

Christopher H. Myers

## The Demography of Royal Navy Surgeons: Some Views on the Process of Prosopography

### Abstract

This study is a brief social biography and demography of British naval doctors during the nineteenth century, asking why Scottish-educated surgeons were so prominent. Understanding the demography and changing dynamics of naval surgeons' labor illuminates the complex relationship between the military, discrimination, education, and nationality that shaped this influential labor market. This study reviews how to collect demographic information from multiple types of sources: university archives, matriculation records, digitized medical journals, and student rolls. It also uses chi-square tests to show the significance of the demographic information collected. The results show us the entangled relationship between database conceptualization, data collection, and data analysis.

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In January 1850, the medical journal *The Lancet* protested against Scottish surgeons' "clannish" domination of the Royal Army and Navy medical services, claiming that 55% of Inspectors and Surgeons, and 71% of Assistant Surgeons appointed during the 1840s were Scottish.<sup>1</sup> As *The Lancet's* invective begins to indicate, references to Scottish surgeons' presence in the Royal Navy from the Victorian period are often partisan and shifting. The issue of Scottish surgeons' representation in the Navy appears to have implications for the nature of domestic and naval medicine. My project uses a quantitative, data-driven approach to naval medical officers' demographic backgrounds in the hope of shedding new light on broader developments in naval and British medicine, especially in relation to education and professionalization.<sup>2</sup>

My efforts to understand naval medical officers' backgrounds have raised several issues related to conceiving, framing, approaching, and making sense of their demography. I had to look well beyond the Royal Navy to factors including sub-national identities, ethno-national discrimination, medical education and labor dynamics to help explain naval surgeons' demography. I found that the broader societal lenses of British medical education and labor dynamics best help to make sense of these demographic trends. In the process, I have embraced several of the CHIA project's research goals related to the incorporation of varying research methods and scales into world historical projects.<sup>3</sup>

### The Process of Conceiving and Constructing a Mixed-Source Database:

I became interested in naval medicine after discovering that the Royal Navy adopted quinine as a tool of new imperialism based on Scottish naval surgeons' work fighting epidemics on the antislavery West African Squadron and Niger Expeditions from the 1830s to the early 1850s.<sup>4</sup> Drawn in by the moral and intellectual complexities of abolitionism and imperialism's relationship, I wondered why Scottish doctors were the ones who experimented with quinine. While recent work on military medicine has investigated the background of army surgeons, the dynamics behind naval medical officers' demography have not been adequately explained.<sup>5</sup>

As I approached this issue, I began to think of naval surgeons as a group that lent itself to a prosopographical, data-driven quantitative analysis.<sup>6</sup> With advice from professors who have constructed databases, and my sociological training's focus on contextualizing research questions and analysis in mind, I adopted a flexible approach to data collection.<sup>7</sup> I constructed my database based on open-ended hypotheses about surgeons' national

distribution and career markers. The prosopographical approach of Ackroyd *et al* served as a model for what variables and factors to investigate and led to my focus on career measures such as appointment and promotion dates, demographic characteristics and, most critically, nationality and education.<sup>8</sup>

Using the historical structure of the Naval Medical Department as my base, I determined my study population: medical officers who entered the Navy between 1815 and 1870. I then began constructing a list identifying the surgeons from that period from the quarterly published *Navy Lists*.<sup>9</sup> I collected their names, appointment, promotion and dropout years, moving by five-year intervals from 1815 until they all left the Navy. Time management and data representativeness guided my collection approach, especially my decision to process the lists in intervals. Given the labor-intensive task of biographically identifying surgeons, processing all 220 *Navy List* versions was unrealistic.<sup>10</sup> I also dropped non-career surgeons (those that served less than five years) from my study since they were the hardest to identify, and could skew the data of career naval surgeons.

The most labor-intensive step in constructing my database was compiling demographic information. I began by searching for surgeons' biographical details through mixed-source triangulation.<sup>11</sup> I first looked for secondary sources containing surgeons' personal information and then proceeded to digitally search primary journals and manuscripts available through Google Books. I identified the nationality and education of 65 to 70% of the surgeons primarily from sources such as primary reports on educational examinations and awards, university student rolls, and national medical registers.<sup>12</sup> I looked primarily at whether surgeons were Scottish, English, Irish, Welsh, or Colonial, and what institutions they attended for their medical education. My primary data collection principle was specificity since variables can be more easily recategorized into shared groups than broken apart by recollecting data.

In terms of primary archival research, I decided to focus my attention to the University of Edinburgh's educational records for several reasons. First, my analysis was primarily concerned with Scottish students who entered the Navy, many of whom received their education at Edinburgh. Second, Edinburgh was one of the leading British medical schools during my period of study. Third, I had greater success finding information on surgeons' education than nationality. Fourth, I had already conducted exploratory research in Edinburgh's records, which hold surprisingly detailed nineteenth-century student records.<sup>13</sup> I found an additional 20% of the surgeons along with their years of attendance in the matriculation indices during my return research visit without massively overextending myself.

### **The Process of Analyzing and Contextualizing Mixed-Source Data:**

The decision to tailor my archival research to Edinburgh created methodological issues that I had to consider during data analysis. Relying on the Edinburgh records introduced representativeness problems, which potentially skewed my data. Additional missing data issues also emerged since I could not identify 10% of the surgeons. The majority of those missing were skewed toward the early part of my study. I also likely missed secondary places of education for many surgeons. Additional research using other schools' student records would partially address these issues, but limited time and funding has made this impractical.

Prosopography's research designs often introduce similar questions of uncertainty and error due to the varying amounts of data left behind about individuals and a lack of uniformity in data collection. Hypothesis testing's dependence on data quality also plays a role.<sup>14</sup> I must therefore be careful to discuss the limitations and statistical power that my data offer for historical analysis and draw out trends and magnitude rather than relying solely on exact statistical tests performed on my data.<sup>15</sup> For example, given the issues noted above, I must critically examine

the reliability, applicability, and assumptions of chi-square, analysis of variation, and OLS-derived multiple regression tests before using them.

I completed cross-tabulations showing my conclusions regarding surgeons' nationality and education. As shown in Table 1, the majority of those medical officers who entered between 1795 and 1830, especially those who rose to the leadership ranks, were Scottish (Lower: 44.7%; Upper: 41.8%; Leadership Ranks: 62.5%). On the other hand, Irish surgeons who entered during that period were relegated to the lower ranks (Lower Ranks: 22.8%). From the 1830s onward, there were several shifts in the ethnic distribution of medical officers. Of those who entered between 1830 and 1850, English surgeons took over the majority of the lower and upper ranks from the 1840s onward (Lower: 45.9%; Upper Ranks: 51.7%). Scots continued to dominate the leadership ranks through the 1850s (Leadership Ranks: 58.3%). However, those Scottish surgeons who entered the Navy between 1850 and 1870 failed to maintain control of the leadership ranks (Leadership Ranks: 25.0%). They especially fell behind the Irish who took over the lower ranks from the 1850s onward, and rose to dominate the higher ranks in the later nineteenth century (Lower: 41.6%; Upper: 48.7%; Leadership Ranks: 58.3%).

		Scottish	English	Irish	Total
		N (%)	N (%)	N (%)	N
Lower Ranks	1795-1829	106 (44.7)	77 (32.5)	54 (22.8)	237
	1830-1849	118 (31.9)	170 (45.9)	82 (22.2)	370
	1850-1870	84 (21.3)	146 (37.1)	164 (41.6)	394
Upper Ranks	1795-1829	23 (41.8)	23 (41.8)	9 (16.4)	55
	1830-1849	37 (25.9)	74 (51.7)	32 (22.4)	143
	1850-1870	22 (19.5)	36 (31.9)	55 (48.7)	113
Leadership Ranks	1795-1829	15 (62.5)	8 (33.3)	1 (4.2)	24
	1830-1849	7 (58.3)	3 (25.0)	2 (16.7)	12
	1850-1870	3 (25.0)	2 (16.7)	7 (58.3)	12

**Table 1. Ethnic Background of Royal Naval Medical Officers Who Served from 1815 to 1870.<sup>16</sup>**

Early-nineteenth-century Scottish domination of the medical ranks is decisive to the point that its magnitude confirms the general trend despite data issues and smaller sample size at the higher ranks. The decline in Scots' representation across the ranks from around 1850 is also evident, but more difficult to explain. While the lag time from entry to promotion explains Scots continued increased representation at the higher ranks, I have been unable to explain the timing of these changes based on nationality and discrimination.<sup>17</sup> This conclusion highlights the

importance of framing results based on historical and social context, especially since prosopography works best when read against a qualitative picture of society.<sup>18</sup> I would have missed the more important societal connections if I had accepted the conclusions regarding naval surgeons' nationality at face value.

When I analyzed naval surgeons' educational backgrounds, I found a more broadly relevant socio-economic pattern. As shown in Table 2, the University of Edinburgh was the largest educator of surgeons who entered the Navy between 1795 and 1830, particularly of those who stayed in the lower ranks (Lower: 49.8%; Upper Ranks: 29.3%). The other Scottish universities contributed a large number of surgeons in the early nineteenth century, including the majority of those rising to the upper ranks through the 1850s (Upper Ranks: 45.1% & 40.3%). While Edinburgh's dominance as a single institution is impressive, Scottish schools as a group educated the majority of naval surgeons through the 1830s. These findings point toward both a correlation between nationality and education, and a process more complex than discrimination.

		Lower Ranks	Upper Ranks	All Ranks
		N (%)	N (%)	N (%)
1795-1829	University of Edinburgh	120 (49.8)	24 (29.3)	144 (44.6)
	Other Scottish Schools	39 (16.2)	37 (45.1)	76 (23.5)
	Irish Medical Schools	23 (9.5)	1 (1.2)	24 (7.4)
	English Medical Schools	59 (24.5)	20 (24.4)	79 (24.5)
1830-1849	University of Edinburgh	103 (27.3)	29 (18.2)	132 (24.6)
	Other Scottish Schools	100 (26.5)	64 (40.3)	164 (30.6)
	Irish Medical Schools	35 (9.3)	12 (7.5)	47 (8.8)
	English Medical Schools	139 (36.9)	54 (34.0)	193 (36.0)
1850-1870	University of Edinburgh	60 (15.0)	17 (13.1)	77 (14.6)
	Other Scottish Schools	77 (19.3)	33 (25.4)	110 (20.8)
	Irish Medical Schools	145 (36.3)	47 (36.2)	192 (36.3)
	English Medical Schools	117 (29.3)	33 (25.4)	150 (28.4)

**Table 2. Primary Place of Education of Royal Naval Medical Officers Who Served from 1815 to 1870.<sup>19</sup>**

Scottish-educated naval surgeons' high level of representation during the early-nineteenth century can be explained by analyzing medical education and professional overcrowding from the later eighteenth century onward. Edinburgh and Glasgow's medical schools rapidly expanded after the 1780s to meet demand during the Napoleonic Wars. The transition to peace flooded the labor market and continued oversaturation of the Scottish labor market

forced medical students to look to England, Ireland, the armed forces, and farther abroad for employment. Of the roughly 3,200 students attending the leading British medical schools in the early 1820s, roughly 60% went to the Scottish universities. Many Scottish-educated students thus considered naval service as an employment option.<sup>20</sup>

Starting in the 1830s, surgeons' educational backgrounds began to shift. As shown in Table 2, those surgeons entering naval service between 1830 and 1850 had greater educational parity. English-educated surgeons from that period had a small majority in overall representation (Lower: 36.9%; Upper Ranks: 34.0%). While Edinburgh still educated many naval medical officers, the proportion of Edinburgh-trained surgeons who entered during the 1830s and 1840s fell dramatically (Lower: 27.3%; Upper Ranks: 18.2%). In comparison to the previous period, those surgeons educated at other Scottish schools who entered during the 1830s and 1840s were more likely to remain in the lower ranks (Lower: 26.5%, +10.3%; Upper Ranks: 40.3%, -4.8%). Scottish and Edinburgh-educated surgeons' representation continued to decline for those entering service from 1850 to 1870 (Other Scottish- Lower: 19.3%; Upper: 25.4%; Edinburgh- Lower: 15.0%; Upper Ranks: 13.1%). Irish-trained surgeons ultimately came to dominate after overtaking both their Scottish and English-educated counterparts (Lower: 36.3%, Upper: 36.2%).

Although Edinburgh and Glasgow drove down their medical student enrollments during the 1830s, nearly half of the new naval surgeons remained Scottish-educated through 1850.<sup>21</sup> Nonetheless, many Scottish-educated students came to see the Navy as an option of last resort for employment as their opportunities improved and naval service conditions remained poor.<sup>22</sup> Fewer Scottish and Edinburgh students joined the Navy, and Scottish-educated surgeons lost their institutional domination. Meanwhile, education in provincial England, the London hospitals, and Dublin expanded rapidly. The resulting increased competition drove more English and Irish-educated students to enter the Navy from the 1840s onward despite the unfavorable but improving conditions.<sup>23</sup> The growth of English medical education began to level off in the late 1850s. While the medical profession remained overcrowded, the severity of the problem was not growing as precipitously as during the 1830s and 1840s. This meant that fewer students educated there entered the Navy. Meanwhile, the instability in the Irish medical market following the Great Famine and subsequent boom in Irish medical education forced more Irish-educated surgeons to enter the Navy from the mid-1840s onward.<sup>24</sup>

### Reflections & New Directions for Analysis:

When I committed myself to prosopographically analyzing Victorian naval surgeons' demography, I did not foresee how time consuming and broad ranging this project would become. While I have spent considerable time constructing my database, and considering the methodological issues that arose during the process of data aggregation and analysis, these have ultimately been the least problematic and laborious issues I have had to confront. While I had to construct an individual-level database to address naval surgeons' demography, I could only complete my analysis by determining which socio-economic and cultural factors impacted surgeons' decision to enter and stay in the Navy. In order to come to any meaningful conclusions with implications for naval and domestic medicine, I therefore have had to immerse myself in discussions of British nationality, medical education, and labor market dynamics. My institutional, national, and sub-national study has thus followed the CHIA initiative's process of world-historical analysis, expanding in scope from data ingest and aggregation to analysis and visualization.<sup>25</sup>

Another link between my project and the CHIA initiative is that the type of national, regional, and global data that is likely to become part of the repository would help me consider the broader Victorian socio-economic and political factors impacting naval medicine. Detailed British sub-national population, education, and wealth distribution data for the nineteenth century would help me refine and expand my analysis of how the demography of



naval medicine impacted and was shaped by British medical education and the medical labor market. For example, I could readdress the issue of medical oversaturation, using two previous calculations of the population per medical professional in mid-nineteenth-century Britain as a starting point. I could introduce new variables such as regional distribution of education and wealth into the calculations, which have not been explicitly considered previously.<sup>26</sup> More general data on British education and the labor market could also allow me to shed light on whether my findings hold true for the British medical profession as a whole.

I see several other directions for moving forward with my analysis of the demography of Victorian naval surgeons. First, I can carry out new statistical analysis on the impact of nationality and education on surgeons' careers, especially their length of service and time to promotion. This would allow me to assess the effects that Scottish domination of the leadership ranks had on naval medicine's institutional dynamics. I could also reevaluate the question of discrimination. Second, I can nuance my analysis by using additional anecdotal and numerical references related to Scottish and Irish surgeons. The two relevant areas of recent scholarship focus on naval medicine during the Napoleonic Wars and on the dynamics of medical migration during the mid-to-late nineteenth century.<sup>27</sup> While my findings generally agree with most of this recent work, I have introduced a greater understanding of the magnitude, course, and dynamics of Edinburgh-educated students' domination of naval medicine in the early nineteenth century and subsequent collapse.

In terms of new data analysis, there are two separate directions in which I could proceed. While working with Edinburgh's matriculation records, I found that they recorded students' class registrations, and degree candidates' exam questions and scores. I created two sub-databases containing the classes that Edinburgh-educated naval surgeons attended, and the exam questions and results of those that graduated.<sup>28</sup> Statistical analysis of these two sub-databases could shed light on Edinburgh's importance to naval medicine and British medical education. Given significant additional research funding and time, I could also return to Britain and Ireland to collect additional data from the student records of the London medical hospital schools, the other Scottish universities, and Trinity College. This would greatly increase the reliability of my data and allow for more sophisticated and precise statistical tests and conclusions.

**Acknowledgements:** A research grant from the History Project, administered and supported by the Harvard-Cambridge Joint Centre for History and Economics and the Institute for New Economic Thinking, made possible the archival research that contributed to the database used in this article. The University of Pittsburgh's Department of History, European Studies Center, and Andrew W. Mellon Pre-Doctoral Fellowship have generously funded my broader dissertation research.

## NOTES

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<sup>1</sup> Anon, "Intelligence," *The Lancet* 55, no. 1378 (January 26, 1850): 136.

<sup>2</sup> For the seminal works on nineteenth-century medical professionalization, see Noel Parry, and José Parry, *The Rise of the Medical Profession: A Study of Collective Social Mobility* (London: Croon Helm, 1976); M. Jeanne Peterson, *The Medical Profession in Mid-Victorian London* (Berkeley: University of California Press, 1978), esp. chs. 1, and 3-6; Irvine Loudon, *Medical Care and the General Practitioner, 1750-1950* (London: Clarendon Press, 1986), part 2. For medical education in British context, see Peterson, ch. 2; Charles Newman, *The Evolution of*

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*Medical Education in the Nineteenth Century* (Oxford: Oxford University Press, 1957). See also some chapters from F.N.L. Poynter, ed., *The Evolution of Medical Education in Britain* (Baltimore: Williams and Wilkins Co., 1966); Vivian Nutton, and Roy Porter, eds., *The History of Medical Education in Britain* (Atlanta: Rodolpi, 1995). For professionalization in naval medicine, see David McLean, *Surgeons of the Fleet: The Royal Navy and its Medics from Trafalgar to Jutland* (New York: I.B. Tauras, 2010), chs. 1-2; Christopher R.H. Penn, "Sir William Burnett and the Medical Staffing of the Royal Navy, 1815-1856," (MA Thesis, University of Exeter, Aug. 2001), West Sussex Record Office, Add. Mss. 52638, chs. 3-5.

<sup>3</sup> For the role of technology and computing in the construction of world historical data and the unification of social scientific analysis, see Patrick Manning, *Big Data in History* (London: Palgrave Pivot, 2013), 25-27. For a discussion of the roles of varied scales of analysis and aggregating local data in the process of collecting world historical data, see Manning, 30-31, and 41.

<sup>4</sup> See seminal works: Philip D. Curtin, *The Image of Africa: British Ideas and Action, 1780-1850*, vol. 2 (Madison: University of Wisconsin, 1964), chs. 12-14; Daniel R. Headrick, *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century* (New York: Oxford University Press 1981), ch. 3.

<sup>5</sup> For the study on army surgeons, see Marcus Ackroyd, Laurence Brockliss, Michael Moss, Kathryn Retford, and John Stevenson, *Advancing with the Army: Medicine, the Professions and Social Mobility in the British Isles, 1790-1850* (New York: Oxford University Press, 2007). For the most recent works generally discussing naval surgeons' backgrounds, see McLean, 25; Matthew Kaufman, *The Regius Chair of Military Surgery in the University of Edinburgh, 1806-55* (New York: Rodolpi, 2003), 79-82 & 225.

<sup>6</sup> Prosopography is the use of individual biographical information in organized collective quantitative analysis of a population sharing a common characteristic. Koenraad Verboven, Myriam Carlier, and Jan Dumoyln, "A Short Manual to the Art of Prosopography," in *Prosopography Approaches and Application: A Handbook*, ed. K.S.B. Keats-Rohan, (Oxford: Occasional Publications UPR, 2007), 39-41. K.S.B. Keats-Rohan, "Biography, Identity, and Names: Understanding the Pursuit of the Individual in Prosopography," in *Prosopography Approaches and Applications*, 143.

<sup>7</sup> See Melissa A. Hardy, and Alan Bryman, "Common Threads among Techniques of Data Analysis," in *The Handbook of Data Analysis* (London: Sage Publications, 2004), 5; Jane E. Miller, *The Chicago Guide to Writing About Numbers* (Chicago: University of Chicago Press, 2004), 11-13, 219, 238, and 244.

<sup>8</sup> Ackroyd, *et al.*, v, 15-19, and Appendices 1 and 2; Verboven, *et al.*, 55-56.

<sup>9</sup> Keats-Rohan, 146-147; Admiralty, *The Navy List* (London: 1815-1905).

<sup>10</sup> Verboven, *et al.*, 51-52, and 58; Keats-Rohan, 147-150.

<sup>11</sup> Keat-Rohan, 147; Verboven, *et al.*, 53-54, and 56; Todd D. Jick, "Mixing Qualitative and Quantitative Methods: Triangulation in Action," *Administrative Science Quarterly* 24, no. 4 (1979): 602-604; A.W. Carus, and S. Ogilvie, "Turning Qualitative into Quantitative Evidence: A Well-Used Method Made Explicit," *Economic History Review* 62, no. 4 (2009): 893.

<sup>12</sup> I found individuals in the *British Medical Journal*, *Edinburgh Medical Journal*, *Edinburgh Medical & Surgical Journal*, *Gentleman's Magazine*, *The Lancet*, *Medical Times & Gazette*, *Medico-Chirurgical Review*, *The*



*Nautical Magazine & Naval Chronicle*, *Provincial Medical & Surgical Journal*, and *United Services Journal*. The published student rolls included: University of Edinburgh, ed., *List of Graduates in Medicine in the University 1705-1866* (Edinburgh: Neill & Co., 1867); W.I. Addison, ed., *A Roll of the Graduates of the University of Glasgow, 1727-1897* (Glasgow: James McLehose & Sons, 1898); P.J. Anderson, ed., *Fasti Academiae Mariscallanae Aberdonensis: Selections from the Records of the Marischal College and University of Aberdeen, 1593-1860*, vol. 2 (Aberdeen: New Spalding Club, 1893); P.J. Anderson, ed., *Officers and Graduates of University and King's College, Aberdeen, 1495-1860* (Aberdeen: New Spalding Club, 1893).

<sup>13</sup> For a lay presentation on the impact of Edinburgh medical education, see R.D. Lobban, *Edinburgh and the Medical Revolution* (New York: Cambridge University Press, 1980). For scholarly works, see Lisa Rosner, *Medical Education in the Age of Improvement: Edinburgh Students and Apprentices, 1760-1826* (Edinburgh: Edinburgh University Press, 1991), latter half; Stephen Jacyna, *Philosophic Whigs: Medicine, Science and Citizenship in Edinburgh, 1789-1849* (New York: Routledge, 1994). For student records, see J.D. Comrie, and John J. Gairdner, "Biographical Index of Edinburgh Medical Graduates, 1705-1866," 1933, Research Annex, Centre for Research Collections, Edinburgh University Library, University of Edinburgh, U.K.; University of Edinburgh, "Medical Class & Matriculation Lists," Vols. 1802-1867, EUA/IN1/STA/3, University Archives, Centre for Research Collections, Edinburgh University Library, University of Edinburgh, U.K.

<sup>14</sup> Verboven, *et al.*, 53-55, and 58; Hardy, and Bryman, 9-11; Gideon Cohen, Andrew Flinn, and Kevin Morgan, "Toward a Mixed Method Social History: Combining Quantitative and Qualitative Methods in the Study of Collective Biography," in *Prosopography Approaches and Applications*, 211, and 218-220.

<sup>15</sup> For general discussions of ramifications of data quality and representativeness, as well as missing data, see Miller, *Chicago Guide to Writing About Numbers*, 212-213; Jane E. Miller, *The Chicago Guide to Writing About Multivariate Analysis* (Chicago: University of Chicago, 2005), 286-287; Paul D. Allison, *Missing Data: Quantitative Applications in the Social Sciences* (Thousand Oaks, CA: Sage Publications, 2002), 1-5, 77-78.

<sup>16</sup> Reported by highest rank achieved in navy and year of entry into navy. Lower ranks are assistant surgeons and surgeons. Upper ranks are staff surgeons, physicians and deputy medical inspectors. Leadership ranks are medical inspectors and director-generals. Twenty-eight Colonial and Welsh surgeons have been excluded from the table, but are included in the percentage calculations to give exact proportions. Chi-Square statistics—for the Lower Ranks:  $\chi^2$  (4, N= 1001)= 63.52, p-value < 0.001; Chi-Square-Upper Ranks:  $\chi^2$  (4, N= 311)= 31.58, p-value <0.001; Fisher's Exact Test- Leadership Ranks: (N= 48)= 12.71, p-value (monte-carlo, R=10,000) < 0.01.

<sup>17</sup> Ackroyd, *et al.*, 1-15; Laurence Brockliss, "The Professions and National Identities," in *Union of Multiple Identities: The British Isles c. 1750-c. 1850*, eds. Laurence Brockliss, and David Eastwood (Manchester, UK: Manchester University Press, 1997), 9-28. For an example, see Douglas M. Haynes, *Imperial Medicine: Patrick Manson, and the Conquest of Tropical Disease* (Philadelphia: University of Pennsylvania Press, 2001), 15-18.

<sup>18</sup> Verboven, *et al.*, 46-48; Cohen, *et al.*, 217-218; Carus, and Ogilvie, 898.

<sup>19</sup> Lower ranks are assistant surgeons and surgeons. Higher ranks are staff surgeons, physicians, deputy and Full medical inspectors and director-generals. The University of Edinburgh was separated into its own category. Other Scottish Schools include five schools. Irish Schools include three schools. English Schools include nine London hospital schools, and a dozen provincial schools. Chi-Square statistics—for the Lower Ranks:  $\chi^2$  (6, N= 1017)=

169.97, p-value < 0.001; Fisher's Exact Test- Higher Ranks: (N= 371)= 65.95, p-value (monte-carlo, R= 10,000)< 0.001.

<sup>20</sup> For analyses of oversaturation and competition in the early-nineteenth-century labor market, see Loudon, *Medical Care and the General Practitioner*, 208-211; Peterson, 29; Christopher Myers, "Explaining the Socio-Economic Demographics of Victorian Naval Medicine," research report for the History Project, accessed February 12, 2015, <http://www.histproj.org/completed/MYERS.pdf>, 2-5, and 7-8; Anne Digby, *Making a Medical Living: Doctors and Patients in the English Market for Medicine* (New York: Cambridge University Press, 2002), 7, 12, and 20-24; I.S.L. Loudon, "A Doctor's Cashbook: The Economy of General Practice in the 1830s," *Medical History* 27 (1983): 257-258; Ivan Waddington, *The Medical Profession in the Industrial Revolution* (Dublin: Gill and Macmillan, 1984), 139-142. For the relative size of medical schools, see Myers, 2-5; Digby, *Making a Medical Living*, 12-13; Alexander Morgan, "Matriculates in the Faculty of Medicine," *University of Edinburgh Journal* 8, no. 2 (1936): 125; Derek Dow, and Michael Moss, "Medical Curriculum at Glasgow in the Early Nineteenth Century," in *History of Universities*, vol. 8 (New York: Oxford University Press, 1988), 239; Carolyn Pennington, *The Modernization of Medical Education at Aberdeen in the Nineteenth Century* (Aberdeen: Aberdeen University Press, 1994), 7.

<sup>21</sup> For the Navy, see McLean, 26-27; Penn, 43; Morgan, "Matriculates," 125; Dow and Moss, 239.

<sup>22</sup> The conditions of naval medical service are described in detail in McLean, chs. 1-2, and Penn, chs. 3-4.

<sup>23</sup> For overcrowding and oversaturation from 1840s onward, see Haynes, 15-18; Loudon, 214-222; Myers, 3-4, and 7-8; Peterson, 29, 117, and 238-239; Waddington, 688; Digby, *Making a Medical Living*, 7, 12-16, and 20-24; Anne Digby, *The Evolution of British General Practice, 1850-1948* (New York: Oxford University Press, 1999), 23-38; Irvine Loudon, "The Origin of the General Practitioner," *Journal of the Royal College of General Practitioners* 33 (Jan. 1983): 15-16. For expansion of London medical and provincial education, see Digby, *Making a Medical Living*, 12-13; S.T. Anning, "Provincial Medical Schools in the Nineteenth Century," in *The Evolution of Medical Education in Britain*, 121-122, and 126.

<sup>24</sup> Myers, 7-8, Digby, *Making a Medical Living*, 14-15, and 20; Kaufman, 226; Greta Jones, "'Strike out Boldly for the Prizes that are Available to You': Medical Emigration from Ireland 1860-1905," *Medical History* 54, no. 1 (Jan. 2010), 55-74.


<sup>25</sup> Manning, Figure 1.1, and related discussion.

<sup>26</sup> For quantitative analyses of overcrowding in the nineteenth-century medical profession, see Loudon, *Medical Care and the General Practitioner*, 214-222, and Digby, *Making a Medical Living*, 7, 12-16, and 20-24.

<sup>27</sup> Ackroyd, *et al.*, passim; Kaufman, 79-82; M. John Cardwell, "Royal Navy Surgeons, 1793-1815: A Collective Biography," in *Health and Medicine at Sea, 1700-1900*, eds. David Boyd Haycock and Sally Archer (Woodbridge, U.K.: Boydell Press, 2009), 38-62; S. Karly Kehoe, "Accessing Empire: Irish Surgeons and the Royal Navy, 1840-1880," *Social History of Medicine* 26, no. 2 (2013): 204-224.

<sup>28</sup> University of Edinburgh, "Medical Class & Matriculation Lists," Vols. 1802-1867, EUA/IN1/STA/3; University of Edinburgh, "General and Medical Examinations," Vols. 1833-1847, EUA/IN1/STA/8, University Archives, Centre for Research Collections, Edinburgh University Library, University of Edinburgh, U.K.

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