HARVARD | BUSINESS | SCHOOL

9-622-007
NOVEMBER 8, 2021

KYLE R. MYERS
MATTHEW GRENNAN
SARAH MEHTA

Kermit PPI

In March 2021, Tom Dougherty, chief growth officer for Baltimore-based Kermit PPI (Kermit), stood up to stretch his legs after a lengthy strategy call with the company's three co-founders. Launched in 2011, Kermit's offerings helped hospitals save money on expensive orthopedic implants and devices, such as artificial knees and hips. Over time, Kermit became skilled at helping hospitals negotiate prices with device manufacturers and developed software to automate the compliance monitoring process—ensuring that hospitals paid no more for devices than their contracts specified. By early 2021, Kermit managed 40% of the orthopedic implant spend transacted in Maryland.

Now, after a decade, Kermit's three co-founders, Richard D. Palarea (CEO), Jason E. Smith (COO), and John P. Owens (managing director of services), felt ready to grow their company. One month earlier, they had hired Dougherty, who had years of relevant experience, to chart a clear growth strategy for Kermit. "We want to go nationwide," said Palarea. "That's why we hired Tom."

On the strategy call, the four discussed several strategic possibilities for growth related to Kermit's services and customers. On the services side, while Kermit had experienced success renegotiating hospitals' orthopedic device contracts, this approach was highly labor-intensive and subject to a long sales cycle. Dougherty feared that scaling this high-touch model would be difficult and costly. Kermit's newer service, the compliance monitoring software—and the new data stream it generated—showed promise and was very scalable, but hospitals had been notoriously slow to adopt new technologies and often found it difficult to make good use of new data.

On the customer side, Kermit could continue to focus on smaller hospitals in neighboring states. Smaller hospitals had historically found the cost savings achieved by Kermit to be more valuable, on a relative basis, than larger hospitals. But a single contract with a larger hospital could be worth five to ten times as much as a smaller hospital and signal the value of Kermit to even more hospitals. Kermit could also identify other characteristics that might make certain hospitals more interested in Kermit's offerings. "A recently merged hospital system might be primed to revisit implant spend," said Palarea. Dougherty knew that these decisions about service offerings and customers needed to be debated in tandem.

HBS Professor Kyle R. Myers; Professor Matthew Grennan (Haas School of Business, University of California Berkeley); and Case Researcher Sarah Mehta (Case Research & Writing Group) prepared this case. 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.

Orthopedic Surgery in the United States

Joint replacements, such as knee and hip replacements, were among the most common surgical procedures. In the U.S., orthopedic surgeons performed about 700,000 knee and 400,000 hip replacements each year.[1] In these procedures, the surgeon removed damaged tissue and bone and used implants, screws, and plates to reinforce or create a new joint.[2,3] These surgeries were largely successful. Nine in ten knee replacement patients had a substantial decrease in pain following surgery, and 82% of these patients' implants were still in place and functional after 25 years.[4] Hip replacement surgery achieved similarly positive patient outcomes.[5]

Orthopedic surgeons relied on device manufacturers for the implants and other items needed to perform joint replacement surgery. Throughout the 2010s, the orthopedic device market consolidated following several mergers and acquisitions.[6] By 2020, the top manufacturers in the U.S. controlled nearly 90% of the market.[7] Major players included DePuy Synthes (a Johnson & Johnson company), Medtronic, Stryker, Smith & Nephew, and Zimmer Biomet Holdings.[8]

In 2020, orthopedic device manufacturers generated $11.5 billion in U.S. sales, down 12% from 2019.[9] (See **Exhibit 1**.) This decline was due to the COVID-19 pandemic. To house the influx of COVID patients, hospitals pushed back elective surgeries, such as joint replacements.[10] Analysts expected device sales to rebound, however, given rising demand among the aging U.S. population.[11]

Orthopedic Implants—a Major Physician Preference Item

Orthopedic implant devices were part of a category of medical products called physician preference items (PPIs). Physicians tended to have strong preferences over the specific brands and types of PPIs they used; they included both expensive (e.g., implants) and inexpensive items (e.g., gloves).[12] A surgeon's preference for one orthopedic implant over another was driven by a confluence of factors, including the device's design, its technological features, and the physician's comfort with and confidence in it.[13] PPIs accounted for 40% to 60% of a hospital's supply spend and roughly one-third of total operating costs.[14]

Given physicians' varying preferences, hospitals typically had to source implants from several different manufacturers. Each hospital system paid its own negotiated price, which could vary considerably. One source reported that in 2017, device manufacturers charged between $3,350 and $5,070, on average, for a total knee construct: Zimmer Biomet charged the most, at $5,070, followed by DePuy Synthes ($4,060), Stryker ($3,890), and Smith & Nephew ($3,350).[15] Device manufacturing costs reportedly hovered around $350, yielding significant gross margins for manufacturers.[16]

Physician preferences also often extended to the specific individuals with whom they worked. Many of these surgeons preferred to work with a single, trusted sales representative (rep) affiliated with their manufacturer of choice.[17] Often present in the operating room during the surgery, sales reps had extensive knowledge of their products.[18] These reps earned a commission on device sales.

Some industry observers criticized the strong bond between device manufacturers/sales reps and orthopedic surgeons.[19] They were particularly concerned about the two parties' close financial ties. Manufacturers paid surgeons royalties and patent license fees as well as consulting and speaker fees. A 2015 analysis found that 15,000 orthopedic surgeons in the U.S. had received $110 million from commercial parties during the five-month study period.[20] Surgeons had to ensure that their financial ties to manufacturers did not influence treatment decisions, as this would violate anti-kickback laws.[21]

Reps and surgeons dismissed the idea that their relationship was inappropriately close. Many surgeons felt that reps added considerable value and viewed their presence in the operating room as ultimately beneficial for the patient. As a surgeon told the press, "I look at [the sales rep as] somebody that's expertly trained in their field to provide support for the implants that they happen to sell."[22]

Planning, Performing, and Paying for Joint Replacement Surgery

Orthopedic surgeons performed joint replacements in a hospital setting. If the surgeon was directly employed by the hospital, they worked with hospital staff to schedule time in the operating room. By contrast, if the surgeon worked in private practice, their administrative team contacted an affiliate hospital to book operating room space.[23] There had been a general shift toward hospital employment. By 2018, about 44% of physicians in the U.S. worked directly for hospitals, up from 25% in 2012.[24]

Once the surgery was scheduled, the surgeon's team notified the sales rep for their preferred device manufacturer.[25] Joint replacement surgery required up to 500 items, including the implant, devices, and all supporting hardware (e.g., screws and wrenches).[26] It fell to the rep to ensure that all equipment was on hand on the day of the surgery.[27] In addition, explained Kermit Vice President Todd Lukens, "the exact size of implant needed for any given patient only becomes apparent during the procedure itself. Due to natural variability, some patients need a larger implant, while others need a smaller one. Because that decision is made intraoperatively, the rep must bring a wide range of implant sizes." Once the surgeon decided which device was needed, the rep unboxed the implant.

"Historically, the device and all other items used during the procedure are tracked on a piece of paper in the operating room," explained Palarea. "It is not digitized. Rather, the rep places a sticker for the implant used on that piece of paper." (See **Exhibit 2** for an example of this document, which hospitals called a "bill only sheet.") Then, hospital staff often manually transferred the data from the bill-only sheet into their enterprise resource planning software, connected to a billing service software to create a purchase order for the charges. Typically, all of these steps were completed by hospital staff with little to no clinical experience who looked to device company representatives for assistance. Lukens, a sales rep for Zimmer Biomet before joining Kermit in January 2020, explained that this manual process left room for creative sales tactics. "Reps are often able to overcome the downward pressure on pricing," he explained.

> In one example, a rep that I was supervising had placed 80 boxes of pins used in a knee replacement in the implant room over time. We never used to charge hospital for these pins, so I asked the rep why the boxes were there. It turns out that the hospital had negotiated a price concession, and the rep had offset that concession by adding a box of pins to every single total knee replacement. Our contracted price for a box of pins was $500, so you're talking about $40,000 sitting on the shelf in unnecessary overbillings. As the manager, I felt very strongly that we should return those pins, which we did. Unfortunately, that's the kind of sleight of hand that frankly happens every day in the operating room.

In addition, hospitals' contracts with device manufacturers were complex and multifaceted, making it difficult to catch pricing discrepancies. "There are 10,000 line items in a spine contract agreement," explained Charles Fletcher, a Kermit client and senior vice president, chief of operations, for Virginia Hospital Center Health System. "No one has time to go back and look at the negotiated price of screw #17253. If the rep submits the charge, it is often just passed through the system to be paid."

After joint replacement surgery, the parties involved issued a set of bills. The hospital sent a bill to the government or commercial payer that insured the patient. This bill covered the surgeon's fee (if the surgeon was a direct employee of the hospital), nursing care, patient room and board, the orthopedic implant, and other surgical supplies.[28] (If the surgeon was part of a private practice, the practice billed the payer separately for the surgeon's fee.)[29] Payers were billed on either a fee-for-service or a bundled payment basis, depending on the hospital's negotiations with the individual payer.[a,30] Finally, the sales rep issued a bill to the hospital for the implant and any other instruments used during the procedure.

The total cost of joint replacement surgery varied wildly across the U.S. A 2015 study by commercial insurer Blue Cross Blue Shield found that total knee replacements cost $31,000 on average, but ranged from $11,000 to $69,000.[31] Government insurance payers like Medicare (for people over 65) and Medicaid (for those who fell under a certain income threshold) paid a lower price.[32]

The Contract Negotiation Process

At the hospital level, three main stakeholders with differing priorities influenced the contract negotiation process with device manufacturers—physicians, hospital supply chain managers, and hospital executives. Because orthopedic devices were PPIs, physicians dictated which products hospitals sourced. Their main priority was ensuring access to their preferred device at the time of surgery. Cost was rarely, if ever, their primary concern.[33] Even if it were a factor, physicians had very little visibility into what hospitals paid for devices.[34]

Supply chain managers' priority was containing costs and ensuring accurate billing in a complex system.[35] Executives' primary concern was sustaining hospital profitability, but with poor data, they struggled to address PPI spend issues.[36] (Patient choice was not a major factor, as patients were generally product-agnostic and relied on their surgeons to choose the best implant on their behalf.)[37]

Most hospitals' contracts with device manufacturers lasted for about three years. "The way it works out is that hospitals are renegotiating a contract two to three times per quarter," said Dougherty. "In any given year, one-third of contracts will come due." For manufacturers, explained Lukens, pricing was influenced by market share, volume, and whether the hospital was an academic institution. "If one manufacturer has 80% of a hospital's market share, they tend to charge that hospital a lower price than if they had a 20% market share," he said. "Likewise, a hospital that spends $10 million with a manufacturer gets a lower price than one that spends $3 million. And if the hospital is training residents who might become loyal to the manufacturer, that will typically result in a lower price."

Beyond consideration of these variables, however, hospitals struggled to enter negotiations with manufacturers from a position of power. With very little information about what their peer institutions paid for devices, they could not make a data-driven case for price breaks. "Hospitals dread these negotiations," said Palarea. "They just don't understand the products well enough to go toe-to-toe with the manufacturers. The technical complexity of the device confuses supply chain managers."

"There are a lot of power dynamics at play in the negotiation process," added Lukens. "Manufacturers just have more power than the supply chain folks because they have more information. Add to that the fact that it is uncomfortable for supply chain managers and hospital executives to question surgeons about their implant choices."

---

[a] In a fee-for-service arrangement, hospitals billed payers for each individual procedure performed. By contrast, a bundled payment scheme called for insurers to pay one fixed fee for a joint replacement, which included both the procedure and all pre- and post-surgical appointments. If expenses exceeded the agreed-upon fee, hospitals absorbed the costs. However, if expenses fell below the fixed fee, hospitals kept the savings. Throughout the 2010s, there had been a push toward bundled payments. Source: "What Are Bundled Payments?" NEJM Catalyst, February 28, 2018, https://bit.ly/3xcTNWe, accessed April 2021.

At least one non-profit organization, ECRI Institute, offered benchmarking metrics to help hospitals negotiate fair pricing. But it was difficult for hospital systems to translate these data into actionable insights. As Kermit client William A. Chapelle, the director of corporate supply chain for Luminis Health, lamented, "You can get data from ECRI, but then you then have to interpret and translate it. Doing that on your own takes an inordinate amount of time." Many hospital systems also relied on group purchasing organizations (GPOs), like Vizient, Inc. and Premier Inc., which negotiated pricing on behalf of several hospitals. But many Kermit clients had found inconsistencies in GPO data.

As Lukens pointed out, many benchmarking organizations could only access the "price at the pump," or products' invoiced prices. But," he explained, "because manufacturers routinely negotiate quarterly rebates, the effective price that hospitals pay is much lower." Because manufacturers benefitted from price opacity, many included confidentiality agreements (or "gag clauses") in their contracts with hospitals to prevent information sharing.[38] As one expert wrote, "[P]ressure to increase price transparency has prompted device manufacturers to aggressively enforce these gag clauses through lawsuits. Often, the target of a manufacturer's lawsuit is not the hospital, but a consultant who has collected price data from many hospitals in an effort to help negotiate lower prices."[39] Despite these challenges, hospitals had much to gain by getting the best device prices possible. Because of the way payer reimbursements worked, any cost savings achieved directly improved hospitals' margins.

Enter Kermit

It was into this context that Kermit launched in 2011. Co-founders Smith and Owens, both long-time medical device sales reps, had just quit their jobs at Zimmer Biomet. "They had grown frustrated by all the things their company was asking them to do in the operating room to keep margins high," recalled Palarea. Smith and Owens wanted to use their knowledge of device pricing to make the contract negotiation process more transparent for hospitals. They planned to keep a portion of any cost savings achieved. "But Zimmer Biomet had an onerous non-compete over their heads," said Palarea, "so they had sought legal counsel from an attorney."

At the time, Palarea was running his own business, which negotiated rates with shipping companies, like FedEx, UPS, and DHL, on behalf of large U.S.-based shippers. "I used my knowledge of shipping rates to secure cost savings for my clients," he explained. "My fee was a percentage of the savings." Palarea's attorney, who happened to be the same person representing Smith and Owens, recognized the similarity between Palarea's existing business model and Owens and Smith's idea. He connected the three men. "Their idea was precisely what I had been doing with my logistics business," said Palarea. "At the time, I was interested in doing something more meaningful—something that not only made money, but also transformed the landscape." The three men joined forces to found Kermit.

The Premise

The co-founders' vision was to use Owens and Smith's knowledge of orthopedic device market prices to help hospitals renegotiate their contracts with manufacturers, keeping 30% of the cost savings. For instance, if a hospital saved $8 million on its annual orthopedic device spend after Kermit negotiated better prices on its behalf, Kermit would keep $2.4 million.

The co-founders would also analyze all of a given hospital's contracts with device manufacturers and distill the several thousand line items into a series of business rules (e.g., a vendor is not permitted to bill for a drill bit when combined with certain hip implants). They would then build these rules into software that alerted the hospital of any charges that deviated from contracted pricing and terms.

Palarea, Owens, and Smith would also build rules into the software to detect charges for surgical procedures that were not technically possible. For example, said Palarea, "say a manufacturer charges a hospital for two tibial implants used during a total knee replacement. It is anatomically impossible for this to happen on a left total knee, so one of those implants must have been wasted. The software flags that." Kermit would permit hospitals to use this software at no cost as part of the initial engagement. Then, at the end of a two-year contract, Kermit would convert clients from the shared savings model to a software licensee. In this model, clients would pay Kermit an annual subscription for the compliance monitoring software.

From the start, Palarea, Owens, and Smith offered to work with hospitals on a fully at-risk basis. "We wanted to make it as easy as possible to use us," said Palarea. "If the hospital doesn't save any money, we don't make any money." They selected a whimsical company name to invoke an almost childlike brand identity.[b] "Hospitals would rather engage in almost any other activity than renegotiate these contracts," said Palarea, "so we wanted our brand to inspire a feeling of ease and security. We wanted hospitals to feel like they could switch to autopilot with Kermit."

Accessing Customers

Kermit used a combination of strategies to access potential customers. "We reach out to hospitals constantly," explained Lukens. "As a salesperson, there is an art to keeping the connection alive by sending periodic emails and inviting your contacts to informational webinars."

The majority of Kermit's initial contracts originated from the founding team's professional network and word-of-mouth referrals. To reach more customers, Kermit developed more formal strategies focused on what they termed "market connectors" and "channel partners." A market connector was any individual with hospital contacts who was interested in monetizing their network. In exchange for an introduction to a hospital's chief financial officer or supply chain executive, Kermit offered the market connectors a portion of revenue if the lead converted. "We just want them to set up a meeting," said Lukens. "We can take it from there." Channel partners were analogous to market connectors, but organized around business-to-business connections. "This might be a health care IT company with connections to the hospital C-suite but no experience in PPIs," said Lukens. As with market connectors, Kermit offered channel partners a share of revenue in exchange for converted leads.

These strategies had yielded mixed results. While many hospital administrators recognized Kermit's value, PPI spend was not always top of mind. "We feel that supply chain spend is the fire that is smoldering in the hospital basement ready to ignite," said Palarea. "But," said Dougherty, "any hospital at any point in time has nine fires going, and you cannot tell them which one to extinguish first. They may not choose to address the fire you care about when you approach them. The key is to be ready to act as soon as they decide to prioritize the supply chain fire."

Renegotiating Contracts

When a lead expressed interest, Kermit kicked off its engagement with the potential client by offering to conduct a free assessment of its orthopedic implant spending. Building on Owens and Smith's knowledge as medical device sales executives and accounting for the hospital's size, scope, and market share, Kermit identified opportunities for cost savings. They then shared their findings with the hospital. If the hospital decided to move forward with Kermit, the company then helped the

[b] Here, the company is alluding to Kermit the Frog, a famous, jovial, puppet character that appeared on several children's television shows, such as *The Muppet Show* and *Sesame Street.*

hospital prepare when its contracts came up for renegotiation. They either directly participated in the renegotiation process or supported the supply chain and hospital executives with analyses, ideas for generating stakeholder alignment, and coaching on how best to negotiate with vendors.

Given pricing confidentiality agreements, it was illegal for Kermit to directly reference the price paid by a peer hospital system during these negotiations, but it could speak generally to the market rate. "When we negotiate," said Lukens, "our mantra is that we are simply asking for prices that exist in the market." Many clients had been surprised by the accuracy of Kermit's data. As Fletcher said, "Their pricing data is better than our GPO's and ECRI's data, sometimes by as much as 10% to 15%."

Clients valued the consistent guidance that Kermit provided in the lead-up to contract renegotiations. Chapelle said that in the six months preceding renegotiation, Kermit staff were "always available" to him. "They're doing the heavy lift at the front end of the contract," he said.

Compliance Monitoring Software

The co-founders understood that it was not enough just to help hospitals secure the best possible price for orthopedic implants. After renegotiating, said Smith, "the vendors started their tricks again. They were trying to find loopholes in the [renegotiated] contract."[40] Thus, to retain the negotiated savings, Kermit developed software that enabled hospitals to: 1) capture orthopedic device charges in real-time; and 2) detect and alert supply chain executives of any billing errors. "It takes a piece of software running *inside* the operating room to make a difference," explained Palarea. He continued:

> Lots of other attempts around this have failed because they wait until the data is accumulated inside of some hospital enterprise system to analyze it. The problem is that those data are full of errors because the crime is being committed on the paper itself. If you don't capture, clean, and categorize the data where it originates, you commit all of that dirty data to your data stream. We have to make a clean catch of the data right in the operating room at the point of use.

A key hurdle was codifying the detailed billing data collected in the operating room, which historically mainly involved paper copies of documents. In 2012, Kermit introduced CaseSnap, a mobile app, as the sales data capture tool. (See **Exhibit 3**.) During joint replacement surgery, the sales rep used CaseSnap to enter details about the case and to take a picture of the bill-only sheet containing implant stickers with all barcodes and hand-written annotations about the implants used in the operating room. CaseSnap then transmitted that information to Kermit's cloud-based platform for analysis. CaseSnap did not save images on the rep's smartphone, thereby removing any risk of violating data privacy protections set in the Health Insurance Portability and Accountability Act (HIPAA). Importantly, said Palarea, "the sales rep keeps his paper ledger because that's his comfort zone. We don't want to change the workflow commonly used inside the operating room."

Kermit's software then checked for anomalies that might indicate billing mistakes or pricing that deviated from that hospital's contracted rates. Kermit then provided supply chain executives with a list of charges that had passed its review and were cleared for payment. "Hospitals can even use Kermit to automatically issue purchase orders for these charges if they want," said Palarea. "That's a big time-saver and cost reduction because no one is having to go in and look at those bills."

Kermit also flagged problematic charges. Palarea offered an example. "Say an implant is wasted during the procedure," he said. "The rep might write on the bill sheet, 'The surgeon went to insert the device and dropped it on the floor. The hospital owes us for that.' We do not just take the rep's word for it." Instead, the Kermit software initiated a messaging workflow, contacting all stakeholders. "After a review of the medical record," continued Palarea, "the hospital might discover that the rep unboxed a size 52 when the surgeon had actually asked for a 53. In that case, the hospital should not have to pay for the wasted implant." Once the underlying issue was uncovered, the Kermit software automatically corrected the charge. Kermit saved its average customer about 6% of their total annual spending on implants, which, for some hospitals, equated to an entire staff member's salary.

Lastly, Kermit used its data to create analytics and dashboards for the three main stakeholders involved in orthopedic PPI spend—surgeons, supply chain administrators, and hospital executives. (See **Exhibit 4**.) These dashboards presented aggregate data, overarching trends, and key performance indicators at-a-glance to monitor orthopedic spending. For hospital administrators, the benefit of these dashboards was evident. "But we've also seen real interest among surgeons," said Palarea. "Because many physicians today are employed by the hospital, they are increasingly invested in being good stewards of the hospital's resources."

Progress

By 2021, Kermit had grown to 21 employees with three sales executives, seven client service and support staff, and three additional executive staff. The company had worked with 10 health systems and 37 hospitals. Kermit's clients were concentrated in the Mid-Atlantic region, with notable penetration in Maryland. By renegotiating their orthopedic device contracts, Kermit had saved its clients an average of 30%, with savings as high as $15 million per year.[41]

Clients valued Kermit. "The primary benefit to us as a hospital system is increased price control and visibility into variations," said Chapelle. "Kermit is one of the few companies that I would call a partner versus just a vendor." Fletcher agreed. "With the Kermit folks," he said, "there is a sense that we're all in this together."

Maintaining and nurturing these partnerships, however, was highly labor-intensive. Dougherty was not convinced that Kermit could scale such a high-touch model, but he was also aware of the need to approach changes carefully. "Relationship management is important in this business," said Fletcher. "John [Owens] and I text and email often. You wonder, if Kermit gets too big, will they provide the same level of service? Growing is great, but they had better have 17 Johns at the ready."

Charting a Growth Strategy

Dougherty had joined Kermit with a clear mandate: work with Palarea, Owens, and Smith to create a viable nationwide strategy. With 25 years of experience in the health care industry, Dougherty felt ready for the challenge. "When we hired Tom," said Palarea, "he had just grown a health care analytics business like ours from pre-revenue to $50 million." Since joining in February 2021, Dougherty had spent his time learning as much as he could about Kermit.

The March 2021 strategy call with the three co-founders had been particularly illuminating, and Dougherty soon found himself lost in thought. Given the extent to which the co-founders directly supported Kermit's clients, Dougherty wondered what services, precisely, the hospitals valued most. "We need to develop better 'product-ization' of our services," he said. "What I mean by that is getting greater clarity around exactly what it is we sell. Is it the contract renegotiation service? Is it the software? And where does one product end and the other begin? Once we get clear about that, I can see a future where we scale and build different service components around our most valued product."

The software service required less time and effort to deliver than did contract renegotiations. Kermit could potentially de-prioritize this more labor-intensive service to focus on selling its compliance monitoring software on a subscription basis. While Dougherty understood this view, he was not convinced that hospitals would adopt the software without guidance from Kermit. “When you give an analytics tool to a hospital manager, utilization is like 25%,” he said. “It’s akin to a gym membership. So I have a hard time seeing how we could maximize the value of the tool if it’s self-managed.”

Compounding his concerns, the co-founders had struggled to realize their original vision of transitioning clients from the shared savings model to software licensees after two years. While one large system had transitioned into the subscription model, a second success seemed uncertain. “Hospitals seem to like the fully at-risk model because they don’t pay unless we deliver,” said Lukens. “Because the system works effectively, many hospitals have asked us to negotiate contract pricing in other service lines beyond orthopedics. To at least some of our clients, that seems to be more attractive than paying for a software license.”

Kermit could also try to segment the market. On their call, Palarea had pitched the idea of identifying characteristics of certain hospitals that might make them more open to Kermit. “Recently merged organizations or hospitals preparing to implement a new electronic health record system might be good targets,” he had said. Prioritizing regions with large clusters of hospitals was also an option.

Dougherty reviewed what he knew about the hospital industry in the U.S.

Hospitals in the U.S.

In 2020, the 5,155 hospitals in the U.S. posted revenues of $938 billion.[42] (See **Exhibit 5**.) The majority of hospital revenues came from reimbursements from the government and commercial payers that insured their patients. In 2020, private insurance generated 50.2% of hospital revenues, followed by government insurance (35.8%), with the remaining 14% coming from other sources.[43] Since the 1980s, the proportion of hospital revenues generated by government payers had increased. (See **Exhibit 6**.) Hospitals provided three types of care: 1) inpatient, acute care, which required at least one overnight stay; 2) outpatient care, which required no overnight stay and typically involved a planned, elective surgery; and 3) emergency care.[44] Inpatient care generated 46% of hospital revenue, followed by emergency care (36%), and outpatient care (18%).[45] Hospitals maintained several service lines, including cardiology, labor and delivery, oncology, and orthopedics.

Hospitals fell into three categories: 1) non-profit community hospitals; 2) for-profit hospitals; and 3) government hospitals.[46] Non-profit community hospitals provided both generalized and specialized care, and some also trained newer physicians.[47] While many community hospitals were actually profitable, they were exempt from paying taxes due to the argument that they meaningfully contributed to the communities in which they operated.[48] Most (57%) hospitals were community hospitals.[49] Some of the most prestigious U.S. institutions, including the Mayo Clinic and Cleveland Clinic, were non-profit community hospitals.[50]

Owned by a corporate entity, for-profit hospitals aimed to both provide patient care and earn a profit for their shareholders.[51] The largest for-profit hospital system in the U.S. was HCA Healthcare Inc., a 179-hospital group headquartered in Nashville, Tennessee.[52] In 2020, HCA Healthcare reported revenues of $51.5 billion.[53] Lastly, government hospitals, funded by tax dollars, provided coverage for a particular geographic region or subset of underserved patients.[54]

Hospitals in the U.S. ranged from small independent institutions to large, sprawling systems. Most (75%) had fewer than 200 beds, while a small minority (8%) had more than 400 beds.[55] Hospitals tended to be concentrated in areas with larger, older populations. The Southeast was home to 26% of all U.S. hospitals, followed by the Great Lakes (14.8%), and the Plains (13.4%).[56] About 9% of hospitals were in Texas, followed by New York (4.8%), and Florida (4.7%)[57] (See **Exhibit 7**). The 2010s had seen a steady stream of hospital mergers and acquisitions. (See **Exhibit 8**.) Analysts expected the trend to continue from 2021 to 2025, with acquisitions increasing by an annualized rate of 0.4%.[58]

In 2020, hospitals struggled financially as they shifted from providing higher-value elective surgical procedures to treating high-cost COVID-19 patients.[59] Rising costs had pushed profitability down. In 2020, hospitals earned a profit margin of 7.6%, down from 9.4% in 2019 (refer to **Exhibit 5**).[60] An economic relief plan passed in March 2020 called the Coronavirus Aid, Relief, and Economic Security (CARES) Act included $175 billion for health care providers.[61] Hospitals could use these funds to either recoup pandemic-related costs or to recover revenue lost because of COVID-19.[62] While COVID-19 had hit hospitals hard, industry observers expected them to bounce back as the pandemic subsided. One analyst projected revenues to grow at an annualized rate of 2.4% from 2021 to 2025.[63]

Setting 2020 aside, the financial health of hospitals in the U.S. varied widely. Wrote one expert, "Many nonprofit hospitals, especially in rural areas, struggle mightily; scores of rural hospitals have closed [. . .]. At the other end are hospitals that earn several thousand dollars in profit *per patient*."[64]

Growing Kermit

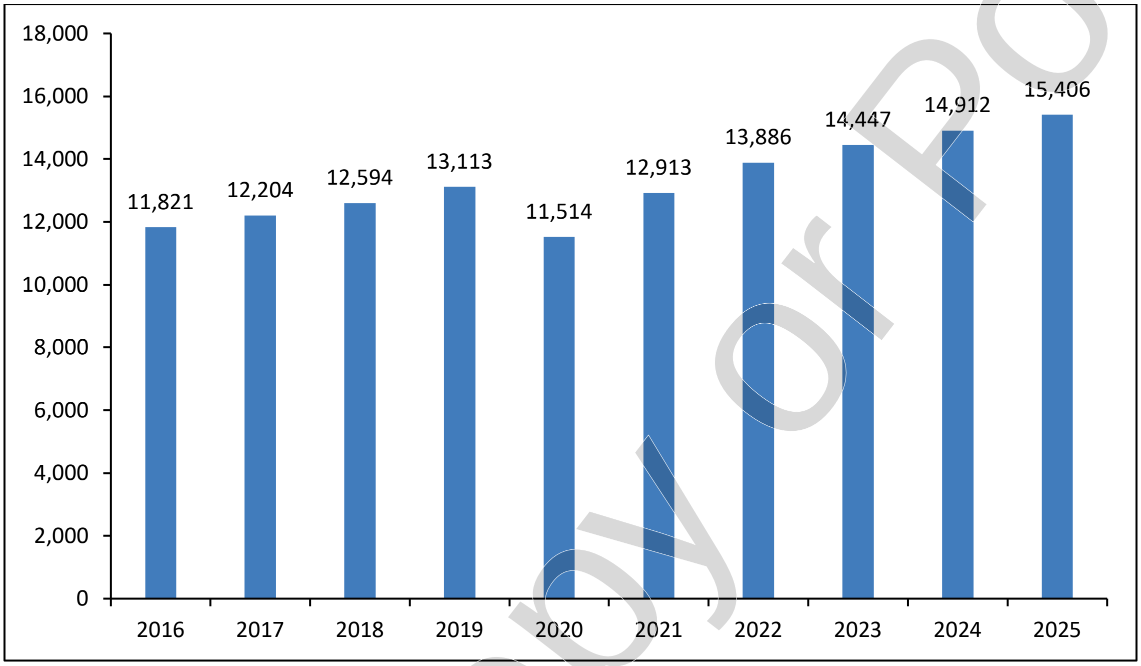
In his one-month tenure with Kermit, Dougherty had learned that the cost savings generated by the company's contract renegotiation service were more valuable, on a relative basis, for smaller, lower-margin hospitals than for larger hospital systems. "Some hospitals get Kermit's value proposition right away," said Lukens, "and they tend to be the ones that are struggling financially. Those with net income of less than 1% recognize that they need our help. However, for a lot of the bigger hospitals that are quite profitable, our value proposition does not resonate as strongly."

In addition, some worried that Kermit's heavy emphasis on bringing down the costs of orthopedic devices might further limit its ability to penetrate larger health systems, whose decisions were often influenced by many factors beyond cost (e.g., being at the technological frontier). But others felt differently. "More and more, orthopedic implants are becoming commodities," said Fletcher. "The outcomes are all the same. They're not as specialized as they used to be."

Another possibility was for Kermit to expand into other hospital service lines. The company had helped Fletcher and Virginia Hospital Center save money on basic commodity supplies, like bandages and gloves. "That's an area where Kermit could grow," said Fletcher. "They ended up reducing commodity costs for us by like 15% just by challenging the manufacturer on a few high-priced items." But such a strategy would place Kermit in direct competition with GPOs, and it was not clear to Dougherty that Kermit had a competitive advantage in areas other than high-value implants.

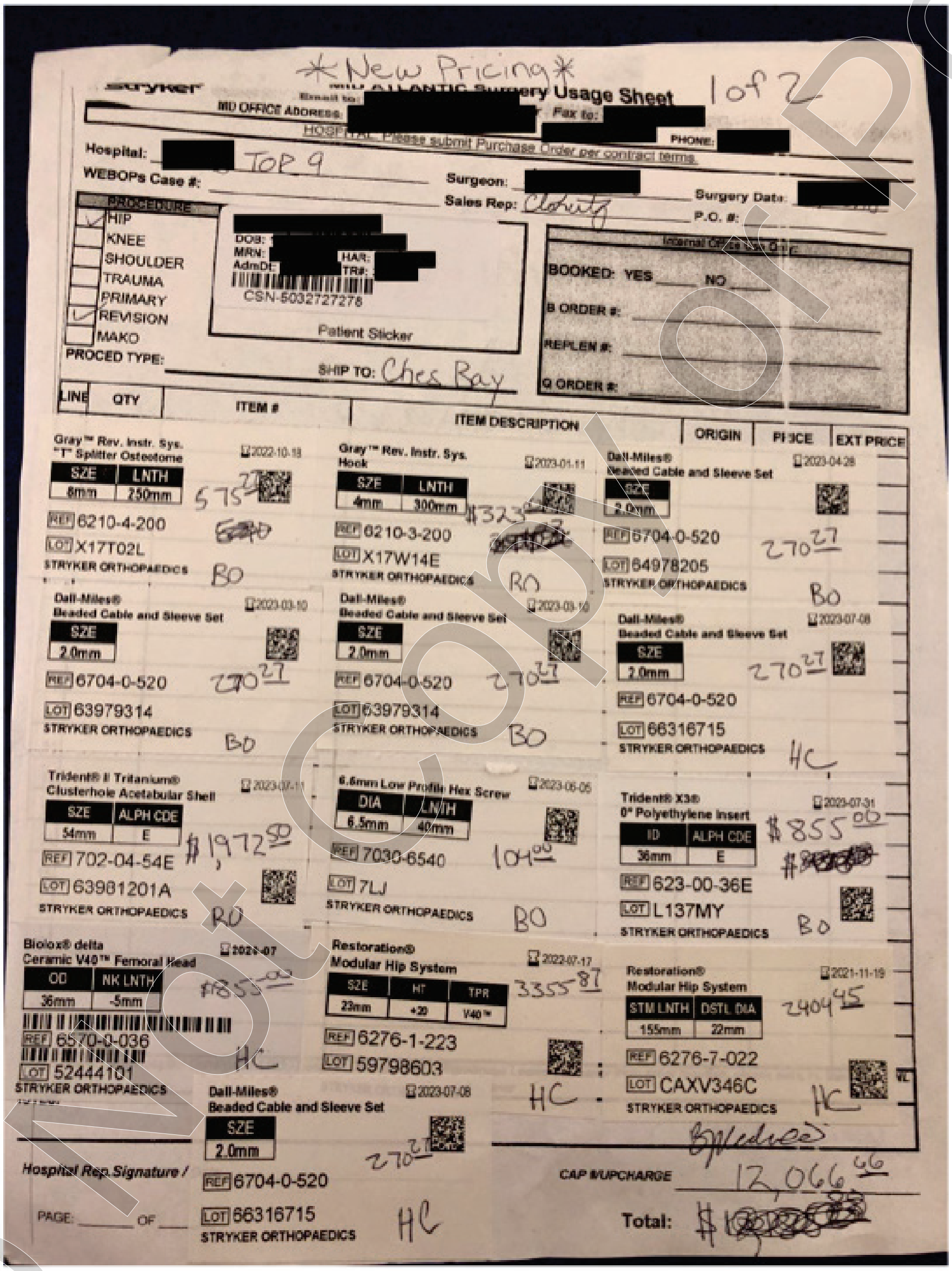
Lastly, Kermit had considered helping hospitals account for the needs of individual patients when selecting orthopedic implants. In this approach, called "demand matching," surgeons would match the device used to the needs of the patient. It was reasonable to assume that athletes, for instance, would exert more pressure on their orthopedic implant than would older, more sedentary patients. Explained Fletcher: "Currently, we are using the latest and highest-cost knees in almost all patients, when in reality some lower-cost, proven technologies with equal quality can provide the same or better outcomes for older populations. With demand matching, we review the specifics of the patient to determine the best choice." Dougherty worried, however, that demand matching might infringe upon surgeons' freedom to choose their PPIs. He considered Kermit's options.

Exhibit 1 U.S. Orthopedic Device Revenues, 2016-2020 (Actual); 2021-2025 (Est.), U.S.$ Millions



Source: "Orthopedic Devices – United States," accessed April 2021 via Statista.

Exhibit 2 Orthopedic Implant Bill Only Sheet, 2020



New Pricing

stryker

MID ATLANTIC Surgery Usage Sheet 1 of 2

Email to: MD OFFICE ADDRESS: [redacted] Fax to: [redacted] PHONE: [redacted]

HOSPITAL: Please submit Purchase Order per contract terms.

Hospital: [redacted]

WEBOPs Case #: TOP 9

Surgeon: [redacted]

Sales Rep: Clohutz

Surgery Date: [redacted]

P.O. #:

PROCEDURE
- ✓ HIP
- KNEE
- SHOULDER
- TRAUMA
- PRIMARY
- ✓ REVISION
- MAKO

PROCED TYPE:

[redacted]
DOB: [redacted]
MRN: [redacted]
AdmDt: [redacted] HAR: [redacted] TR#: [redacted]
CSN-5032727278
Patient Sticker

SHIP TO: Ches Bay

Internal Office Use Only
BOOKED: YES ____ NO ____
B ORDER #:
REPLEN #:
Q ORDER #:

LINE	QTY	ITEM #	ITEM DESCRIPTION	ORIGIN	PRICE	EXT PRICE

Gray™ Rev. Instr. Sys. "T" Splitter Osteotome — 2022-10-18 — SZE 8mm, LNTH 250mm — REF 6210-4-200 — LOT X17T02L — STRYKER ORTHOPAEDICS — 575^27 — BO

Gray™ Rev. Instr. Sys. Hook — 2023-01-11 — SZE 4mm, LNTH 300mm — REF 6210-3-200 — LOT X17W14E — STRYKER ORTHOPAEDICS — $323 — BO

Dall-Miles® Beaded Cable and Sleeve Set — 2023-04-28 — SZE 2.0mm — REF 6704-0-520 — LOT 64978205 — STRYKER ORTHOPAEDICS — 270^27 — BO

Dall-Miles® Beaded Cable and Sleeve Set — 2023-03-10 — SZE 2.0mm — REF 6704-0-520 — LOT 63979314 — STRYKER ORTHOPAEDICS — 270^27 — BO

Dall-Miles® Beaded Cable and Sleeve Set — 2023-03-10 — SZE 2.0mm — REF 6704-0-520 — LOT 63979314 — STRYKER ORTHOPAEDICS — 270^27 — BO

Dall-Miles® Beaded Cable and Sleeve Set — 2023-07-08 — SZE 2.0mm — REF 6704-0-520 — LOT 66316715 — STRYKER ORTHOPAEDICS — 270^27 — HC

Trident® II Tritanium® Clusterhole Acetabular Shell — 2023-07-11 — SZE 54mm, ALPH CDE E — REF 702-04-54E — LOT 63981201A — STRYKER ORTHOPAEDICS — $1,972^50 — BO

6.5mm Low Profile Hex Screw — 2023-06-05 — DIA 6.5mm, LNTH 40mm — REF 7030-6540 — LOT 7LJ — STRYKER ORTHOPAEDICS — 104^00 — BO

Trident® X3® 0° Polyethylene Insert — 2023-07-31 — ID 36mm, ALPH CDE E — REF 623-00-36E — LOT L137MY — STRYKER ORTHOPAEDICS — $855^00 — BO

Biolox® delta Ceramic V40™ Femoral Head — 2024-07 — OD 36mm, NK LNTH -5mm — REF 6570-0-036 — LOT 52444101 — STRYKER ORTHOPAEDICS — $855^00 — HC

Restoration® Modular Hip System — 2022-07-17 — SZE 23mm, HT +20, TPR V40™ — REF 6276-1-223 — LOT 59798603 — 3355^87 — HC

Restoration® Modular Hip System — 2021-11-19 — STM LNTH 155mm, DSTL DIA 22mm — REF 6276-7-022 — LOT CAXV346C — STRYKER ORTHOPAEDICS — 2404^45 — HC

Dall-Miles® Beaded Cable and Sleeve Set — 2023-07-08 — SZE 2.0mm — REF 6704-0-520 — LOT 66316715 — STRYKER ORTHOPAEDICS — 270^27 — HC

Hospital Rep Signature /

PAGE: ____ OF ____

CAP W/UPCHARGE 12,066^46

Total: $

Source: Company documents.

Exhibit 3 CaseSnap Screenshots

Source: Company documents.

Exhibit 4 Sample Kermit Dashboards

Source: Company documents.

Exhibit 5 Key U.S. Hospital Statistics, 2011-2020

	Number of Hospitals	Revenue ($Mn)	Profit (EBIT)	Employment	Wages ($Mn)
2015	5,361	1,013,211	8.0%	5,199,364	340,260
2016	5,417	1,059,783	8.6%	5,300,881	346,197
2017	5,544	1,088,941	8.5%	5,529,637	368,929
2018	5,444	1,107,572	7.9%	5,564,706	374,342
2019	5,529	1,142,764	9.4%	5,699,659	383,983
2020	5,155	938,185	7.6%	5,021,662	333,694

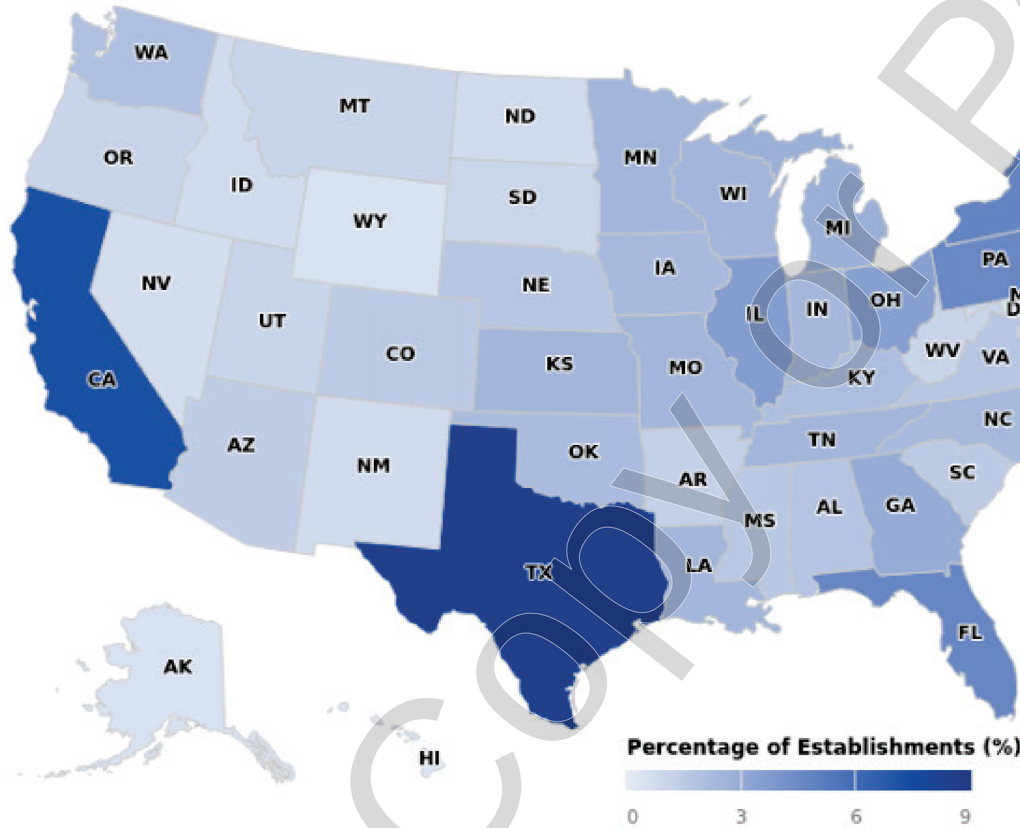
Source: Casewriter, compiled from: Jack Curran, "Hospitals in the US," IbisWorld Industry Report 62211, January 2021, pp. 13, 23.

Exhibit 6 Distribution of U.S. Hospital Costs by Payer, 1980-2016

	1980	2000	2016
Medicare	34.6%	38.3%	40.8%
Medicaid	9.6%	12.8%	18.5%
Other Government	6.1%	1.1%	1.5%
Private Payer	41.8%	38.7%	33.4%
Other Sources	7.9%	9.1%	5.8%

Source: Casewriter, adapted from: "Distribution of hospital costs in the U.S. in 1980, 2000, and 2016, by payer," American Hospital Association, May 2018, accessed April 2021 via Statista.

Exhibit 7 Concentration of Hospitals in the U.S., 2020



Source: Jack Curran, "Hospitals in the US," IbisWorld Industry Report 62211, January 2021, p. 20.

Exhibit 8 Number of Acquired Hospitals in the U.S., 2010-2017

Year	Number of Acquisitions
2010	125
2011	160
2012	242
2013	292
2014	169
2015	267
2016	241
2017	216

Source: "Total number of acquired hospitals in U.S. hospital transactions from 2007 to 2017," American Hospital Association, May 2018, via Statista, accessed April 2021.

Endnotes

[1] Campbell Clinic Orthopaedics, "Total Joint Replacement Procedures Continue to Increase," February 15, 2019, https://www.campbellclinic.com/total-joint-replacement-procedures-continue-to-increase/, accessed April 2021.

[2] Tim Calkins and Joseph Harmon, "Zimmer: The Gender-Specific Knee," Kellogg School of Management KEL276 (Boston: Harvard Business School Publishing, 2007), p. 2.

[3] National Health Service, "Hip replacement," February 14, 2020, https://bit.ly/3bP2w7P, accessed April 2021.

[4] Healthline, "Critical Outcomes and Statistics of Knee Replacement," April 15, 2020, https://www.healthline.com/health/total-knee-replacement-surgery/outcomes-statistics-success-rate, accessed April 2021.

[5] Steven B. Haas and Thomas P. Sculco, "Hip and Knee Replacement Surgery FAQs," May 27, 2016, https://www.hss.edu/conditions_hip-knee-replacement-surgery-faqs.asp, accessed April 2021.

[6] Jack Curran, "Orthopedic Products Manufacturing," IbisWorld U.S. Industry (Specialized) Report OD4097, October 2020, p. 7.

[7] Curran, "Orthopedic Products Manufacturing," p. 8.

[8] "Orthopedic Devices – United States," via Statista, accessed April 2021

[9] "Orthopedic Devices – United States," via Statista, accessed April 2021.

[10] Sarah Zhang, "What It Really Means to Cancel Elective Surgeries," *The Atlantic,* March 17, 2020, https://www.theatlantic.com/science/archive/2020/03/patients-whose-surgeries-are-canceled-because-coronavirus/608176/, accessed April 2021.

[11] Curran, "Orthopedic Products Manufacturing," p. 10.

[12] Jeff Lagasse, "Here's a big supply chain cost-savings opportunity: physician preference items," Healthcare Finance, December 27, 2018, https://www.healthcarefinancenews.com/news/heres-big-supply-chain-cost-savings-opportunity-physician-preference-items, accessed April 2021.

[13] Lawton R. Burns, Michael G. Housman, Robert E. Booth, and Aaron M. Koenig, "Physician preference items: what factors matter to surgeons? Does the vendor matter?," *Med Devices (Auck)* 2018(11): 39-49.

[14] Lawton R. Burns, Michael G. Housman, Robert E. Booth, and Aaron M. Koenig, "Physician preference items: what factors matter to surgeons? Does the vendor matter?," *Med Devices (Auck)* 2018(11): 39-49; and "Changes in Hospital Medical and Surgical Supply Costs Year-to-Year," Definitive Healthcare, 2020 Trend Report, https://www.definitivehc.com/resources/healthcare-insights/changes-in-supply-costs-year-to-year, accessed April 2021.

[15] Conor Stewart, "Total knee construct average pricing in the U.S. as of 2017, by supplier," Vizient, April 26, 2018, via Statista, accessed April 2021.

[16] Elisabeth Rosenthal, "In Need of a New Hip, but Priced Out of the U.S.," *New York Times,* August 3, 2013, https://www.nytimes.com/2013/08/04/health/for-medical-tourists-simple-math.html, accessed April 2021.

[17] Blake Farmer, "Sales Reps May Be Wearing Out Their Welcome In The Operating Room," NPR, November 23, 2018, https://www.npr.org/sections/health-shots/2018/11/23/659816082/sales-reps-may-be-wearing-out-their-welcome-in-the-operating-room, accessed April 2021.

[18] Farmer, "Sales Reps May Be Wearing Out Their Welcome In The Operating Room."

[19] Jim Hoover, "Relationships Between Orthopedic Surgeons and Medical Device Companies," Birmingham Medical News, https://www.birminghammedicalnews.com/news.php?viewStory=1177, accessed April 2021.

[20] Andre M. Samuel, Matthew L. Webb, Adam M. Lukasiewicz, Daniel D. Bohl, Bryce A. Basques, Gleen S. Russon, Vinay K. Rathi, and Jonathan N. Grauer, "Orthopaedic Surgeons Receive the Most Industry Payments to Physicians but Large Disparities are Seen in Sunshine Act Data," *Clin Orthop Relat Res.* 2015 Oct; 473(10: 3297-3306.

[21] Constantine Cannon, "Anti-Kickback Statute and Stark Law," https://bit.ly/31pUSPd, accessed April 2021.

[22] Blake Farmer, "Sales Reps May Be Wearing Out Their Welcome In The Operating Room," NPR, November 23, 2018, https://www.npr.org/sections/health-shots/2018/11/23/659816082/sales-reps-may-be-wearing-out-their-welcome-in-the-operating-room, accessed April 2021.

[23] Tim Calkins and Joseph Harmon, "Zimmer: The Gender-Specific Knee," Kellogg School of Management KEL276 (Boston: Harvard Business School Publishing, 2007), p. 4.

[24] Les Masterson, "Hospitals now employ more than 40% of physicians, analysis finds," Healthcare Dive, February 21, 2019, https://www.healthcaredive.com/news/hospitals-now-employ-more-than-40-of-physicians-analysis-finds/548871/#:~:text=The%20number%20of%20hospital%2Dacquired,doubled%20to%2044%25%20in%202018., accessed April 2021.

[25] Calkins and Harmon, "Zimmer: The Gender-Specific Knee," p. 5.

[26] Calkins and Harmon, "Zimmer: The Gender-Specific Knee," p. 5.

[27] Calkins and Harmon, "Zimmer: The Gender-Specific Knee," p. 5.

[28] Calkins and Harmon, "Zimmer: The Gender-Specific Knee," p. 6.

[29] Calkins and Harmon, "Zimmer: The Gender-Specific Knee," p. 5.

[30] Keith D. Lind, "Understanding the Market for Implantable Medical Devices," AARP Insight on the Issues, August 2017, https://www.aarp.org/content/dam/aarp/ppi/2017/08/understanding-the-market-for-implantable-medical-devices.pdf, p. 3, accessed April 2021.

[31] Blue Cross Blue Shield, "A study of cost variations for knee and hip replacement surgeries in the U.S.," January 21, 2015, https://www.bcbs.com/the-health-of-america/reports/study-of-cost-variations-knee-and-hip-replacement-surgeries-the-us#:~:text=Within%20a%20market%2C%20extreme%20cost,replacement%20procedure%2C%20which%20averaged%20%2430%2C124., accessed April 2021.

[32] Calkins and Harmon, "Zimmer: The Gender-Specific Knee," p. 6.

[33] Lawton R. Burns, Michael G. Housman, Robert E. Booth, and Aaron M. Koenig, "Physician preference items: what factors matter to surgeons? Does the vendor matter?," *Med Devices (Auck)* 2018(11): 39-49.

[34] Kermit PPI, "The Problem," http://kermitppi.com/, accessed April 2021.

[35] Kermit PPI, "The Problem."

[36] Kermit PPI, "The Problem."

[37] Lawton R. Burns, Michael G. Housman, Robert E. Booth, and Aaron M. Koenig, "Physician preference items: what factors matter to surgeons? Does the vendor matter?," *Med Devices (Auck)* 2018(11): 39-49.

[38] Keith D. Lind, "Understanding the Market for Implantable Medical Devices," AARP Insight on the Issues, August 2017, https://www.aarp.org/content/dam/aarp/ppi/2017/08/understanding-the-market-for-implantable-medical-devices.pdf, p. 4, accessed April 2021.

[39] Keith D. Lind, "Understanding the Market for Implantable Medical Devices," AARP Insight on the Issues, August 2017, https://www.aarp.org/content/dam/aarp/ppi/2017/08/understanding-the-market-for-implantable-medical-devices.pdf, p. 4, accessed April 2021.

[40] Mendix, "Stem the Capitol Hemorrhage," https://www.mendix.com/customer-stories/kermit-ppi/, accessed April 2021.

[41] Mendix, "Stem the Capitol Hemorrhage," https://www.mendix.com/customer-stories/kermit-ppi/, accessed April 2021.

[42] Jack Curran, "Hospitals in the U.S.," IbisWorld Industry Report 62211, January 2021, p. 13.

[43] Curran, "Hospitals in the U.S.," p. 19.

[44] Curran, "Hospitals in the U.S.," pp. 17-18.

[45] Curran, "Hospitals in the U.S.," p. 8.

[46] Curran, "Hospitals in the U.S.," p. 17.

[47] Jason B. Liu and Rachel R. Kelz, "Types of Hospitals in the United States," JAMA Patient Page, September 11, 2018, https://jamanetwork.com/journals/jama/fullarticle/2702148, accessed April 2021.

[48] Danielle Ofri, "Why Are Nonprofit Hospitals So Highly Profitable?," *New York Times*, February 20, 2020, https://www.nytimes.com/2020/02/20/opinion/nonprofit-hospitals.html, accessed April 2021.

[49] Kaiser Family Foundation, "Hospitals by Ownership Type," 2019, https://www.kff.org/other/state-indicator/hospitals-by-ownership/?dataView=0&currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D, accessed April 2021.

[50] Danielle Ofri, "Why Are Nonprofit Hospitals So Highly Profitable?," *New York Times*, February 20, 2020, https://www.nytimes.com/2020/02/20/opinion/nonprofit-hospitals.html, accessed April 2021.

[51] Curran, "Hospitals in the U.S.," p. 17.

[52] Curran, "Hospitals in the U.S.," p. 29.

[53] HCA Healthcare, "HCA Healthcare Reports Fourth Quarter 2020 Results and Provides 2021 Guidance," February 2, 2021, https://investor.hcahealthcare.com/news/news-details/2021/HCA-Healthcare-Reports-Fourth-Quarter-2020-Results-and-Provides-2021-Guidance/default.aspx, accessed April 2021.

[54] Jack Curran, "Hospitals in the U.S.," IbisWorld Industry Report 62211, January 2021, p. 17; and Danielle Ofri, "Why Are Nonprofit Hospitals So Highly Profitable?," *New York Times*, February 20, 2020, https://www.nytimes.com/2020/02/20/opinion/nonprofit-hospitals.html, accessed April 2021.

[55] "Number of registered hospitals in the U.S. in 2018, by number of beds," American Hospital Association, 2018, via Statista, accessed April 2021.

[56] Curran, "Hospitals in the U.S.," p. 20.

[57] Curran, "Hospitals in the U.S.," p. 20.

[58] Curran, "Hospitals in the U.S.," p. 15.

[59] Curran, "Hospitals in the U.S.," p. 9.

[60] Curran, "Hospitals in the U.S.," p. 23.

[61] Karyn Schwartz and Anthony Damico, "Distribution of CARES Act Funding Among Hospitals," Kaiser Family Foundation, May 13, 2020, https://www.kff.org/coronavirus-covid-19/issue-brief/distribution-of-cares-act-funding-among-hospitals/, accessed April 2021.

[62] Schwartz and Damico, "Distribution of CARES Act Funding Among Hospitals."

[63] Curran, "Hospitals in the U.S.," p. 9.

[64] Ofri, "Why Are Nonprofit Hospitals So Highly Profitable?"