



Partnership for Innovation in Education

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ST. CLEMENT HOSPITAL

This case is written by the Partnership for Innovation in Education with Gamble Montessori School students. This format is based upon the Case Method. ©2015

Dr. Tina Patterson thinks the newest technology in sanitizing hospital rooms is a program that could be deployed at St. Clement Hospital. The Hospital President has asked that she study the opportunity and report her findings immediately. Can you help her fulfill this assignment?


Situation

Dr. Tina Patterson was worried. Kevin, her younger brother, had just been admitted to the St. Clement Heart Institute. The doctors determined that he needed a heart valve repair. Although St. Clement surgeons were considered some of the best in the world, they wanted to minimize any risk, so the team would include robotic-assisted surgery tools. In addition, Kevin's team featured one of the most practiced physician leaders in vascular technology. With such an invasive surgery, she knew her brother would need to remain at the hospital for several days.

Dr. Patterson was acutely aware that her brother was immunodeficient, and his body's inability to fight off infections and illnesses might be compromised in a hospital setting. If prior occupants in Kevin's hospital room had any active infections, it could affect Kevin's recovery.

While Dr. Patterson didn't doubt the effectiveness of St. Clement's housekeeping staff as it sanitized hospital rooms, she was aware certain areas were very hard to clean. Typical cleaning supplies could only kill 99.999% of germs. What if the .001% that survived hurt her brother?

Dr. Patterson voiced her concerns to Dr. Bailey, who specialized in infectious disease. She mused, "Isn't there a better way to confirm that all rooms are clean?" Dr. Bailey stroked his chin and answered, "My wing has a new UVC device. I can make a request, and have your brother's room cleaned with it!"



Dr. Patterson gratefully accepted. The next day, Kevin's surgery went well, and his recovery was successful. Dr. Patterson was ecstatic, and she wondered if the UVC cleaning helped in his recovery.

"I'm impressed with how well the UV sanitation worked and I think we should invest in more of them!" Dr. Patterson told Michael Orwell, the President of St. Clement. He replied, "That's an interesting idea, but I'm not sure if it's cost efficient. If it's worth the expense, I'll consider it. Report back to me next week and I'll put your UVC analysis on the Board agenda." Jotting down a few notes, Dr. Patterson bumped into St. Clement's Executive Director of Operations, Jim London, and asked that he help her with the President's request. Walking quickly down the well-lit hospital corridors, they planned their next steps.

Company Background

In 1995 Shoreditch General and St. George's joined their hospitals, health sites, and doctors together to create St. Clement, one of the top integrated health systems in the Eastwick area.

St. Clement includes Shoreditch General North, St. George's, and Shoreditch General Amaranth County Hospitals and three satellite ambulatory networks: Shoreditch General Crystal Springs, St. George's Clearwater, and St. George's Outpatient Center. All patient information is linked between these hospitals allowing, for example, a cardiologist at Shoreditch General North to review initial diagnoses from a physician at the St. Clement Heart Institute.

St. Clement employs nearly 600 physicians at over 125 locations in Greater Eastwick, with specialties spanning obstetrics, sports medicine, orthopedics, and oncology, to geriatric medicine for older adults, including physical therapy centers.

The medical group has net revenue of almost \$1.3 billion dollars per year, with spending of \$73 million annually on community outreach programs. These include medical education and research, subsidized health services and charity care.

St. Clement has received numerous honors and awards over the years. Recently, The American Medical Group Association awarded St. Clement the AMGA Acclaim award, recognizing quality improvement in patient care. Both Shoreditch General North and St. George's were among the top heart hospitals in the country in 2009, and in 2010 the *U.S. News and World Report for Diabetes and Endocrinology Care* ranked St. George's #42 in the country.

St. Clement is a recognized global expert in many fields, including specializing in robotic-assisted surgery, and the institutional use of electronic medical records for quality patient care.

The St. Clement Market

St. Clement sees 50,000 patients annually. The majority of these patients live in the Greater Eastwick region; however, significant portions of patients travel across the nation to visit the St. Clement Cancer and Heart Health Institutes. These Institutes are ranked some of the best in the country.

There are 2.2 million residents in the Greater Eastwick area, and 21% of Eastwickians aged 18 to 64 do not have health insurance.

Health insurance is a program where individuals pay a monthly amount called a “premium” to an insurance company. When an insured patient visits a doctor, a copay is expected (a flat fee you’ll pay for each visit). After a claim is submitted by the doctor’s office, the patient must pay the remaining amount. Until the patient fulfills the deductible (a pre-established amount the patient must pay), all fees must be paid out-of-pocket by the patient. Once an insured patient reaches his or her deductible, the insurance company will pay a negotiated percentage of the patient’s medical costs.

There are many ways to obtain insurance. Some individuals obtain insurance through their employers, while others buy it on their own. Some individuals with lower incomes are insured through the United States Government-run Medicaid program. And some people cannot afford -- or choose not to -- have any health insurance at all.

This is important because people who don’t have health insurance tend to see doctors less often, and tend to visit the emergency rooms much more often. Emergency room visits are much more expensive than a routine visit to an area doctor’s office. Emergency rooms must be outfitted with a range of very expensive equipment and physician specialists who are “on call” depending upon who comes through the hospital’s doors. One emergency room physician commented: “I could have 5 gun shot wounds in the morning, and invasive pneumonia infections in the afternoon. Our trauma center is prepared to save people’s lives at a moment’s notice. We are not your ‘go to’ physicians for the common cold.”

Overall, Americans spend an enormous amount on health care. In 2012, healthcare spending accounted for 17.2% of the GDP (Gross Domestic Product—the total amount of goods and services a country produces over a specific time). This is more than any other country in the world, though it has begun to shrink.

Additionally, hospital spending increased 4.9% to \$882.3 billion in the same year.

Hospitals

St. Clement has three main hospitals, and each features a variety of specialties.

St. George’s Hospital is the oldest and largest private teaching and specialty health care hospital in Greater Eastwick. The hospital has an Emergency Department, pharmacy, and weight management center in addition to offering palliative care (used to improve quality of life for patients facing serious

illnesses) and an orthopedic center. St. George's also has sections devoted to the St. Clement Cancer Institute, the St. Clement Heart Institute, the St. Clement Digestive Institute, and the St. George's Hospital Breast Center.

SGH is renowned for its obstetrical (pregnancy and childbirth) services and delivers over 3,500 babies a year. They have a state-of-the-art Level III Neonatal Intensive Care Unit for newborns requiring extra attention, and a level II nursery for newborns requiring average care.

St. George's Hospital has 460 adult and 130 newborn beds available.

Shoreditch General North is among the top 100 U.S. hospitals for cardiac care. It is the only designated trauma center in northern Eastwick, and is among the top 5% in the country for clinical excellence. Similar to St. George's, Shoreditch General North offers Emergency Care, palliative care, orthopedics, obstetrics, and a pharmacy.

The hospital also features separate care centers including St. Clement Digestive Institute, St. Clement Heart Institute, St. Clement Cancer Institute, and the Mary Cropper Family Center for Breast Care. Unique to the hospital, Shoreditch General North offers outpatient imaging, allowing doctors to "see" the body in real-time using ultrasounds, MRIs, and X-rays. In addition, St. Clement has several satellite hospital care centers which feature care for seriously ill patients requiring extended recovery time, a stroke and physical therapy center, a burn center with wound healing laboratories, and a fertility clinic.

Shoreditch General has 360 adult and 60 newborn beds currently available.

Shoreditch General Amaranth Hospital offers a smaller range of services to the Amaranth County area. They have an emergency department, imaging and diagnosis services, a laboratory, and a physical therapy center. Shoreditch General Amaranth offers general inpatient and outpatient surgery, pain management, and an Endoscopy Lab.

Shoreditch General Amaranth Hospital has 10 surgical beds, 17 emergency department beds, and 8 operating rooms.

Competition

With a regional population of 2.2M, the Eastwick metro area, boasts a wide array of hospitals and medical groups competitive with St. Clement. These include:

Sacred Heart opened in 1823 as the first teaching hospital in the United States. Their network is comprised of the University of Eastwick Medical Center, West Chester Hospital, Muriel Lake Center for Post-Acute Care, and the University of Eastwick Physicians, a group of over 750 doctors.

Some of their services include a cardiovascular institute, a cancer unit, burn center, head and neck surgery, infectious disease wing, and rehabilitation services. They also offer radiology services, an emergency department, kidney disease center and endoscopy unit, among many other specialty departments.

The Sacred Heart Medical Center has three UV sanitizers and the Muriel Lake Center has one.

Freylake Health is the network of Foxhurst Hospital, Norham Hospital, Lightlin Hospital and West Hospital. Truven Health Analytics named it one of the Top 15 Health Systems in the nation in both 2013 and 2014.

Freylake Health has one of the region's largest intensive care units, the only adult bone marrow transplant center, and an orthopedics center with a dedicated operating room, maternity care, emergency care, wound care, and an inpatient/outpatient surgery center.

Freylake Health uses the IRiS Whole Room UV treatment, and they have reported a decrease in infection rates among the hospital wings using the special UV treatment.

Technology

St. Clement uses Ultraviolet Radiation devices at their Shoreditch General North and St. George's hospitals for all precaution rooms. For instance, if the preceding patient had a multidrug resistant organism, influenza, or *clostridium difficile* (an easily spread infection), their rooms are sanitized with the UV device after the traditional cleaning.

This will also help eliminate traces of MRSA, VRE, norovirus, influenza, ESBL, and CRE.

When a regular patient is discharged from their room, a housekeeper will change the bedding, mop the floor (sanitizing liquid is changed between all rooms to protect from contamination), and use disposable wipes to clean the windows, tables, telephone, and monitor. This process takes 15-25 minutes.

If the last patient in the room had some type of infection and the regular cleaning method is used, the next patient has an 85% change of picking up those organisms.

Infection Prevention Technologies (IPT) estimates 1.7 million infections a year occur because of hospital stays. These cases can cost hospitals an average of \$11,285 per case and in the United States cause 99,000 deaths a year.

UVC energy devices use a type of intense light similar to that of the sun to kill microorganisms, viruses, and bacteria. The UV rays stops their ability to grow or mutate.

In a test between bleach, which is traditionally used to clean rooms, and the UV devices, the bleach only destroyed 70% of the C. diff in a room, while the UV device killed 95%.

While UV devices are very useful, there are drawbacks. First, the machines cost \$90,000, and a large hospital requires at least 4 machines. Second, UVC devices only kill microbes in the machine's line of sight. Housekeeping staff spends extra time adjusting the curtains and positioning the mattresses so that all room

surfaces are fully sanitized. Third, it takes 60 minutes for the UV machine to fully sanitize the room, allowing no patient occupancy.

St. Clement UV Testing

As she fulfilled her care-giving duties at the hospital, Dr. Tina Patterson met with the hospital’s business team, including Tony Dotson, who served as the Clinical Operations Consultant. Tina knew that the hospital was forced to juggle many different funding and revenue roles as it strived to offer the best care to its patients.

“I’ve actually just finished some trials of the UVC devices, and we have some interesting data,” Dotson said. “Would you like to review our numbers?”

Dr. Patterson excitedly scanned the data. For the past year, Shoreditch General North and St. George’s Hospitals tested the UV cleaners with all their Intensive Care Unit discharges – 5.6% of Shoreditch General North’s total 25,000 discharges and 5.77% of St. George’s 26,000¹. Shoreditch General North used 4 devices, while St. George’s had 5.

As predicted, the number of Hospital Acquired Infections (HAIs) decreased, and so did the costs associated with treating the infections. Here is how the number of HAIs changed during the year at the hospitals:

Shoreditch General	Number of HAIs	Cost per HAI	Total HAI Cost
Before UV Trial	19	\$11,285.00	\$214,415.00
After UC Trial	14	\$11,285.00	\$157,990.00

St. George’s	Number of HAIs	Cost per HAI	Total HAI Cost
Before UV Trial	19	\$11,285.00	\$214,415.00
After UC Trial	11	\$11,285.00	\$124,135.00

“It’s great news that the number of HAIs decreased! However, we had to clean so many rooms, that we aren’t sure if it was worth the cost,” Dotson mused.

“Every room took an hour to clean. Then, it costs Environmental Services a significant amount to run the UV machines. Because the UVC devices require technical competency, we had to use Environmental Services supervisors instead of lower-salaried housekeeping. They make \$16/hr and we factor in 35% of their hourly rate for benefits and overhead². This alone is almost twice what it costs

¹ This could be changed to an actual number depending on students’ level.

² This also could be changed depending on student level

for housekeeping! Also during the trial’s time each machine depreciated, or lost value because they became older and more used, at a rate of \$750 per machine per month,” the operations consultant explained.

“This will be an interesting challenge. Thank you for this excellent data!” Dr. Patterson replied, ready to do begin her calculations. “I’ll use it to figure it whether the machines were financially valuable for the hospitals.”

Cost Analysis

First, determine whether or not the UVC machines added financial value to the hospitals ICU departments. You can figure this out by subtracting the total costs for the year to run the UVC devices (the Environmental Services costs plus the equipment costs) from the Reduced HAI cost (the difference between HAI costs before and HAI costs after UV was used). Using a table like this may be helpful.

Benefit	Costs		Conclusion
Reduced HAI Cost	EVS Cost	UV Equipment Cost	Value

What does a positive Value amount show? What does a negative Value amount show?

Once Dr. Patterson determines if the UV devices are financially valuable in the ICU, she needs to know if they would be cost effective to use in cleaning all rooms from discharged patients. To determine if the UV devices are more cost efficient than traditional house keeping, you need to consider several variables and the costs of each. Here is some information you can assume:

- 1) Housekeepers are paid \$13.20/hr.
- 2) A thorough room cleaning takes 15-25 minutes
- 3) Housekeepers use \$0.97 of cleaning supplies per room
- 4) St. George’s Hospital will total 26,000 discharges in a year and Shoreditch General North will have 25,000 annual discharges
- 5) Before the machine is used, a housekeeper spends 3 minutes prepping the room. After the UVC device cleans a room, a housekeeper requires 2-5 minutes to clean items out of the machine’s sight line.
- 6) UVC devices have an average life span of 5 years with regular use

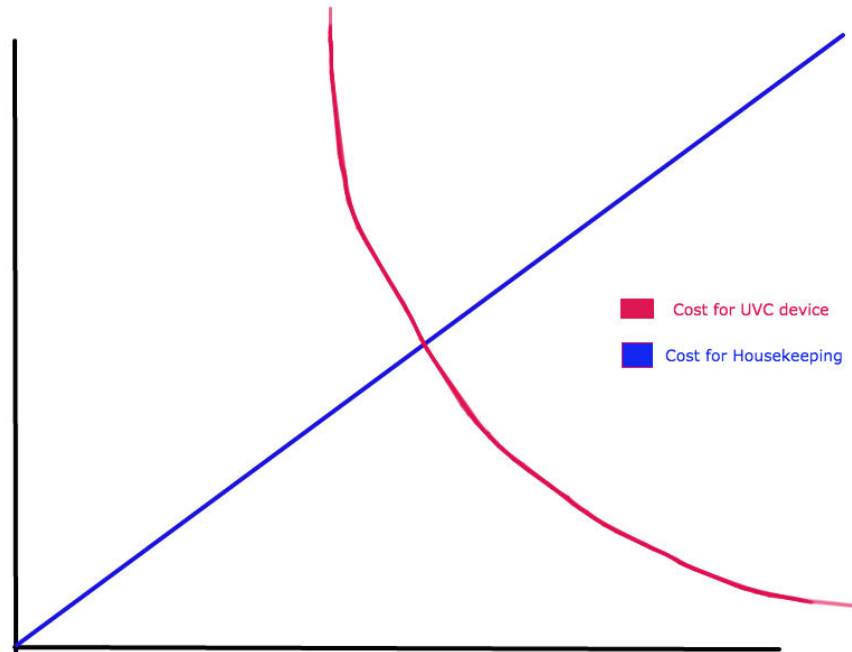
UVC Radiation equation:

This equation maps out the cost per year to run the UVC devices. Some items to consider: a) the number of machines needed, b) the average volume of hospital rooms required by patients, c) the average length of time to clean hospital rooms and d) the estimated total cost per UVC-cleaned room.

House Keeping equation:

This equation illustrates how much it costs per to have housekeeping clean the rooms. Some items to consider: a) the average amount of time it takes to clean a

room, b) the housekeeper's wage per room cleaning, and c) the cost of cleaning materials per room.



How will your equations relate to this example?

The Problem

Should Dr. Patterson recommend that St. Clement purchase more UVC devices?

QUESTIONS TO BE RESEARCHED:

- What is the cost/benefit value for St. George's and Shoreditch General North? If there is a negative cost/benefit value, why could it make sense to continue the program anyway?
- What could be done to enhance the value proposition or running the UV devices in St. Clement Hospitals?
- What is the cost to run the UVC devices for a year? What would it cost after one (1) year? ?
- What does it cost for housekeeping to clean all the rooms for one (1) year? What would it cost after one year?
- Does it matter that St. Clement's competition uses UVC devices? Can St. Clement's Marketing and Communications Department use this information in its competitive advertising? Will consumers value this information, or fear it?
- Should all the hospitals purchase the devices? Why or why not? If St. Clement can only purchase 2 more devices, which hospital(s) should receive them?

- Research the mission and values of a hospital near you. If St. Clement's had similar missions and values, would an investment of additional UVC devices align with providing effective health care services, while still maintaining the hospital's revenue objectives?
- How would health insurance companies feel about this added cost? Call an insurance company, and request an interview with their care services representative.
- What other factors should a hospital consider when reviewing features that will help patient recovery, but drive up costs and highlight "invisible" safety issues to patients?
- Can you identify an ethical issue here? Perform research and offer a parallel dilemma, indicating how the issue was resolved. (Hint: Study how the American automobile industry handled a similar debate regarding air bag installation, pitting passenger safety with increased product costs and decreased revenues.)

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