Cytotechnology Labor Market
An Update

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Abstract

Based on historic data, we recently developed a model for the cytotechnology labor market that predicted shrinkage in the workforce secondary to a reduced demand for cytotechnologists that would offset any expected increase secondary to demographic changes in the number of women eligible for cervical cancer screening. In this report, we describe the comparison of our previous model with data that were available for the 2005-2009 period. As predicted, the cytotechnology workforce experienced significant shrinkage. The 2008 wage decreased when adjusted for inflation, demand shifted downward significantly, and supply shifted, in response, slightly downward. In 2009 supply (6,064 available staff) and demand (6,355 open and filled positions) were lower than those of the 2005 market.

The last few years have brought much speculation about the impact of the changing cervical cancer screening environment on the cytotechnology workforce. Based on historic data, we recently developed a model for the cytotechnology labor market that predicted shrinkage in the workforce secondary to a reduced demand that would offset any expected increase related to demographic changes in the number of women eligible for cervical cancer screening. In this update, we collected data from different sources to compare actual data with the prediction model. Our finding supports the previous model and shows a shrinking labor supply that is most likely due to a reduced demand for cytotechnologists.

Materials and Methods

To construct a useful workforce model, we consolidated publicly available market data from a variety of sources. Data for the total number of cytotechnologists were obtained from the American Society for Clinical Pathology (ASCP) Board of Certification (BOC) and from the Centers for Medicare & Medicaid Services (CMS) (written communication, Judith Yost, Director, Laboratory Service, CMS, March 2010). Data for wages and vacancies were obtained from the American Society for Cytotechnology (ASCT) and the ASCP annual wage and vacancy surveys. Student outcome and cytotechnology training program data were obtained from annual reports of the Cytotechnology Programs Review Committee of the American Society for Cytopathology (ASC) (written communication, Deborah MacIntyre, CPRC coordinator, March 2010). Estimates of the total volume and frequency of Papanicolaou (Pap) tests and expected changes were based on our previous article.
To determine the current and future labor markets, data were classified as supply or demand and then used in quantitative and empiric analyses. The new data, collected in the 2005-2009 period, were compared with our model that reflects the period before 2000. The market dynamic was constructed similar to the Job Opening and Labor Turnover Survey of the US Bureau of Labor Statistics (BLS). Participation rates for women older than 55 years were obtained from the BLS.

All cytotechnologists who took the GYN Proficiency Test (PT) were considered to represent the active workforce (stayers). Cytotechnologists who passed the BOC examination were considered entrants. Separation (leavers) was then calculated by adding “entrants” and “stayers” from the previous year and subtracting the current number of stayers. Generally, there are 3 types of separation: quitting, discharge/layoff, and unemployment. The BLS defines quitting as voluntary separation of an employee for any reason except retirement, and layoffs and discharges are separations initiated by the employer. Unemployment is the state of being available and willing to work but currently without work. By using this framework, we compared the annual rate of entry and separation, along with their trends over time.

Results and Discussion

2005 was a pivotal year for study of the cytotechnology workforce: Proficiency testing presented the opportunity, for the first time, to know the exact size of the workforce (cytotechnologists available to work). By using the annual number of cytotechnologists who passed ASCP BOC examinations, we were able to estimate the average annual number of cytotechnologists who separated from the field. Figure 1 shows the trends for the total number of working and available to work cytotechnologists (CMS PT data) compared with our previously published prediction model. In the period 2005 to 2009, the workforce shrank by 7.1% instead of increasing by 4.1%, as would have been the case based on demographic changes, or 10.7% based on historic accession and separation rates. This trend in workforce number was similar but not identical in degree to what we predicted would occur (a decrease of 13.6%) after adoption of the recent changes in screening guidelines for Pap and human papillomavirus (HPV) testing and the management of women with cervical lesions (Figure 1).

Compared with the 2005 model, accessions have decreased and separations have increased during the last 4 years Table 1. Accordingly, since 2005, 1,115 (17.1%) cytotechnologist entrants have joined the workforce and 1,553 (23.8%) cytotechnologists have separated, with a net separation of 6.7%. In the meantime, the population eligible for screening increased by 4.1% (from 94.2 million to 98.0 million). If 2005 market conditions remained static during this period, the market would have experienced a shortage of 10.8% (6.7% + 4.1%). On the contrary, the vacancy rate according to the 2008 ASCP Wage and Vacancy Survey was less than half this figure, 4.8% for staff and 0% for supervisors Figure 2. The obvious conclusion is that the shrinkage in the labor market is due to a reduced labor demand rather than a decreased labor supply. The ASCT data for vacancy rates are generally higher and may be less accurate than ASCP data because they reflect answers from individual cytotechnologists compared with ASCP data, which reflect answers from laboratory managers in hospitals, private clinics, and reference laboratories. A vacancy would be counted more than once in the ASCT survey.

As additional evidence of a reduced demand, a recent study showed a Pap test volume decreasing (60%) or remaining the same (20%) in 194 laboratories surveyed. Moreover, the 2009 Cytotechnologist Workforce Assessment Survey, jointly sponsored by the ASCP, ASC, and ASCT, showed similar trends.
The degree to which screening guidelines are followed remains an important determinant of the total number of Pap tests performed and, therefore, the demand for cytotecnologists. Similar to our predictions, Solomon et al\textsuperscript{12} suggested that by 2010, 75 million Pap tests would be performed if guidelines were not followed compared with a 15\% reduction (65 million performed) if screening of women who had undergone hysterectomy was eliminated and a 50\% reduction (34 million performed) if the screening frequency and HPV testing guidelines were strictly followed. Studies show, however, that adoption of guidelines is extremely variable. In a recent health impact study commissioned by the ASC, 85\% of US Pap test providers surveyed reported ordering “reflex” HPV testing for atypical squamous cells, and 76\% reported ordering HPV/Pap cotesting. However, 50\% continued to screen elderly women with negative for intraepithelial lesion or malignancy test results, and 44\% continue to screen patients who have undergone hysterectomy.\textsuperscript{13} Two thirds of recently surveyed providers recommended a yearly Pap test for 18-year-old girls who were not sexually active.\textsuperscript{14} These variable patterns of practice delayed a precipitous decrease in cytotechnologist demand.

The HPV vaccine, on the other hand, has not yet impacted the Pap test demand. In 2008, vaccine coverage of 13- to 17-year-old girls was 37.2\% (\pm 1 dose), an increase of 12 percentage points over that of 2007.\textsuperscript{15} This cohort of girls will likely be eligible for cervical cancer screening 7 to 11 years following vaccination (2015-2019).

In addition, disease causing HPV types not covered by vaccination may emerge after widespread vaccination for HPV types 16 and 18. It is also unclear as to what impact the recently approved boys’ HPV vaccination will have on the burden of cervical disease in the general population. Clearly, there are many unknowns regarding the HPV vaccine, including whether it will meet expectations. Whatever the outcome, the effect on demand for cytotechnologists will likely not be felt for a decade or more and will not be as detrimental as the effect of HPV testing.

In theory, one could argue that the PT itself is an additional inducer of separation (dropout) from the workforce. However, since 2005, a total of 99 cytotechnologists (annual average of 20 [0.32\%]) dropped out of the testing cycle, representing only 6.4\% of the total separation from the workforce (1,553) in the same period Table 2. Although wages are not as elastic as other prices, evidence of reduced demand can also be seen in the annual change in cytotechnologist wages, which remained at a level that barely kept pace with the US inflation rate Figure 3. This happened despite a jump in Pap test fees from $14.96 in 2000 (conventional Pap test) to $28 (liquid-based test, performed now in almost all laboratories) to $38 (imaged Pap test, performed in a large proportion of laboratories). This change in Pap test fees is related to reagent costs and new improved methods of screening but not labor costs.

The most noticeable and important change in the 2005-2009 period has been cytotechnology program closures. Of 48 cytotechnology schools, 12 have closed, resulting in a decrease in the number of cytotechnology students from 269

\begin{table}[h]
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\begin{tabular}{lrr}
\hline
Year & No. Enrolled & No. (\%) Dropped \\
\hline
2005 & 6,530 & 18 (0.28) \\
2006 & 6,379 & 28 (0.44) \\
2007 & 6,260 & 9 (0.14) \\
2008 & 6,184 & 13 (0.21) \\
2009 & 6,064 & 31 (0.51) \\
Average & 6,283 & 20 (0.32) \\
\hline
\end{tabular}
\caption{Dropouts From Proficiency Testing Program Have Minimal Impact on Separation From the Workforce}
\end{table}
in 2005 to 200 in 2009. On its face, this may seem to explain the shrinkage of the cytotechnology workforce. However, despite this decrease in student numbers, job placement remains flat at 91%, resulting in the actual number of jobs filled by new graduates at 182 in 2009 compared with 245 in 2005 [Figure 4]. This is yet another strong indicator of a decrease in demand for cytotechnologists.

As with any workforce, there are numerous reasons cytotechnologists separate, including quitting, unemployment, layoffs, discharges, and retirement. Retirement in an aging cytotechnologist workforce has been frequently cited as a potential cause of an increased demand in the future. The two sides of this statement, however, have not been studied critically. First, is the cytotechnology workforce aging? Second, are cytotechnologists retiring? Although no solid data on cytotechnologist workforce age structure have been published, from a practical standpoint, it is hard not to believe the preceding statement. Fortunately, the ASCT survey collects data on years in practice, which is an indirect measure of age, at least in the upper brackets (cytotechnologists who stayed >30 years in the workforce). This fraction of the workforce has remained steadily around 25%, higher than the percentage of women in the general workforce at this age (16% in 2002 increasing to 19% in 2008).16 If the ASCT survey sample truly represents the cytotechnology workforce, based on calculation, one can safely conclude that the separation of older cytotechnologists, mostly due to retirement, did not change significantly since 2005.

The 2008 ASCT survey addressed for the first time the issue of future voluntary separation and indicated that 57% of cytotechnologists would leave the job (33% would retire and 24% would quit) in 10 years. This is an annual separation rate of 5.7% (3.3% retirement and 2.4% quit rates). Unemployed cytotechnologists were not polled in this survey. This retirement rate was similar to that in the 2009 Cytotechnologist Workforce Assessment Survey; in 3 years, 8.4% (2008 survey) and 9.2% (2009 survey) would separate from the workforce. It is not possible to state whether these rates would be higher or lower than past rates because neither the ASCP nor ASCT surveys collected retirement data in the past.

From the preceding discussion, it is clear that demand and supply of the workforce have decreased (demand far more than supply), leading to a shrinking labor market. In theory, at market equilibrium, the supply will equal the demand. In reality, this balance rarely occurs.

There are shifters on the supply and demand side of the equation that cause the market to be in disequilibrium. Supply shifters include the number of cytotechnology schools and their occupancy rates, competition with other jobs, accessions and separations from the workforce, regulatory requirements such as PT examinations, and workload limits.

For the cytotechnology workforce, the primary demand shifter for the purpose of the current model is the volume of Pap tests performed. This volume is affected by the number of women eligible for Pap tests, the percentage of women...
covered by the Pap test, and cervical cancer screening guidelines. Technology and its impact on productivity along with market expectations and speculation can also be powerful market shifters for supply and demand. In addition, workloads other than gynecology such as fine-needle aspiration and molecular testing performed in cytology may shift demand for cytotechnologists in the laboratory.

In summary, if we compare the 2005 with the 2009 market, we see a shrinking workforce. The wage has decreased when adjusted for inflation, demand shifted downward significantly, supply shifted, in response, downward slightly, both supply (6,064) and demand (supply + vacancy; 6,355) are lower than those of the 2005 market [Figure 5].

Limitations

Our illustration is a simplistic supply-demand model, and, in reality, wages unlike prices in other markets are not as elastic as one may think. While our model relies heavily on published data, the data are sometimes imperfect. For example, we have annual wage and vacancy surveys from national organizations, but participation rates in these surveys are only approximately 7% of the workforce. The National Health Interview Survey is our best available predictor of Pap test volume but is based on recall information. However, the data that show workforce shrinkage (CMS PT data) and decreased acessions (ASCP BOC) are unlikely to be biased by sampling or otherwise.

We make the assumption throughout this account that the primary driver for cytotechnologist demand is the volume of Pap tests. However, the cytotechnology workforce serves many other roles, which are increasing in number and diversity, including managerial, service, and teaching cytotechnology skills in or outside the United States. However, the extent of this demand is not available beyond anecdotal information.

It is possible that we have underestimated the number of cytotechnologists who had annually separated in the historic model. Our model is based on an unweighted mean of annual separation since 1957. However, separation may vary during the years: recent separation may be higher than earlier separation, and the opposite may also be true. For example, an ASCP survey in 1969-1970 showed that new cytotechnologists worked for an average of 3.8 years before resigning for the first time. In comparison, we used ASCT data for years in practice for the years 2002-2007 and 2003-2008 and calculated 5-year separation rates of 30% and 8% for new entrants to the workforce in 2002 and 2003, respectively, which is far less than that of 1969-1970 separation of new entrants. How much of this finding is an artifact of sampling is difficult to determine. Without accurate data demonstrating the pattern of separations, we thought that the unweighted mean fairly represented historic separations. Again because of the ASCP BOC and PT data, an accurate separation rate can now be deduced from the accession and workforce size of 2006 and subsequent years.

The findings in this and our previous study could well represent a self-fulfilling prophecy or a preemptive reaction to what potentially is more serious than HPV cotesting or HPV vaccination, and that is the prospect of primary HPV testing. Should primary HPV and reflex cytology become the standard of care, the annual volume of Pap tests could be 10 million or less, rather than the current 68 million.

Conclusions

The cytotechnology workforce has shrunk and will remain stagnant for some time, perhaps until the current guidelines are effectively followed, then the demand will rise again in response to demographic trends, and this will continue as long as a primary HPV test is not introduced. Markets are ultimately self-correcting, and we are possibly experiencing the first phase of that correction. This is expected because during the last decade, emerging technology and revised screening guidelines have spurred discussion about the future of cytotechnology. The ASC and ASCP have led the effort in plotting the future for this unique and vital profession. An extra effort is needed to increase the number of...
survey participants and include the data concerning retirement and other separation. The most effective vehicle for this data collection would be through PT providers or the CMS.

Discussion and predictions regarding the cytotechnology market come from many sectors of the health care community. These stakeholders have diverse needs and perspectives and, sometimes, competing interests. They include cytotechnologists, cytotechnology students, program coordinators, Pap test providers, pathologists, and manufacturers. In the larger perspective, our economy and society as a whole are stakeholders who will ultimately demand cost-effective testing. These members of the cervical cancer screening community share a common interest of the greatest importance, the potential population of 60 million women to be screened. To quote Mark Stoler, MD, ASCP president, the discussion could be better brought into perspective with a focus on “patient centric care.”

“Abandoning the status quo and pursuing a strategy of patient-centered advocacy and optimized care may sometimes appear contrary to our own interests. But the status quo cannot continue. Just listen to the news. Economic pressures and the push for health care reform will ultimately force change. Right now we have a chance to do it right, but we must be willing to bring ourselves to the table and participate in the process.”

The basic microscopy skill of cytotechnologists is a core competency not duplicated in other allied health professions. That skill has played the central role in the remarkable reduction of cervical cancer in the United States and around the world. The challenge is to preserve a workforce (the last Mohicans) with this unique skill set while offering enough diversity to attract talented people to the profession as Pap test volumes decrease and new methods emerge.

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References