HARVARD | BUSINESS | SCHOOL

9-724-373
AUGUST 21, 2023

MICHAEL E. PORTER
ROBERT S. KAPLAN
MARY L. WITKOWSKI
DAVID N. BERNSTEIN

Vanderbilt: Transforming an Academic Health Care Delivery System, 2020

"We emerged from the separation from Vanderbilt University with significant improvements in both financial performance and balance sheet stability. But costs were rising more than twice as fast as revenues, and competition was increasing. We had to respond to the financial challenges while continuing to innovate and remain a leading academic medical center."

— Jeffrey Balser, M.D., Ph.D., Chief Executive Office, Vanderbilt University Medical Center

Dr. Jeff Balser, an anesthesia-trained critical care physician, took the helm of Vanderbilt University Medical Center (VUMC) as the Chief Executive Officer in 2009. He completed his M.D. and Ph.D. at Vanderbilt University and then trained at Johns Hopkins Hospital in Baltimore. As a young attending physician, he conducted NIH-backed research aimed at the genomic underpinnings of cardiac rhythm disorders. He became Vanderbilt's chair of anesthesiology in 2001, and the health system's Chief Research Officer in 2004 prior to his current position.

Dr. Balser embraced innovation, and after exposure to value-based health care, developed a passion for it. He believed it was the "right thing to do," especially at VUMC. He wondered, however, whether now was the right time to push the envelope to transform health care at VUMC while it coped with rising costs, increasing competition, and physician burnout.

VUMC

In 2019, U.S. News and World Report ranked VUMC as the leading hospital system in Tennessee, with its numerous highly ranked medical and surgical specialties across its adult and children's hospitals (**Exhibit 1**). From a clinical standpoint, VUMC consisted of the 680-bed adult hospital, a 305-bed children's hospital, a 92-bed psychiatric hospital, a recently-acquired 245-bed community hospital, an 80-bed rehabilitation hospital, and outpatient care units. It was also affiliated with Vanderbilt University's Schools of Medicine and Nursing. The Vanderbilt-Ingram Cancer Center was one of 71

Professor Michael E. Porter, Senior Researcher Zachary C. Landman, and Project Director Derek Haas prepared the original version of this case "Vanderbilt: Transforming a Health Care Delivery System," HBS No. 715-440. It is being replaced by this version prepared by Professor Michael E. Porter, Senior Fellow Robert S. Kaplan, Fellow Mary L. Witkowski, and Senior Researcher David N. Bernstein. It was reviewed and approved before publication by a company designate. Funding for the development of this case was provided by Harvard Business School and not by the company. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

Comprehensive Cancer Centers in the U.S. designated by the National Cancer Institute, and the only so-designated center in Tennessee. VUMC's Level 1 trauma center in central Tennessee was one of six in the state. Overall, more than 2.7 million patients from across the U.S. sought treatment at VUMC (**Exhibit 2**) from its more than 3,500 faculty physicians and 20,000 staff. Dr. Balser oversaw all of VUMC and its operations with support from a diverse leadership team (**Exhibit 3**). VUMC had earned a 22 percent market share of all patient volume in the Nashville metropolitan area and provided 9 percent of all inpatient care in Tennessee.

VUMC was also among the top academic medical centers in the southeast region. The Vanderbilt University School of Medicine was ranked 17th for research-based medical schools in the U.S. News and World Report.[1] Like most academic medical centers, revenue from clinical care subsidized education and research.

Vanderbilt's health and biomedical science educational program was among the largest at a private U.S. university, with approximately 500 MD and MD/PhD students, 1,000 residents and fellows in 78 accredited specialty training programs, and over 900 students in advanced practice nursing. The School of Medicine also hosted one of the nation's largest biomedical science PhD training programs, which included 600 PhD students and over 500 postdoctoral fellows in an array of research programs ranging from basic science to biomedical informatics and epidemiology. VUMC estimated that education and resident training required subsidies in excess of revenue and other financial support of $59.8 million in 2019. VUMC spent approximately $755 million on all research and educational activities. About two-thirds of this amount was covered through support from outside funding, including Medicare and Medicaid support for education (e.g., resident training), federal research grants, and private contracts. The remaining "gap" of approximately $248 million was covered by VUMC.

In 2019, VUMC's total revenue neared $4.5 billion, yielding a net income of $181 million (**Exhibit 4**). This was in stark contrast to just seven years earlier when the institution had faced a revenue shortfall of $250 million, as the number of government-insured patients rose and price pressures grew across commercial and government (e.g., Medicare and Medicaid) payors. A few years later (in 2016), VUMC split from Vanderbilt University to become an independent entity, though still closely related to the medical school, to allow for greater financial flexibility and borrowing power for its clinical mission. This approach also permitted Vanderbilt University to maintain a higher bond rating than the medical center. Despite its relatively small balance sheet, VUMC was able leverage its large revenue base and strong operating cash flow to secure an investment-grade, yet lower, "single-A" rating and would accept a higher cost of debt than the university.

Care Delivery Re-Organization at Vanderbilt, 1995 – 2019

Like most academic medical centers, physicians at VUMC were organized into specialty departments and divisions such as anesthesiology, urology, and orthopedic surgery. Physician compensation was set by department chairs and based on specialty averages, as well as the relative value unit (RVU) scale. Physicians involved in research and education had a portion of their salaries tied to metrics such as academic citations and student evaluations. Money paid for clinical care flowed through departments and their leadership.

In parallel with this department structure, Vanderbilt had established multiple Patient Care Centers (PCCs) to facilitate multi-disciplinary care for cancer, cardiac, neurologic, and other conditions. The orthopedics PCC, for example, combined inpatient orthopedic nurses, operating room technicians, physical therapists, outpatient clinic staff, surgeons, and administrative personnel under a single clinical management structure.

In the Heart and Vascular Institute and the Wilkerson Center, physicians and support services staff from various departments were co-located in shared space. For example, the Wilkerson Center co-located the faculties of Hearing and Speech Sciences and otolaryngology (ear, nose, and throat surgery) together so that speech-language pathologists, teachers of the deaf and hard-of-hearing, audiologists, and rehabilitation therapists could easily collaborate and treat patients with their physician and Ph.D. colleagues. The PCCs promoted formal and informal collaboration among diverse physician specialties and support staff through common patients, personal relationships, and joint research activities. Initially, some PCCs were run directly by department chairs, while others were led by adult hospital management.

VUMC experienced significant department chair turnover between 2009–2012 and had appointed new chairs in more than 10 departments or divisions. By 2012, some of the new department chairs had begun to voice concerns that PCC priorities were not aligned with those of their departments and that leading a department from a clinical, research, and financial standpoint in this setting was incompatible with also running a PCC. A March 2012 retreat resulted in "PCC 2.0 model", which changed the management structure. In the "PCC 2.0 model", PCCs were overseen by an executive committee consisting of the department chairs of the relevant specialties, the adult hospital President or COO, and the chief nursing officer. Executive committees were responsible for ensuring that the PCCs' goals were aligned with those of each of the clinical departments involved.

Individual PCCs also had a separate leadership team comprised of an executive medical director, nurse leader, and administrative leader. Executive medical directors were chosen by the clinical department chairs, and other leadership roles by the full PCC executive committee. The PCC medical director and all faculty remained supervised by their respective department. All compensation, reviews, and promotions were the responsibility of department chairs. Compensation of PCC directors was linked to PCC quality, patient satisfaction, and expense management. Executive committees of the PCCs determined a relevant subset of measures, including care processes and some outcomes, such as inpatient mortality and frequency of readmissions. Chair compensation included financial incentives related to the performance of PCCs in which the department was involved, as well as overall VUMC quality performance, such as hospital complication rates and mortality, and the overall financial success of the medical center.

By January 2020, VUMC had 16 PCCs (**Exhibit 5**), each with the goal to manage care for the complete care cycle and improve outcomes for its assigned clinical conditions.

Information Technology at VUMC

VUMC was a pioneer in health information technology (IT) and had developed a proprietary IT system for clinical care, knowledge management, and provider decision support. It used vendor systems for administrative and operational tasks.

In 2016, VUMC and Epic partnered on "EpicLeap", a two-year, $200 million dollar implementation plan to make Epic the electronic medical record system for VUMC. Epic allowed for improved patient data interoperability and supported continued innovation from within VUMC, which could be incorporated into the traditional Epic interface. One key goal was to connect Epic to REDCap, a VUMC research database software used in over 2400 institutions and 115 countries. This would allow for ease of data transfer between clinical and research settings and allow stakeholders from across the institution to easily search and use patient and outcomes data for clinical and research purposes.

In 2016, VUMC was selected by the National Institutes of Health (NIH) to lead its Data and Research Center program for the nation's "All of US" precision medicine initiative. It aimed to accelerate the prevention and treatment of disease by understanding more granular, individual patient data, including social, genomic, economic, and environmental information. After two years of preparation, the program was launched in July 2018. By August 2019, 230,000 patients had been enrolled with a final goal of 1 million participants expected by 2024.

Outcomes Measurement

In 2018, VUMC leadership reassessed their routine patient data collection to ensure they were measuring all necessary outcomes, including those most important to patients. VUMC leadership turned to the International Consortium of Health Outcomes Management (ICHOM) to identify outcomes to be measured. Many of the recommended physician-related outcomes, such as mortality and complications, were already being recorded. However, VUMC had no systematic approach to collecting, using, or reporting patient-reported outcome measures, or PROMs. Dr. Justin Bachmann, an M.D. and former Senior Researcher at Harvard Business School, was named the Medical Director of Patient-Reported Outcome Measurement and tasked with implementing a system of routine PROMs collection.

Bachmann identified 47 different and independent efforts at VUMC to collect PROMs. Most physicians collecting PROMs (62%) used them only for clinical research, and only 21 percent collecting PROMs used them for clinical care and to help patients better understand their treatment options.

VUMC's Epic system enabled PROMs to be collected electronically either at home prior to a clinic visit or on a tablet computer in the clinic waiting room and immediately made available to clinicians in real time. But VUMC had no standardized approach for PROMs selection, collection, and use Bachmann began pilot projects for three common conditions − inflammatory bowel disease, prostate cancer, and pediatric asthma− based on the presence of a PROMs clinician champion, and well-validated survey instruments recommended by ICHOM.

Payment Reform

In 2014, alongside federal programs such as the Centers for Medicare and Medicaid Services (CMS) Bundled Payments for Care Improvement (BPCI) initiative, Governor Bill Haslam launched Tennessee's Health Care Innovation Initiative in order to transition state health care payors, such as TennCare (Tennessee's Medicaid program), away from volume towards value. A key goal was to implement 75 bundled payments for complete episodes of care for different conditions or procedures over 5 years.

With the announcement of this statewide initiative, VUMC recognized the need to have a team dedicated to implementing bundled payments. The Episodes of Care Team, located in the Department of Population Health, was established to lead VUMC's implementation of TennCare's episode-based payment models. The unit provided an opportunity for VUMC to further the bundled payment concept with internal stakeholders and build out its capabilities for implementing bundled payments, including CMS bundles at the federal level.

In 2017, Dr. C.J. Stimson, a former advisor to CMS and urologic surgeon, was recruited to VUMC's Episodes of Care team and began developing a commercial bundles program under a program called the Care Transformation Initiative. The initial strategy to build and implement bundled payment

models in partnership with commercial payors was unsuccessful, as payors in the Tennessee market had little appetite for novel value-based arrangements. In response, Stimson pivoted to a direct-to-employer strategy to capitalize on the shared goals of VUMC and local employers – to provide the best patient care experience. By the second half of 2018, the search for employer-partners was underway.

We went out to find employers who shared our vision of a more rational health care system and were willing to go on a value journey together to build [bundles], but there was no playbook for how to do it.

— C.J. Stimson, M.D., J.D. Medical Director, Care Transformation Initiative

The Metro Nashville Public Schools, with over 11,000 staff and 18,000 covered lives, sought to implement an innovative approach to improving health care value for its employees and their dependents. The school district identified maternity and musculoskeletal care as the area of greatest need. Based on these recommendations, Stimson and the Care Transformation Initiative team elected to begin the design and implementation process focused on maternity health directly with Metro Nashville Public Schools.

The maternity bundle was the first bundle to be designed. An interprofessional team defined the full cycle of care. This included maternity-related care delivered from the first prenatal visit through three months after delivery (about one year in total time), including all scheduled clinic visits and delivery services, laboratory tests, imaging, birthing and lactation educational classes, and obstetric-related emergency room visits and hospital admissions. Prenatal telehealth visits and the technology to enable these visits were also included in the bundle. Offered as an option for patients who were clinically qualified for virtual visits without any traditional regulatory restrictions (e.g., originating site), the prenatal telehealth program represented a care model that was not available under prior fee-for-service arrangements. Finally, a new team of patient navigators was stood up to support each patient enrolled in the maternity bundle to help them seek and receive appropriate care.

VUMC's actuarial team then set prospective bundle prices using historical utilization rates and internal cost, charge, and revenue data. Prices were stratified into three pricing tiers based on the clinical characteristics of the patient, which was primarily focused on comorbidities (e.g., diabetes). The method of delivery (i.e., vaginal versus cesarean section) was excluded from the price stratification methodology. This established single prospective prices for maternity care that were agnostic to the delivery method. Prices were set such that participating patients would have no out-of-pocket expenses.

To start, VUMC would assume the financial risk across the care cycle. Given VUMC physicians were employed and had compensation plans incentivized by a wide range of metrics already (e.g., relative value units [RVUs]) but not linked to patient collections, physicians bore no direct financial risk related to payment. In the setting of bundled payments, this meant that if the cost of care exceeded the bundled payment amount, VUMC would be financially responsible for the monetary difference and physicians' incomes would not be impacted. Because the bundle included the full care cycle, VUMC collected the full bundle price and also administered the payments among the different provider entities that were delivering the care.

Patient quality metrics, including satisfaction, would be monitored but not used for payment purposes. Ongoing discussions with physicians and employers to determine what outcomes were most important to measure were ongoing, with the goal of being finalized by beginning of spring 2020. In addition to the school district bundle, VUMC launched a maternal bundle for its own employee health plan. The "pilot run" of the maternal bundle was set launched in January 2020, with additional bundles targeted for January 2021.

Building a Delivery Network

Rural parts of Tennessee and the surrounding states suffered from a lack of access to subspecialists who could provide complex medical and surgical care. Many patients, who could have been treated successfully in their community, were being transferred to academic medical centers, such as VUMC, VUMC decided, in 2011, to address this issue by launching the Vanderbilt Health Affiliated Network (VHAN).

VUMC partnered with three high-performing community hospitals in Central Tennessee to enable integration between VUMC and community providers. VHAN was organized as a separate subsidiary, with VUMC providing the initial funding, supplemented with dues from member hospitals and revenues from clinical practice. Affiliate hospitals had two voting positions on the VHAN board, which was chaired by Dr. C. Wright Pinson, Deputy CEO and Chief Health System Officer of VUMC with a rotating affiliated hospital representative as vice chair.

Many clinics and community hospitals expressed interest in joining the VHAN Network, and by 2019 VHAN had expanded to include 13 health systems and 68 participating hospitals across a five-state region (**Exhibit 6**) providing care for more than 350,000 patients. In many cases, VHAN participation was seen by its member hospitals as a market differentiator, an outward sign to patients and competitors of their commitment to value, innovation, accountability, and collaboration. Further, VHAN members felt the benefit of being able to have a constant connection and line of communication amongst each other. Rural physicians could discuss challenging cases with experienced VUMC subspecialists, and those at VUMC could discuss how best to set up follow-up in the community for patients with their rural colleagues.

VHAN provided trained quality improvement specialists for member clinics and hospitals. These professionals offered practice performance and process improvement support to VHAN members who are interested in supporting the transition to value-based health care but who otherwise do not have the resources to do so. Clinical initiatives involved assisting community hospitals to set up multi-disciplinary team structures, establishing joint ventures between VUMC and affiliates, such as a new dedicated cancer center with West Tennessee HealthCare and integrating Williamson Medical Center into the Neurosciences PCC using telemedicine. A $28 million grant to VUMC from CMS under its Transforming Clinical Practice Initiative (TCPI) was deployed to determine ways to connect the over 4,000 physicians across VHAN to improve quality through evidence-based practices. By 2019, a total of 115 practices had been engaged through the VUMC Office of Population Health. As part of the transformation process, clinics were asked to participate in introductory health care improvement courses from the Institute for HealthCare Improvement (IHI) Open School, as well as develop a quality improvement transformation plan that they felt would work best in their respective clinic settings. One pediatrics practice recognized many of their patients had depression and behavioral issues following the implementation of routine screening, which led to co-locating a behavioral health specialist in the clinic.

System-wide data sharing was necessary to enable VHAN's full benefits, but difficult to achieve with the more than 70 different electronic medical records being used in the network. Interoperability was also challenging with the high diversity in organizational and technology capabilities between large medical centers and small rural clinics.

The Health Insurance Portability and Accountability Act (HIPAA) created an additional hurdle. VHAN spent significant money to ensure the necessary administrative, physical, and electronic security and privacy controls to safeguard the data of the patients attributed to VHAN providers or covered by the employee benefit plans. VHAN had continual difficulties getting its participants and

contracted payors to transfer data to it. The participants' privacy officers frequently questioned VHAN's need for all of the data, citing the minimum necessary rule, a HIPAA clause stating that only the bare minimum amount of data needed to accomplish the intended purpose is required. Without access to full data, VHAN continued to struggle to design and implement network-wide programs like assessing if outcomes differed or were similar based on location of care for a given condition or illness.

VHAN also wanted to transform payment structure from fee-for-service to value-based risk-sharing models across the network. But it first had to reduce variation in care and increase the measurement of outcomes.

Next Steps

In January 2020, Dr. Balser was reassessing VUMC's priorities to remain a premiere academic medical center able to deliver exceptional care, produce groundbreaking research, and train the medical professionals of tomorrow. While VUMC had improved its financial position over the past few years, outside pressures from regulators, payors, and competitors were hard to ignore and continued financial stability was crucial for VUMC to continue to deliver on its mission. He noted, "we want to be distinctive. The only way for us to be distinctive is to be a really prestigious academic, with a capital 'A', medical center."

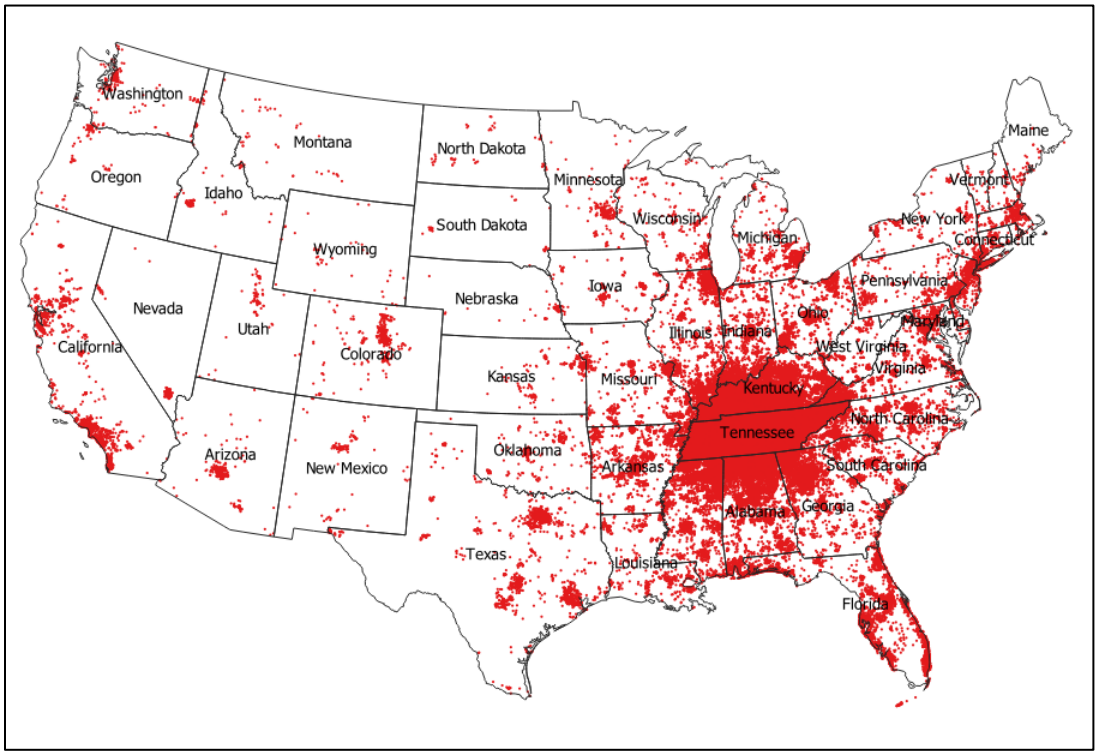
The initial results of many of VUMC's value-based health care initiatives were promising and grounded in robust theory. But Balser felt that more unanswered than answered questions remained. How will VUMC perform with the rising price pressure and the growing issue of staff burnout? Is expanding value-based health care the solution? How could VUMC continue on this journey and still maintain it academic mission? Amidst worrisome reports coming out of China and Italy about an emerging virus, Dr. Balser knew he would have to answer them if he was going to continue to innovate and drive positive change in health care delivery.

Exhibit 1 Vanderbilt University Medical Center, U.S. News and World Report Rankings of "Top 5" Adult & Pediatric Specialties, 2019-2020

Adult Hospital	
Specialty	**Ranking**
Nephrology	9
Urology	18
Ear, Nose, & Throat	20
Cardiology & Heart Surgery	35
Pulmonology & Lung Surgery	38
Children's Hospital	
Specialty	**Ranking**
Urology	7
Cancer	14
Pulmonology & Lung Surgery	15
Gastroenterology	17
Nephrology	24

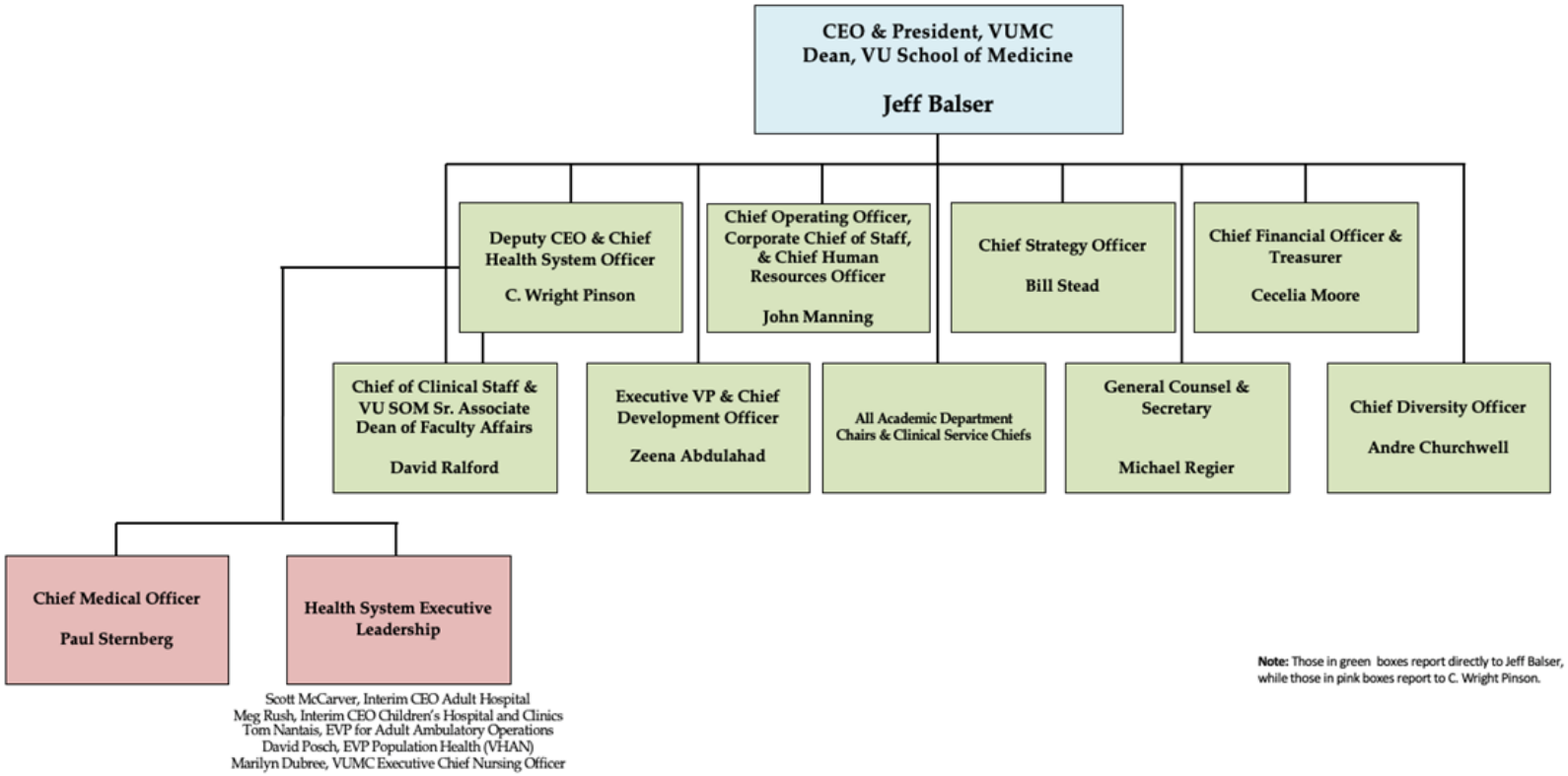
Source: Compiled by casewriters from Christina Echegaray, "Children's Hospital again ranked among nation's best by U.S. News & World Report," VUMC, June 18, 2019, https://news.vumc.org/2019/06/18/childrens-hospital-again-ranked-among-nations-best-by-u-s-news-world-report/, and; Kristi Nelson, "Vanderbilt nationally ranked in medical specialties; 12 other Tennessee hospitals 'high performing'," Knox News, July 30, 2019, https://www.knoxnews.com/story/news/health/2019/07/30/best-hospital-rankings-vanderbilt-ut-medical-center-methodist-hospitals/1837169001/, accessed August 2023.

Exhibit 2 Patient Origin of Vanderbilt's 2.7 Million Patient Encounters, FY2019



Source: Vanderbilt University Medical Center's Decision Support System, 2019.

Exhibit 3 Vanderbilt University Medical Center Organizational Chart



Source: Casewriter, based on company documents.

Exhibit 4 Vanderbilt University Medical Center Financial Statements, 2016-2019

INCOME STATEMENT

Millions of Dollars

Revenue	**2016**	**2017**	**2018**	**2019**
Net patient service revenue	$3,066	$3,335	$3,578	$3,820
Academic and research revenue	364	416	495	519
Other revenue	98	152	148	157
Total	**3,528**	**3,903**	**4,086**	**4,497**
Expenses				
Salaries, wages and benefits	$1,850	$2,035	$2,179	$2,290
Supplies and drugs	648	699	770	892
Facilities and equipment	186	246	256	268
Purchased services, professional fees and other	614	605	659	701
Depreciation and amortization	100	91	105	106
Interest	60	48	58	56
Total	**3,458**	**3,725**	**4,030**	**4,316**
Profits				
Income From Operations	$70	$178	$56	$181
Non-Operating Gains (Losses)	$17	$53	$46	$31
Operating Profit	$87	$231	$102	$212
%	2.5%	5.9%	2.5%	4.7%

VUMC BALANCE SHEET

Assets	**2016**	**2017**	**2018**	**2019**
Cash	$597	$521	$578	$587
Accounts receivable	413	459	531	541
Inventory	62	67	73	75
Investments	197	431	581	711
Property, plant and equipment	1,130	1,220	1,307	1,395
Prepaid expense and other assets	120	103	122	137
Total	**2,519**	**2,801**	**3,192**	**3,446**
Liabilities				
Payables and accrued liabilities	$641	$656	$690	$693
Deferred revenue	44	50	56	23
Total debt	1,291	1,294	1,519	1,516
Total	**1,976**	**2,000**	**2,265**	**2,232**
Net Assets				
Unrestricted net assets	$509	$714	$813	$1,058
Restricted net assets	34	87	114	156
Total	**543**	**801**	**927**	**1,214**
Total Liabilities and Net Assets	**$2,519**	**$2,801**	**$3,192**	**$3,446**

Source: Casewriter, based on company documents.

Exhibit 5 Patient Care Centers in 2019

	Patient Care Centers
1.	Behavioral Health
2.	Bill Wilkerson Center
3.	Cancer (Ingram Cancer Center)
4.	Heart and Vascular (Heart and Vascular Institute)
5.	Medicine/Primary Care
6.	Neurosciences
7.	Ophthalmology (Eye Institute)
8.	Orthopedic Institute
9.	Adult Surgery
10.	Pediatric Surgery
11.	Transplant
12.	Urology
13.	Women's Health
14.	Dermatology
15.	Pulmonary (Vanderbilt Lung Institute)
16.	Physical Medicine & Rehabilitation/Integrative Medicine

Source: Casewriter, based on company documents.

Exhibit 6 Location of Care Sites, Vanderbilt Health Affiliated Network, 2019

Source: Company documents.

Endnotes

[1] "Vanderbilt graduate schools named among nation's best," VUMC, March 22, 2018, https://news.vumc.org/2018/03/22/vanderbilt-graduate-schools-named-among-nations-best/, accessed August 2023.