Like Nobody’s Business is a remarkable piece of work. The book describes all aspects of the enormously complicated business of higher education in terms of the flow and utilization of resources—human but predominantly financial. In doing so, the author addresses all the issues that are perennially discussed and contested in the popular media, in both governmental and nongovernmental policy forums, and in academic studies. This book simply provides a wealth of information on topics large and small, but especially on the chief foci of policy and controversy in American higher education.

— Roger Lewis Geiger, distinguished professor of education at Pennsylvania State University

How do university finances really work? From flagship public research universities to small, private liberal arts colleges, there are few aspects of these institutions associated with more confusion, myths or lack of understanding than how they fund themselves and function in the business of higher education. Using simple, approachable explanations supported by clear illustrations, this book takes the reader on an engaging and enlightening tour of how the money flows. How does the university really pay for itself? Why do tuition and fees rise so fast? Why do universities lose money on research? Do most donations go to athletes?

Grounded in hard data, original analyses, and the practical experience of a seasoned administrator, this book provides refreshingly clear answers and comprehensive insights for anyone on or off campus who is interested in the business of the university: how it earns its money, how it spends it, and how it all works.

As with all Open Book publications, this entire book is available to read for free on the publisher’s website. Printed and digital editions, together with supplementary digital material, can also be found at www.openbookpublishers.com
II. Health Sciences, Hospitals & Medical Schools

II.1 How do hospital budgets compare to main campus budgets?

Some of the health sciences operate on a completely different financial basis to the rest of campus because of their reliance on clinical revenues. Nowhere is this truer than in medical schools, although it can also be a factor across nursing, pharmacy, dentistry, public health and veterinary medicine. We’ll get to medical school funding in the next section, but first, let’s get a feel for the basic numbers.

In earlier chapters I was careful to point out where hospital revenues or medical employees needed to be excluded from our campus comparisons. That’s because (i) most universities don’t have hospitals or medical schools, (ii) of those with medical schools, at more than half the hospital partner is an independent corporation rather than the hospital being incorporated within the university, and (iii) hospital budgets can be as big or bigger than the universities with which they are directly or indirectly affiliated. The Association of American Medical Colleges (AAMC) lists 155 accredited member medical schools in the United States (Association of American Medical Colleges 2020), 115 of which are spread across our comparison data set of nearly 1,200 four-year higher education institutions, as illustrated in Figure 11.1 (the rest are largely stand-alone specialty or for-profit schools). Of those, 45 (39%) report in-budget hospitals on IPEDS.¹

Unsurprisingly, R1 universities are home to most medical schools and in-budget hospitals, with fewer of each down the size scale. We can get a sense of hospital budget sizes by breaking out the hospital and non-hospital (i.e., university) revenues for those institutions with in-budget hospitals, as shown in Figure 11.2. Three quarters of these hospitals are at R1 universities and their budgets average about 40% of the total budget or, put differently, hospital budgets approach the size of the regular university budget. Financially and organizationally, it’s like adding a second university to the main campus. There are no publicly-accessible comprehensive statistics on the budgets of

¹ Technically, IPEDS lists the Penn State College of Medicine separately for academic data, while the finances of Penn State Health are included in main campus financials. For Rutgers, IPEDS reflects the medical school and hospital on the New Brunswick campus plus two small hospitals at the Camden and Newark campuses although they don’t have separate medical schools.
other independent teaching hospitals that work with the remaining medical schools, although from individual examples it is clear that they have not dissimilar financial scopes of in-budget hospitals and sometimes more.

Figure 11.1. FY2018 numbers of higher education institutions with medical schools and with hospitals included in the reported institutional budget, by Carnegie classification and control. Source: IPEDS (2020).

Figure 11.2. FY2018 hospital and non-hospital portions of total institutional revenue for the 45 institutions reporting in-budget hospitals, by Carnegie classification and control. Source: IPEDS (2020).
11.2 How are medical schools funded?

Most medical schools don’t exist in financial isolation in the way that other campus professional schools do. Business schools, law schools, engineering programs and colleges of education all connect to their domains of professional practice to ensure that students can learn through hands-on experience, like medical schools, but none of those require the level of financial integration with clinical activities necessary to support a contemporary US medical school. Put more pointedly, with the exception of the few that focus exclusively on teaching medical students, medical schools rely overwhelmingly on clinical revenues to support themselves with tuition playing only a minor role.

How does that work? The necessary combination of medical education, research and clinical practice is enabled by organizational and financial elements of what is called an academic medical center, which is typically comprised of the medical school, its affiliated hospital (historically university-owned but also independent), and the faculty practice plan. Practice plans originated as organizations to handle clinical revenue collection and compensation for the faculty as practicing physicians, much like a group private practice. While this is still their core function nowadays, practice plans have evolved into organizations that also promote patient care, manage the various medical specialty practices, recruit and retain quality physicians, and ensure an adequate number and range of patients for research and teaching. These activities are aligned with the mission of the academic medical center.

The practice plan looks after the interests of faculty physicians, as distinct from those doctors and other health professionals without academic appointments who work directly for the hospital. Faculty practice plans are usually separately incorporated, meaning that the academic medical center is a three-way partnership between the university, the practice plan, and the hospital. Each brings something to the table: the university and medical school need clinically active professors and a means to compensate them from the practice plan, plus the physical and organizational infrastructure of the hospital; the hospital desires the prestige of being a specialized institution with renowned experts and the latest treatments; and, the practice plan needs them both while providing a vehicle for the academic and clinical activities of faculty physician scientists.

As you will have surmised by now, successful academic medical centers therefore involve the exchange of large sums of money among the three parts, in particular to support the medical school. The practice plan contributes substantial clinical income while the hospital contributes payments for medical services as well as additional investments into the teaching, research and clinical care missions. These latter investments, which are typically tens of millions of dollars annually, are known as “mission support” and they essentially provide a cross-subsidy of teaching and research.² Figure 11.3 illustrates the critical role of practice plan and hospital revenues

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² Mission support funding has to be carefully structured to avoid kickback and ethics laws because the medical school’s physicians refer patients to the supporting hospital (Bulleit et al. 2017).
for medical schools, in a roughly two thirds/one third split that together comprise 63% of the total support. Research grants and contracts are the other large source of medical school revenue, with federal and other sources accounting for a combined 22% of medical school revenue on average.

Figure 11.3 also shows that the remaining sources of medical school income are all much smaller, each making up just a few percent of the total. Support from state and local governments and from the parent institution (i.e., the university) and revenue from tuition and fees each average about 4% of the total although, as we’ll see next, these two categories differ across public and private institutions. Gifts, endowment income and other miscellaneous costs round out the revenue portfolio.

The average dollar amounts for each of these sources at public and private medical schools are illustrated in Figure 11.4. While the general profile is similar, the revenues supporting private medical schools are approximately double those at public universities. There are two noteworthy departures from this overall pattern though; public medical schools naturally receive relatively more via state and local government support, while private medical schools generate almost three times more in gift income on average.

To appreciate the magnitude of total dollars required to fund a medical school, the level of funding is on the order of ten times the budget of a regular college at an R1 university. That contrast makes it instructive to return for a moment to the cross-subsidy of teaching and research by mission support and other funds. Tuition revenues are insufficient to cover the substantial infrastructure, operational and labor costs of the
Figure 11.4. FY2018 supporting revenue sources averaged across 85 public and 56 private US medical schools. Source: AAMC (Association of American Medical Colleges 2019b).

The whole enterprise associated with educating medical students. At most major medical schools, the faculty will outnumber the students and they will be among the highest salaried professors in the university (see the next section). Thus, even from this limited example, and with perception of medical school tuition as high, it is clear that tuition alone will not come close to covering the institutional costs of education. Regarding research, remember that we saw in Section 8.4 how research actually loses money because facilities and administration costs are not fully recovered. This is especially true for medical schools because biomedical research support and compliance costs are among the highest across campus. We’ll examine health science research funding in Section 11.4.

As with general university funding, the relative roles of revenue sources have changed over time for medical schools. Figure 11.5 illustrates the trends in relative shares of clinical revenues (also known as medical services), state and institutional funding, and tuition and fees since FY1977. Tuition and fees have stayed consistent around 4–5% of budget over the entire period, and other sources have stayed flat or decreased slightly in share over time (not illustrated; FY2018 values were 14% federal research, 13% other income, and 2% other federal revenue). However, clinical income

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3 Note that medical schools offer not only medical degrees but also training programs required for physicians to be able to practice, i.e., residencies and fellowships. Confusingly, these latter programs are known as Graduate Medical Education (GME). GME is funded largely by the Federal government through Medicare with small amounts from states and hospitals. Federal GME funding has essentially been capped since the Balanced Budget Act of 1997, creating a bottleneck for residency slots.
rose from a 20–60% share of the budget over the last four decades. Because state funding stayed about the same over time in inflation-adjusted dollars, its relative share decreased from 30–5% of the total budget over the same period. Of course, the world of healthcare finance was completely different back then—Medicare and Medicaid started in the 1960s, and various successive forms of health insurance emerged over the decades too. Understanding the changes in the complex healthcare business would take a book of its own, but do recall that healthcare has many of the same underlying economic drivers of cost increases as higher education, as we saw in Section 3.7 and Box 3.1. Those costs are anticipated to grow faster than revenues in coming years, creating a vulnerability for medical schools that are dependent on clinical revenues and transfers from the other parts of the academic medical center (Guadagnolo 2018).

![Figure 11.5. Trends in the shares of three revenue sources for US medical schools, FY1977 to FY2018. Source: AAMC (Association of American Medical Colleges 2019c).](image)

### 11.3 How much are medical school faculty salaries?

Medical school professors are the highest compensated faculty members in the university, earning roughly three times more on average than their colleagues elsewhere on campus. Figure 11.6 illustrates total compensation by rank and medical specialty. Across all departments and specialties, assistant professors earn about $300,000 per year and full professors almost $400,000, while department chairs average $632,000. Across the departments, salaries in the basic medical sciences (i.e., those without a clinical component such as immunology, microbiology, and pharmacology) are the lowest, although they are comparable to some of the higher-earning disciplines in the
arts and sciences. Surgery is the highest-compensated set of medical specialties, where instructors earn $300,000 to $400,000 annually and the average chair of surgery makes almost $1M per year. The other specialties cover a broad range in between. Assistant professors earn 70–90% of full professor compensation across most specialties, whereas in the basic medical sciences that figure is just over 50%, reflecting the absence of clinical revenues and the structure seen elsewhere in the university.

Why are medical school salaries so high? There are at least two factors at work: (i) as is true elsewhere in the university for fields that have a practice component with high market rates, such as computer science or accounting, that market drives the academic salaries higher; and (ii) medical professors are at the pinnacle of clinical care by virtue of their academic and technical expertise, thus they are the top earners in their profession overall (unlike computer science and accounting). If you are diagnosed with a hard-to-treat disease or you were in an awful accident, you will want to seek out the “top” medical expert in the necessary specialty—that doctor is in all likelihood a professor at a leading medical school. Likewise, many leading cancer centers, heart institutes, etc. are part of academic medical centers. Thus, the confluence of eminent technical expertise with elevated market rates, which in turn are enabled by the way the US healthcare system is set up, lead to the high compensation we see in US medical schools. In fact, at many of these universities, it’s not unusual to have a dozen or more individuals in the medical school earning more than the university president.
Clinical revenues are a key part of academic medicine. Medicare payments for medical services provided by physicians across the US are accounted for using a system that assigns relative value to each of more than 10,000 distinct services. Relative value units (RVUs) largely reflect the total time necessary to perform the service (before, during the service, and after) as well as skill, complexity, judgment, etc. So, for example, the RVU to remove a foreign body from an eye is 0.49 while it is 1.95 to repair a minor eye wound, meaning that the latter is four times the work of the former (AAPP 2020b). This is known as the work RVU and it is used with two others in the Medicare payment formula, practice expense (PE) RVUs and malpractice (MP) RVUs; the average shares of each across all payments are 51%, 45% and 4% respectively (AAPP 2020a). There are geographic practice cost indices (GPCI) used to weight each kind of RVU as well as distinctions based on the place of service (e.g., a physician’s office versus a hospital). Medicare sets an annual per-RVU dollar conversion factor (CF), which has been close to $36 in recent years (AAPP 2020a), enabling the payment to be calculated as follows according to the US Centers for Medicare and Medicaid Services (2020):

\[
\text{Payment} = \left[ (RVU_{\text{work}} \times GPCI_{\text{work}}) + (RVU_{\text{PE}} \times GPCI_{\text{PE}}) + (RVU_{\text{MP}} \times GPCI_{\text{MP}}) \right] \times CF
\]

Using the minor eye wound repair example, for a physician in Arizona doing the procedure in her office in 2020, the numbers look like this:

\[
\text{Payment} = \left[ (1.95 \times 1.0) + (5.86 \times 0.961) + (0.13 \times 0.846) \right] \times 36.0896 = 277.58
\]

In San Francisco, because of two higher GPCI values reflecting the higher expenses of the area (1.076, 1.327, and 0.44 respectively), the Medicare payment for the same service would be $358.43. If the procedure was done at a hospital, where the physician does not have to incur the overhead costs, then the physician payment amounts are $140.59 in Arizona and $169.26 in San Francisco because the practice expense RVU decreases from 5.86 to 1.91.

While this sort of calculation is far from a perfect representation of the work involved, it certainly beats its simplistic predecessors such as number of patients seen. Of course, because of their key connection to revenue generation, RVUs are extensively used to measure physician productivity. Ask almost any doctor about this and you’ll hear plenty of criticism, including: it is imprecise because each case is different, no allowance is made for challenging cases, experienced physicians can handle complex cases more efficiently, the system can be manipulated, it incentivizes physicians to break procedures into parts, it doesn’t include patient satisfaction, and much more.

In academic settings, the pressures to deliver on RVUs are in direct tension with, and exclude consideration of, research and teaching. While that tension cannot be fully removed, it can be minimized if administrators and faculty design clear workload expectations and implement effective multidimensional and holistic evaluations.
11.4 What is the mix of health science research funding?

We saw in Chapter 8 that support from the National Institutes of Health (NIH) provides more than half of all university research funding. NIH funds virtually all federal health sciences research and we also saw that it spends about three times more than NSF, which covers all the other sciences and engineering. In addition, we saw how NIH funding doubled in the early 2000s via a program of increased appropriations by Congress. But to which diseases and conditions does NIH funding go, and to which universities?

![Figure 11.7. Share and cumulative share of FY2019 NIH spending on specific diseases and conditions for the top 50 of 292 categories. Source: NIH (National Institutes of Health 2020b).](image)

As the plural in its name indicates, the NIH comprises over 20 major institutes and centers, organized largely around disease areas, through which most of its funding flows. Of the $39B total NIH budget in FY2019, more than 80% was awarded for extramural research. Over half the funding was awarded through just five institutes: the National Cancer Institute (16%); the National Institute of Allergy and Infectious Diseases (14%); the National Heart, Lung, and Blood Institute (9%); the National Institute on Aging (8%); and the National Institute of General Medical Sciences (7%).

While institute-level funding provides a broad sense of the fields supported, the NIH produces a list of how much is spent across almost 300 diseases and conditions. It specifically includes multiple counting of research projects because a particular project could be addressing several topics (e.g., the genetics of brain disorders in the elderly, which covers at least three areas). The top 50 funded categories are illustrated in Figure 11.7 and they provide a sense of the wide range of research funded by the NIH.
Clearly, many studies involve clinical research, a theme that is associated with $16B in research funding at 6.6% of the total. Among the higher-funded diseases, cancer, infectious diseases and rare diseases all receive similar levels of support at around 2.5% of the total (about $6B) annually. Half of the funding goes to the first 18 diseases, and three quarters to the first 45.

Figure 11.8. FY2019 NIH funding awarded to higher education institutions, for the top 50 of 516 listed institutions. Data for multiple units on the same campus have been combined. Source: NIH (National Institutes of Health 2020c).
Looking down the list, each university will naturally have its own strengths across the spectrum of health research, with the highest-funded institutions being active across multiple areas. Those universities are ranked in Figure 11.8, which shows the top 50 institutions nationally. The first 23 on the list win half of all higher education NIH funding. That group includes 10 public universities and 13 private ones, and in the top 50 there are 29 publics and 21 privates. The amount of NIH research funding awarded to all higher education institutions exceeded $22B in FY2019, accounting for over half of the $39B total (National Institutes of Health 2020a; 2020c). It is important to note that more than 500 US higher education institutions receive NIH funding although there are only about 150 medical schools. Thus, many institutions are awarded support across a wider set of biomedically-related sciences and social sciences than just the clinically-oriented and basic medical science departments found in a medical school. Of higher education institutions receiving NIH funding in FY2019, the average was $43M and the median was just $3.6M. Thus, while NIH research support is concentrated at high-profile institutions with medical schools and extensive biomedical programs, the effects of NIH funding extend far more widely than just those institutions with medical schools.