

The New Public Health Workforce: Employment Outcomes of Public Health Graduate Students

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ABSTRACT

Context: Much has been written about the public health workforce, but very little research has been published—and none in a peer-reviewed journal or other report since 1992—regarding the employment outcomes and employment sectors of graduate students pursuing public health as an area of study.

Objectives: Our objectives were to review the literature and analyze data regarding the employment outcomes of public health graduate students and to examine how public health schools and programs might respond to changes in the sectors hiring their graduates.

Design: We reviewed the literature regarding the employment of public health graduates; analyzed 5 years of graduate outcomes from Columbia University's Mailman School of Public Health using logistic regression; and we examined data collected by the Association of Schools & Programs of Public Health.

Participants: The study included data from surveys of 2904 graduates of Columbia University's Mailman School of Public Health, across 5 graduating cohort years, for whom there were employment sector data available for 1932.

Results: Much of the research on the public health workforce has defined it as governmental public health. Across each of 5 graduating classes from Columbia University's Mailman School of Public Health, the odds of for-profit sector employment increased by 23% (2012-2016), while hiring by government agencies declined or remained flat. Publicly available employment data from the Web sites of schools of public health and from surveys by the Association of Schools & Programs of Public Health show that hiring of new graduates by for-profit corporations now either closely matches or exceeds governmental hiring at many schools of public health.

Conclusions: Public health graduates are increasingly working outside of government, and additional analyses are required to determine whether core competencies of public health curricula reflect the needs of the employers that are hiring public health graduates today. Schools and programs of public health should invest in their career services offices and gather input from employers that are currently hiring their graduates, especially as the sectors hiring them may be changing.

KEY WORDS: employment, MPH, workforce

As a professional field of study, public health is designed to prepare graduates for the public health workforce. Indeed, most would agree that the function of schools and programs of public health is to create future leaders of this workforce.¹ While the definition and enumeration of the public

health workforce have been a matter of some debate,² in most cases the major focus of studies of the public health workforce has been on governmental public health (local, state, and federal health departments)^{3,4} since “public health may traditionally be thought of as the domain of government.”³ Moreover, core competencies of a public health education are primarily based upon input from governmental public health entities. Shifts away from governmental public health have implications for the competencies with which we equip public health graduates.

However, are public health graduates actually finding jobs in government? Very little data have been published regarding the employment outcomes of public health graduates, and these data have not been synthesized. To determine the employment outcomes of and sectors in which public health graduates are working, we undertook a literature review and conducted analyses of data regarding employment

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The employment outcomes surveys used by Columbia were approved by the IRB at Columbia University and all data were deidentified.

The authors declare no conflicts of interest.

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outcomes of public health graduates at Columbia University's Mailman School of Public Health, data from several other graduate public health schools, and data collected by the Association of Schools & Programs of Public Health (ASPPH).

Methods

Literature review

To find any published research on employment outcomes of public health graduates, we conducted a literature review from 2000 to present in PubMed: “public health employment,” “public health workforce,” “public health careers,” “public health personnel,” “public health personnel education,” “MPH employment outcomes,” “master of public health jobs,” “where do public health graduates get jobs,” and “career outcomes of MPH graduates.” We also conducted similar searches of *Journal of Public Health Management and Practice*, *AJPH*, and the *Annual Review of Public Health 2011-2016* and used Google for “MPH employment outcomes” for “gray” literature.

Columbia University and other data

Each graduating class of Columbia University's Mailman School of Public Health, from 2012 through 2016, was sent an e-mail survey (via SurveyMonkey until 2013, then via Qualtrics), upon graduation and then in the December following graduation, with up to 8 reminder e-mails sent to the graduates; there were 2904 graduates surveyed across the 5 years. In addition, for those students who responded that they were job seeking upon graduation and then never responded to follow-up surveys, additional data were collected from alumni correspondence with career services staff, from School's staff and faculty who could verify graduates' whereabouts, and from publicly visible information gathered from LinkedIn.com, following generally accepted protocols to gather such data, designed by National Association of Colleges and Employers.⁵

We analyzed associations between employment sector and graduation year using χ^2 tests of the association between graduation year and the organization type/industry. We also performed a Cochran-Armitage Trend Test for graduation year and employer organization, combining nonprofit and government organizations into 1 category and comparing it with for-profit organizations. We then used a logistic regression to analyze the odds of for-profit employment in graduating cohorts. Finally, to find any comparable employment outcomes data, we reviewed the Web sites of more than 100 Council on Education

for Public Health (CEPH)-accredited schools and programs of public health in the United States and also reviewed data gathered by the ASPPH.⁶ In their pilot survey year, data were submitted to ASPPH regarding 4867 graduates by 57 CEPH-accredited schools and programs of public health. This was the first effort of its kind in decades.

Results

Literature review

We reviewed a total of 91 articles, of which 12 focused on building partnerships between academic institutions and primarily government public health agencies; 6 focused on public health workforce shortages (primarily focusing on impending retirements in government); 30 focused on the training needs of the existing public health workforce, of which 24 defined the workforce as employees of local, state, or federal health departments; 23 on curriculum development for public health schools and programs; 17 on the definition and enumeration of the public health workforce; and 2 articles were broad-based reviews of the field of public health. No articles could be found—since 1992—that focused on the sectors in which graduates of public health degree programs actually found employment.

Much has been written about the demographic trends, training needs, and current skills of the existing public health workforce.⁷ Of the research conducted regarding how to develop a curriculum that matches the needs of the public health workforce, most focuses either exclusively or primarily on government and nonprofit organizations. For example, the *Council on Linkages Between Academia and Public Health Practice/Public Health Foundation Core Competencies*⁸ authors, and the Core Competencies Workgroup,⁹ are composed primarily of representatives from government or academia, with apparently no members from for-profit companies. The *ASPPH Framing the Future Task Force* (Blue Ribbon Employer Panel)¹⁰ included 96 employer panel contributors, of which only 3 (3.1%) were from for-profit industry. The *National Board of Public Health Examiners* survey to create the Job Analysis of the Certified in Public Health¹¹ included 4850 survey responses, of which 33.9% were from government, 7.3% were for-profit companies, and the rest primarily from academia, hospitals, and nonprofits.

In other large studies of public health workforce (Public Health Workforce Interests and Needs Survey, the 2015 Forces of Change Survey, and the 2010 report by US Department of Health & Human Services), the public health workforce was defined specifically as government public health, although many researchers

would define the workforce as “people who provide essential public health services, regardless of the nature of the employing agency.”¹² A prior comprehensive review of the literature found that “Nearly all of the literature obtained focused on the governmental public health workforce, with virtually no other references to or literature available on private sector public health workers.”¹²

On the contrary, the focus of most articles on MPH education is on how to prepare MPH graduates to work in local health departments/government public health¹³; there were a handful of articles focused on gathering employer input into the design of public health degree programs, but the main focus was research on the training needs and composition of the “public health workforce,” defined in about 80% of articles as governmental public health. Only 1 article¹⁴ discussed the lack of coursework offered by public health schools/programs regarding for-profit industry.

Although no recent published articles could be found in the peer-reviewed literature regarding where public health graduates have found employment, some data are still available. The authors used 3 main sources of data: 5 graduating cohorts’ worth of employment outcomes data collected by Columbia University’s Mailman School of Public Health; the publicly visible information reported on public health schools’ Web sites; and the new employment outcomes data collection conducted by the ASPPH. We were also provided with 2 prior reports of employment outcomes of public health graduates, 1 from 1982¹⁵ and 1 from 1992.¹⁶

Columbia University data

Of the combined 2904 surveyed across the 5 cohorts, there were 621 nonresponders/unknowns,

109 unemployed/seeking, 35 not seeking by choice, 186 continuing study, and 1950 employed, of whom there were 1932 for whom the employment sector was known.

At the Mailman School, there has been an increase in the proportion of graduates finding “first destination” employment in for-profit sectors (including consulting, pharmaceuticals, insurance, and other for-profit companies such as technology and marketing firms) and flat hiring by government. The total share of graduates (of those graduates who were employed and whose employment sector was known) working in for-profit companies in 2012 was 13.51%, and government was 15.14%; but by 2016, the share going into for-profit companies was 31.46% and government was 11.57% (Figure). Percentages listed in the figure are of the total number of graduates who were employed and whose employment sector was known.

In analyses of associations between employment sector and graduation year, a χ^2 analysis of the association between graduation year and the organization type/industry demonstrated significant differences across years ($\chi^2 = 33.29$, $P < .001$). A further Cochran-Armitage Trend Test for graduation year and employer organization type was conducted, combining nonprofit and government organizations into 1 category and comparing it with for-profit organizations ($T = 5.27$), with a negative linear trend—as graduation year moves from 2012 to 2016, the percentage of students working in for-profit organizations increases. In addition, a logistic regression analysis showed a 1.23 (95% confidence interval [CI]: 1.13-1.33) greater odds of for-profit employment with successive graduating cohorts.

Statistical analyses of employment outcome, particularly employment in for-profit organizations, were performed using 1782 observations after exclusion

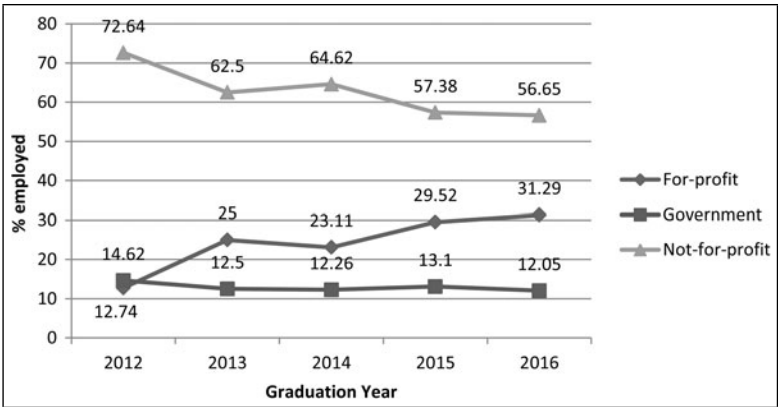


FIGURE Percentage of Mailman School Graduates Employed by Sector and Graduation Year^a
^aData indicate the percentages of Mailman School graduates who found their first employment after graduation in different sectors for the graduating cohorts of 2012, 2013, 2014, 2015, and 2016. Percentages are of the total number of graduates who were employed and whose employment sector was known.

of those with missing value for age, employment status, and organization type. Logistic regression was conducted using probability of becoming employed in a for-profit organization as the outcome. Significant predictors were graduation year (odds ratio [OR] = 1.20, 95% CI = 1.11-1.30), US citizenship, with citizens being less likely to find employment in the for-profit sector than noncitizens (OR = 0.49, 95% CI = 0.38-0.63), MPH/MS status (OR = 2.14, 95% CI = 1.51-3.03), and department for crude analyses. In adjusted models, controlling for department, degree type, and citizenship, several predictors were associated significantly with employment in for-profit organizations: graduation year (OR = 1.19, 95% CI = 1.09-1.29), US citizenship (OR = 0.52, 95% CI = 0.39-0.69), MPH/MS status (OR = 2.54, 95% CI = 1.76-3.68), and department ($\chi^2 = 78.58$, $P < .001$). Test for goodness of fit suggested that the model fit the data well ($\chi^2 = 6.28$, $P = .711$). The odds ratio of being employed in a for-profit company for a student who graduated 1 year later is 1.185 (95% CI: 1.09-1.29) times the odds of being employed in a for-profit company for a student who graduated this year, controlling for department, MPH/MS status, and US citizenship.

Data from CEPH-accredited schools' and programs' Web sites and ASPPH

Although all schools and programs that are accredited by the CEPH must report employment data to CEPH, the data schools and programs must report are very basic (including number of graduates who are employed, unemployed, continuing their studies, unknown/nonresponders, etc) and do not include information about employment sectors. There are also no standards regarding how such employment data should be publicly presented by public health schools or programs.

Of the 101 CEPH-accredited schools and programs of public health in the United States that were reviewed at the time of this study, only 11 schools had publicly visible, by-industry employment data listed on their Web sites. Industry definitions were not typically provided but we assume that they are relatively similar across schools. To simplify the analysis, we combined various sectors into 3 categories—government (city/county, state, federal, military, and international); nonprofit (including health care system, hospital/HMO/clinic, research/university/institute, nonprofit/CBO/national association, or NGO), and for-profit (consulting firm, corporation/private industry, biotech/pharmaceutical, industrial/manufacturing, health insurance/managed

care, private practice). There are certain categories that could overlap, for example, while the majority of hospitals in the United States are nonprofits, some are for-profit and some are government-run; some insurance firms are nonprofits. We attempted to follow the ASPPH pilot survey data collection definitions where possible.

In the ASPPH pilot survey's 2014 data for master's graduates (which could include MPH, MHA, MS, etc), overall governmental hiring was 19.4% and for-profit hiring was 17%. In this survey, there was more granularity requested in the data regarding government employment than any other category; there were 9 subcategories for government employment, but no subcategories for nonprofits, and 4 subcategories for for-profits.

In the much older reports from 1982 and 1992, government hiring was indeed a much greater share of the employment; in the 1982 US Department of Health report, which analyzed public health graduates from 1978 and 1979, a total of 51.9% of graduates found employment in government, 23.9% in the "voluntary" (nonprofit) sector, 13% in "proprietary" (for-profit), and 11.2% in "other" settings.¹⁵ In the 1992 Association of Schools of Public Health longitudinal study of graduates, 41.6% of graduates from the classes of 1956-1965 found their first employment after graduation in "health departments" and 5.4% in "industry," while in contrast, 17% of the classes of 1976-1985 found their first employment in health departments and 15.1% in industry (with the remaining graduates finding employment in "medical care," or "education," the only 2 other categories listed).¹⁶ From this, it appears that government was a larger employer of public health graduates in the past.

According at the publicly visible employment outcomes data available from the Web sites of Boston University, Columbia University, Emory University, Harvard University, New York University, Tufts University, UC Berkeley, University of New England, University of Michigan, University of Pittsburgh, and Yale, it was found that in 6 of 11 individual schools, for-profit hiring exceeded government hiring in the most recent year reported, sometimes by a wide margin (Table), and government was 17% or less of the hiring in 9 of 11 schools. It is important to note that some schools indicated that their data pertained to the MPH specifically, and others did not, so data on MPH, MS, MHA, and PhD or DrPH graduates may be included, and most schools did not list raw numbers of graduates surveyed, numbers for whom data could be found, or numbers of graduates by department. None of these data pertains to undergraduate degrees. Of all the schools of public health that listed data on their Web sites, only 4 listed multiple years of

TABLE
Employment by Sector and School of Public Health^a

	Boston University (2016)	Columbia University (2015)	Emory University (2016)	Harvard University (2016)	NYU (2016)	Tufts University (2016)	UC Berkeley (2017)	University of New England (2017)	University of Michigan (2014)	University of Pittsburgh (2016)	Yale (2017)	ASPPH Pilot, 2014
Overall percentage for-profit	30%	29%	25%	11.9%	9%	8.6%	18%	10.5%	27.9%	7%	43.2%	17%
Overall percentage government	14.1%	13%	33%	8.2%	9%	16%	17%	42.1%	12.6%	14%	12.6%	19.4%
Overall nonprofit	56.2%	58%	43%	53%	82%	75.3%	64%	47.3%	59.5%	79%	44.2%	55.4%

^aData was collected from any publicly visible reports on the Web sites of schools of public health after a search of 101 CEPH-accredited schools and programs of public health. Most reports were specifically for MPH graduates but some did not indicate whether the population was MPH, MPH plus PhD, etc and did not list the number of graduates by academic department. Sectors included in for-profit: proprietary firm, consulting, pharmaceuticals, insurance, IT, private practice/self-employed. Sectors included in non-profit: academia/university/research, hospital/health care, nonprofit/NGO. Sectors included in government: local/state/tribal, federal government, military. Boston University: did not indicate number of respondents, only percentages. Columbia University: 533 surveyed; 430 indicated sector of employment. All degrees combined. Emory University: 527 surveyed; 371 indicated sector. All degrees combined. Harvard University: 550 surveyed; 294 indicated sector. All degrees combined. NYU: 50 surveyed; 43 indicated sector; degree/department not indicated. Tufts University: Did not indicate number of respondents, only percentages. UC Berkeley: Did not indicate number of respondents, only percentages. University of New England: 170 surveyed; 106 respondents; number of employed respondents whose industry is known is not indicated. University of Michigan: 379 surveyed; 299 indicated sector. Degree level not indicated. University of Pittsburgh: 168 surveyed; 136 indicated sector. Master's level only analyzed. Yale: 119 surveyed; 95 total for industry known. Degree level not indicated. ASPPH: Total of 4867 graduates. Master's level only analyzed. The ASPPH pilot survey did not clearly give the number of respondents who went into different sectors, separated by degree; they gave only overall number respondents, and percentages who went into different sectors, by degree level.

employment outcomes, and no clear trend was visible in terms of increases in hiring by for-profit companies, indicating that there is a chance that changes observed at Columbia may be specific to Columbia. More research into employment trends would be valuable.

Discussion and Conclusion

This set of analyses adds a critical dimension to the discussion of the future of our public health workforce by presenting compelling data on the present employment trends of public health school graduates. We used a combined approach of a literature review, analyses of Columbia University employment outcome data, and data from other schools of public health in the United States.

Limitations

Because of the changes in survey design and survey methodology, the analyses of Columbia data are subject to some limitations. The knowledge rate increased from 48.37% in 2012 to 93.72% in 2016, and the analyses of data are based on the assumption that the distribution of employed organization type was the same for individuals with missing data and for those with known information. If selection bias was an underlying issue and the resulting data were unequally distributed, this would have a large impact on the 2012 and 2013 data.

Trends in employment and competencies

If core competencies for public health graduate programs are based primarily on research on governmental agencies, which now comprise between 9% and 19% of employers hiring public health graduates at several schools and the ASPPH pilot data, perhaps future research on core competencies should attempt to gain more insight from other sectors. There are many possible reasons why there may be a trend toward public health graduates finding employment outside the traditional public health fields.

Industry growth rates

The US Department of Labor's Bureau of Labor Statistics data show government either shrinking or growing more slowly than most other sectors in the next several years,¹⁷ with the federal government expected to shrink by 1.6% per year (2 406 500 jobs), and state/local government to grow by only 0.5% (20 032 200 jobs), whereas professional/business services are growing by 1.8% (21 413 000 jobs expected by 2022) and health care/social assistance growing

2.6% (21 965 000 jobs). Also, the reported shortage of epidemiologists does not match with US Department of Labor statistics on the growth of this particular occupation.¹⁸ Anticipated retirements from government have been a source of concern for decades, but new hiring to replace the wave of retirees has not apparently transpired. Changes in job markets and issues with cuts to local health departments and other labor economics issues^{7,19} may have meant that governmental public health departments are shrinking because of retirements and that workers are not being replaced.

Increased enrollments mean that public health graduates must find work outside traditional public health sectors

The number of CEPH-accredited schools and programs offering public health degrees nationally has increased from 28 schools and 43 programs graduating approximately 5500 master's level students per year in 2001²⁰ to 163 CEPH-accredited schools and programs as of 2015, and with 11 932 master's graduates from 90 ASPPH-reporting member institutions in 2017.²¹ Within Columbia University's School of Public Health, the graduating class grew from 521 in 2012 to 669 in 2016. Considering the increased enrollments over time, the actual number of public health graduates entering government may actually be increasing, even if the proportion of graduates entering government is flat over time, but, combined with the slower growth of government employment, as compared with the rest of the economy, it seems very possible that government simply cannot absorb the increased numbers of public health graduates in the workforce.

Salary differentials

Differences in salaries among industries could deter graduates from considering government careers. The relatively lower pay in government employment, as compared with private and sometimes even nonprofit employment, may be a large factor for students in choosing which job offers to accept. The evaporation of previously common benefits in government such as tuition remission/loan forgiveness, the lower starting salaries, and the possible decline in job security (especially in local government health departments, which saw large-scale layoffs during the 2008 recession) may have dissuaded students from pursuing government employment. Data from Columbia University's Mailman School of Public Health (class of 2016) indicate that government pays among the lowest starting salaries of all sectors, an average of approximately \$5000 less than the industry-wide salary average

for MPH graduates. This could also provide some explanation, if the increase in hiring by for-profit companies has increased solely at Columbia, because 67% of Mailman School graduates are employed in the relatively expensive New York City metropolitan area, and while it contains a large and well-regarded health department, New York City has comparatively fewer federal or state government jobs.

The *generation gap* between “Millennial” generation graduates and the increasingly aging public sector workforce may cause generational differences in values or interests.²² The office of personnel management states that the average age of a federal government employee is 47.5²³ and 60.4% of federal employees are 45 years of age or older, and the Bureau of Labor Statistics states that the median age of the overall workforce is 42.2 years but the median age for public administration employees is 45.6 years,²⁴ the second oldest employed population by industry after agriculture. Purely because younger employees might share similar interests with others in a similar age range could explain a preference for careers outside government, but students also report a desire for a fast pace of change, the opportunity to see immediate impact, and access to the newest technology, which may not always be available in government workplaces. In addition, government sector employment may take substantially longer to secure compared with private sector employment, is subject to hiring freezes, and may have specific application requirements (eg, specialized resume designs, examinations, and security clearances) that the private sector does not. A study by Deloitte found that “Young workers interested in public service have innovative new types of careers and employers to choose from, including social entrepreneurship, corporate citizenship jobs, and NGOs.”²⁵ More research is needed to determine whether younger public health graduates have specific preferences when choosing which sectors to consider for employment.

Changing demographics of public health students

The composition of graduates in terms of age, race/ethnicity, gender, citizenship/work authorization, or prior work experience may have changed. According to the Institute of International Education,²⁶ there is a national trend of increasing international student enrollment for colleges, with almost doubled total number of international students in 2015-16 (1 043 839) as compared with the number in 2005-06 (564 766), and their ability to work in federal government, and often in local or state government, is very limited. The percentage of international students enrolling in

reporting ASPPH institutions increased from 13.48% in 2010 to 15.05% in 2017.²¹

Changes in the actual degrees being offered and/or changes in departmental enrollment could impact hiring. At Columbia University, there was a positive association between finding employment in a for-profit organization as compared with other types of organizations for biostatistics and health policy and management graduates; logistic regression suggested that, after controlling for the graduation cohort, citizenship, and degree type, department is a significant predictor for the odds of becoming employed in a for-profit organization, with the odds for students from the health policy and management department being as high as 8.350 (95% CI: 4.851-14.373) times the odds for students from the population and family health department, following by biostatistics department with an odds ratio of 7.126 (95% CI: 3.844-13.210). However, as mentioned, we did still find a trend toward for-profit employment after any enrollment changes were accounted for.

Career services efforts

The Mailman School's Office of Career Services expanded its employer outreach efforts starting in 2013, bringing thousands of new employer records to its database. These efforts were informed by surveys of student interests, so student demand could have led to greater outreach to certain types of employers.

Students' skills gaps

Possibly, governmental public health employers find that graduates of public health programs do not have all the skills necessary for their needs, and additional collaborations are needed between schools and programs of public health and health departments to fill a skills gap.¹³ This is certainly an area for further research.

This study highlights the dearth of research on the actual employment outcomes of public health graduate students and the need to make better connections between the organizations that are currently hiring these graduates and the schools offering the degrees they pursue. With the new data collections for public health graduates' employment outcomes being conducted by the ASPPH, perhaps new insights will be uncovered regarding whether there are national trends in the employment of public health graduates. What seems clear is that many graduates are entering less traditional sectors, and that schools and programs of public health would be well served by investing in their career services and field practice offices—the vital link between schools and their

Implications for Policy & Practice

- At Columbia University and nationally, a minority of public health graduate students are now entering government as their first sector of employment. At Columbia, an increasing number are entering for-profit employment. The skills that students of public health offer are in high demand by employers in a broad range of sectors and industries.
- Most research on the public health workforce defines it as governmental public health. Further research into the non-governmental public health workforce and the competencies needed by this workforce are needed.
- As public health challenges become more complex, they are likely to require broad-based, cross-sector solutions. There could be positive value to adding a public health lens to for-profit organizations that may be increasingly hiring public health graduates.
- Schools and programs of public health would be well advised to invest further in their career services offices, which are well positioned to gather input from the employers that actually hire their graduates, so that they can best work together with employers to build the public health workforce of the future.

employer partners—to provide feedback on the curriculum and to ensure that students are best prepared to enter the new public health workforce.

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