *Family Practice*. 18 February 2011. http://fampra.oxfordjournals.org/content/28/4/461.full.pdf. Retrieved September 1, 2013.
6. AAMC Center for Workforce Studies. *2008 Physician Specialty Data.* November 2008. http://www.omionline.org/newsite/docs/specialtyphysiciandatabook.pdf. Retrieved September 1, 2013.
7. Howard University Hospital (Ward 1), MedStar Georgetown University Hospital (Ward 2), The George Washington University Hospital (Ward 2), Sibley Memorial Hospital (Ward 3), MedStar Washington Hospital Center (Ward 5), and Children's National Medical Center (Ward 5).
8. Health Professional Shortage Areas (HPSAs) are geographic areas, or populations within areas, that lack sufficient health-care providers to meet the healthcare needs of the area or population. HPSAs are used by the Federal government to recognize shortages of healthcare providers for geographic areas, population or facilities and to prioritize the allocation of Federal and local resources to address these shortages.
9. Anacostia and East Capitol Southeast were assigned HPSA scores 19 and 18 respectively. HPSA scores indicate an area's degree of shortage on a scale of 1 to 25, with "25" indicating the greatest shortage. HPSA information was provided by the D.C. Department of Health, Community Health Administration.