

INFORMATION SYSTEMS EDUCATION JOURNAL

Special Edition: Teaching Cases

4. **A Database Design and Development Case: Smile Land Academy**
Ranida Harris, Indiana University Southeast
Ken Harris, Indiana University Southeast
David Eplion, Indiana University Southeast

10. **Case for Calculating Innovation Score: Comparison between Apple, Inc. and Microsoft, Corp.**
Ehi E. Aimiuwu, Morgan State University

16. **IT System Integration: Global Medical Acquisition of Health Tech Case Study**
Mark Russo, Quinnipiac University
Bruce White, Quinnipiac University

28. **Privacy and ethics in the age of the smartphone: A Case Study**
Cameron Lawrence, University of Montana
David Firth, University of Montana
Jake Balyeat, University of Montana

35. **Enhancing the IT Infrastructure at Saint Philip's Hospital: Point-Of-Care Solutions**
Iva Naydenova, Quinnipiac University
Bruce White, Quinnipiac University

49. **Real time locations systems or outsourcing: A case study**
Cameron Lawrence, University of Montana
David Firth, University of Montana
Floyd Khumalp, University of Montana

57. **LINUX, Virtualization, and the Cloud: a hands-on student introductory lab**
Anthony Serapiglia, St. Vincent College

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Teaching Case

Enhancing the IT Infrastructure at Saint Philip's Hospital: Point-Of-Care Solutions

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Abstract

Healthcare has become a rapidly changing field. With the introduction of value-based purchasing to determine reimbursement of Medicare providers based on the quality of care in addition to outcomes in treatment, the environment is becoming ever more competitive. Saint Philip's Hospital is among the largest non-profit hospitals in the nation offering a wide variety of specialist services. It has an outstanding reputation among its competitors, but like everyone, it needs to find additional ways to remain competitive in this field. The most recent patient satisfaction reports reflect a drop in quality measure results from the previous quarter and Saint Philip's needs to find a way to retain its reputation as being among the leaders in providing excellence in treatment and patient-focused care. With the recent increase in patient flow, this has been challenging. Saint Philip's IT infrastructure is strong, but increasing efficiency is pivotal for the future performance of the hospital in the increasingly changing and digitally-enhancing healthcare environment. (Note – some of the data is based upon a real New York metropolitan hospital, but the case is fictitious)

Keywords: value-based purchasing, point-of-care, quality improvement, patient satisfaction

1. INTRODUCTION

James Kirby walked into his office early in the morning at the end of the fiscal year, on June 30, 2010 and sat behind his desk. He brought in the extra-large coffee that he bought from the Cafeteria on the way back from the quarterly executive meeting with the Quality Improvement and Patient Safety Committee that he attended much earlier this morning. James was the CEO of the largest hospital in the New York metropolitan area. Saint Philip's Hospital has a 21-year history of serving patients from the North-East area. It offers top notch inpatient,

ambulatory, and preventive care in all areas of medicine at each of its five major centers.

James had been the CEO only for the past 2 years, but during this time he saw a dramatic change in the way hospital administration was developing all around the country. And with President Barack Obama signing the health care reform legislation on March 23, 2010, James knew that the healthcare system would never be the same.

He put his cup of coffee on the desk and started going through the handouts from this morning

again. The quarterly executive quality improvement meetings were held with the purpose of improving operations within the hospital to continuously enhance the quality of healthcare provision and the efficiency in treatment for the patients.

The mission statement of Saint Philip's Hospital includes its commitment to "excellence in patient care, research, education and community service." The hospital is dedicated to providing exceptional services and to stand up to its ranking of a first-rate medical institution.

Quarterly meetings with the Quality Improvement and Patient Safety Committee were officially administered and required the participation and contribution of the hospital's leaders who were members of the Committee. Senior members included James Kirby, Jonathan Wiseczcki (Chief Financial Officer), Bruce Goodwill (Chief Information Officer), and Lisa O'Connor, RN (Director of Patient Care & Employee Relations). Other members were leaders from the main units of the hospital, including Surgery, Cardiothoracic, Intensive Care Unit (CTICU), the Emergency Department, and the Cardiovascular Unit (CVU), which had the most intensive patient flow and therefore the quality of care in these units was among the most critical for the reputation of the hospital.

James started going through the bar charts with the results of their latest Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) report. The hospital used Press Ganey to track patient satisfaction and these reports gave measured evidence for the quality of care provided across the different units.

Generally, Saint Philip's enjoyed high scores on overall ratings of the hospital by patients and their willingness to recommend the hospital to friends and family. Lower ratings generally included evaluation on quietness of the environment (noise had been a huge problem for many healthcare providers, especially large hospitals), and cleanliness. However, this time Saint Philip's saw an unexpected decline in patients' scores on physician and nurse communication with the patients and this was surprising to James. Saint Philip's had always had a reputation of providing exceptional services to its patients. Effective physician and nurse communication made patients feel that they were being treated with exceptional care,

catering to their needs. The three areas determining proper physician and nurse communication with patients included treating patients with courtesy and respect, listening carefully to the patients, and explaining things in a way that the patients could understand.

It was true that in the 2009 Annual Report, Saint Philip's admitted experiencing a consistent growth of patient flow, especially in inpatient care. The beds were filled almost up to capacity (for more information on the distribution of beds, please see [Figure 1](#) in the "Appendices" section). James was wondering whether this could be the reason for the drop in patient satisfaction regarding communication with physicians and nurses. He remembered the presentation of Enrico Gomez (Director of Emergency Department) this morning on efforts in patient safety and quality of treatment that had been implemented by the Emergency Department and the Intensive Care Units. Enrico presented data for the past quarter on readmission levels and sentinel events. Unfortunately these numbers also saw an increase in comparison to past performance.

James could see Lisa's face at the meeting becoming increasingly red with embarrassment. She was nervously moving her leg under the table and this could also be noticed. She interrupted Enrico right in the middle of his presentation: "I don't understand why those numbers are so different from last quarter, Enrico. I have been having monthly meetings with the head nurses of the departments, and considering all the efforts that we had put in to ensure providing exceptional patient-centered care, we expected to see a decrease in sentinel events, reduced readmission rates, and an improvement of patient satisfaction scores. I just don't understand why this would happen. Perhaps the efforts are not being equally implemented by the different departments? I have to see how I should present this at the next Nurse Leadership meeting!"

James remembered this occurrence from this morning and immediately felt a headache from looking at the numbers again. He knew that the new healthcare reform by the Obama Administration would bring new challenges in hospital administration and new standards to live up to. Although the changes would not be actually seen until 2012, he knew that actions had to be taken in advance. Thinking about the future need of implementation of electronic

medical records systems (EMRs) and future reimbursement based on a value-based purchasing plan by the Center for Medicare and Medicaid Services (CMS), which were all parts of the healthcare reform, only increased his headache. He trusted that Bruce Goodwill as a CIO would do a good job in enhancing the IT infrastructure of the hospital and the efficient implementation of the electronic medical records system. However, he also knew that the hospital had to be pro-active and engage in other initiatives that would increase the quality of care provision even with the increased inpatient admissions.

James heard the tone of an incoming email. It was from Bruce:

"James,

I am confirming that I will come to the emergency senior executive meeting next week! I will have a rough draft of an IT infrastructure plan that I would want to implement in order to increase staff productivity while also increasing patient satisfaction and quality of healthcare delivery.

I hope that you, John and Lisa will find it valuable as well. I think it will be a great opportunity for us to be pioneers in this area as we establish one of the most sophisticated integrated IT solution systems that would combine efficient and effective health information exchange along with practical treatment management tools for our staff.

This can be huge and improve our scores significantly. Remember the Point-of-Care solutions that I mentioned to you? I will explain more at the meeting. See you next week!

Best,
Bruce"

James had sent an urgent email to both Bruce and Jonathan regarding an emergency senior executive meeting to be held in a week through his cell phone right after he left the quarterly meeting this morning. He did not want to invite Lisa this time as he felt that with every meeting all she did was express disapproval and initiate arguments. James never heard her make any

suggestions on her own and this morning he saw her frustration which made him decide to give her some time to cool off.

James remembered a brief conversation in the Cafeteria with Bruce about Point-Of-Care solutions – technological systems that enable physicians and nurses to provide effective treatment through any point of patient care. There were several possible devices and system management tools that ranged in services and functions which could help medical staff provide excellent treatment to patients. James was curious to hear more about the preliminary plan that Bruce would develop. Ten minutes after Bruce's email, James received a confirmation from Jonathan as well. He took another sip of his coffee. Things can get better as long as the right people are part of a team. And James knew he had the best team in the area!

2. ABOUT THE HOSPITAL

New York-based Saint Philip's Hospital is one of the largest not-for-profit hospitals in the nation. Having 2,409 beds, and about 2 million inpatient and outpatient visits a year, the institution strives for excellence in healthcare delivery through the hard work of its 6,144 affiliated physicians and 19,376 staff members. It has five major centers and has enjoyed high reputation and ranking across its competitors.

The Saint Philip's Healthcare System provides healthcare services to residents of Brooklyn, Bronx, Manhattan, Queens, and also Connecticut, Long Island, New Jersey, Westchester, and several upstate New York counties. The system is affiliated with the medical colleges of Weill Cornell Medical College and Columbia University College of Physicians and Surgeons. It has been praised to employ leading specialists from every field of medicine.

Saint Philip's Healthcare System includes both acute-care and community hospitals, ambulatory sites, continuum-of-care facilities and specialty institutes. All members of the system are committed to providing high-quality and easily accessible care to residents, while also maintaining a cost-effective structure.

In 2009, according to the hospital's annual report, Saint Philip's experienced high increase in volume of patients. Mostly very sick patients with complex problems sought care from Saint Philip's. From inpatient statistics, the total

number of patients discharged increased from 111,726 in 2008 to 114,628 in 2009 (more details can be found in [Figure 1](#)). The total distribution of beds was about 2,389 in 2009.

In 2010 the hospital continued to enjoy prestigious rankings, being recognized in the beginning of the year as the Number 1 Hospital in the NYC metropolitan area and Number 6 in the nation, according to U.S. News Media Group's 2009-2010 report on "America's Best Hospitals" survey. The hospital was also included in the "America's Best Children's Hospitals" Honor Roll of the 2010 U.S. News & World Report. It was the only tri-state area hospital to get such recognition.

The hospital's financial report from 2009 shows increase in total revenue and even higher increase in expenses. However, the excess of revenue over expenses has also improved significantly. More information on Saint Philip's financial performance is presented in [Figure 2](#).

Saint Philip's has also gained reputation as being among the leaders investing in healthcare information technology to improve quality and efficiency of healthcare provision. The hospital adopted a decision support system (DSS) to assist physicians when they needed consultation in making treatment decisions. The initial release of the system in 2008 gained so much popularity among physicians that they would often line up at the available workstations to use it. Bruce Goodwill decided that it was time to expand the system even further. Ideally Bruce wanted to adopt a system where the hospital staff could have mobile access to the DSS. An integrated system which would also offer access to patient health records and other clinical data would ideally improve quality of care while lowering costs.

The Hospital was using the "Five Rights" from a Health Information and Management Systems Society (HiMSS) report as founding principles for any Clinical Decision Support system (CDS). Those rights were:

- Right information (evidence based, guide, action...)
- Right people (clinicians, and patients)
- Right intervention formats (alert, order set...)
- Right channel (Computer Information Systems, internet, mobile)

- Right points in workflow (decision/action) (HiMSS, 2010)

In addition, there were several types of CDS systems that the hospital could implement. Among the ones that Bruce was interested in were:

- Medication dosing support;
- Order facilitators; and
- Point-of-care alerts/reminders (drug-drug interaction to critical lab alerts)

3. NEW POLICIES, REGULATORY BODIES, AND STANDARDS

Value-Based Purchasing:

Value-Based Purchasing is one of the elements stemming out of the Affordable Care Act introduced by the Obama Administration and signed on March 23, 2010. It basically combines outcomes with quality of care measures to determine reimbursement for healthcare providers. The Centers for Medicare and Medicaid Services (CMS) released a decision plan based on value-based purchasing which reveals that clinical quality process of care and patient satisfaction measures will provide for 1% of a provider's base DRG payment for the federal fiscal year of 2013. Fiscal year 2014 will also incorporate performance on outcome measures for the payments. Patient satisfaction scores are reflected on HCAHPS reports. Saint Philip's and many other hospitals use Press Ganey to gather and analyze data from patient satisfaction surveys through HCAHPS reports.

According to the U.S. Department of Health and Human Services, "In FY 2013, an estimated \$850 million will be allocated to hospitals based on their overall performance on a set of quality measures that have been shown to improve clinical processes of care and patient satisfaction" (U.S. DHHS, 2011). The idea is to take the funds of what Medicare would have spent initially and to shift funding from reimbursement based on volume to reimbursement based on performance. The funding is expected to be increasing over time.

Health Information Technology Exchange (HITE):

The goals of Health Information Technology Exchange (HITE) include providing standards and principles of health information storage,

sharing, and general management of patient data to ensure a secure exchange of this data between healthcare providers, consumers, private payers and government organizations in accordance with the standards from the Health Information Portability and Accountability Act (HIPAA).

HIPAA policies require efficient data exchange through standards-based enforcements and protection of the confidentiality and security of health data. The overall mission is to seek ways to improve quality, safety and efficiency of health delivery system (Chaudhry et al., 2006).

Measurements of achieved goals, as published by the CMS include:

- Improved health care quality;
- Prevented medical errors;
- Reduced health care costs;
- Increased administrative efficiencies
- Decreased paperwork; and
- Expanded access to affordable care.

4. SAINT PHILIP'S SITUATION

The spectrum of care delivery at Saint Philip's often required data to be mobile and to be able to be accessed from different locations to improve workflow of operations by staff members.

Bruce knew all about Point-of-Care systems and had a stack of marketing materials from different companies on his desk regarding latest technology in the field.

Bruce was a very creative IT specialist. He had worked at the hospital for 10 years and knew all about the operations and staff members' needs from the different departments. He could also implement an effective IT system, modified to cater to the needs of the hospital. All he needed to do was browse through the marketing materials and find ways in which to integrate different solutions in the most efficient and cost-effective manner so that patient care was handled with the exceptional service expected from Saint Philip's Hospital. Some of the materials that Bruce had on his desk are included in the "Appendices" section for review.

Bruce picked up one of the marketing reports sent from Intel. He read that the company was now offering mobile enabled electronic medical

record (EMR) applications that would allow instant access to patient records through a wireless network. Bruce was reading Intel's promises on the system:

"Errors are reduced, decisions are made more quickly, and quality of care is increased. At El Camino Hospital in California, the number of errors per 1000 patient days dropped from six to four following the implementation of electronic medical records and a WLAN. In the United Kingdom, staff at the George Eliot Hospital admitted to saving up to four hours per week after they were given wireless access to hospital and patient information" (Intel, 2007).

Bruce wrote something down on his pad. His pad had a bunch of random notes that Bruce would take whenever a new IT idea came into his mind. He liked using the ideas as if they were pieces of a puzzle that could be combined and work together to effectively create a beautifully integrated picture of well-functioning IT systems. On the first page he had a centralized phrase - "Point of Care" - and all around it floated different ideas and solutions that could mold the future of the hospital.

Bruce remembered that SpyGlass Consulting Group released in February 2010 their survey findings regarding Point-of-Care Computing. The study explored the perceptions of physicians and the current adoption of computing solutions at the point of care. The company had done more than 100 in-depth interviews with physicians working in acute care and ambulatory environments from a broad range of competencies. This was a national study. Some of the findings included the physicians' embrace of mobile computing devices, physicians' primary use of desktop computers to access patient data, and the trend that Hospital IT was resistant to supporting personal devices on corporate network.

Bruce read a highlighted statement from the Spyglass report: "Mobile device adoption is being driven by technology innovation including easy-to-use, low-cost, lightweight mobile devices, widespread cellular broadband availability (3G/4G), a cloud-based ecosystem to support internet-connected applications, and the emergence of location-based services" (Spyglass, 2010).

Bruce wrote some additional thoughts on his pad after reading this statement.

The report also included that 83% of interviewed physicians used desktop computers to access needed data. On the other hand, 75% of physicians also reported that their institution's IT infrastructure did not support personal mobile devices on the network.

Intel's report on the other hand shared that "the rapid growth and adoption of mobile devices and applications in other industries had spurred a large number of healthcare software vendors to enable their applications for mobile platforms such as notebook computers, tablet computers, or personal digital assistants (PDAs)."

At any point of care, having access to critical patient data and decision support information system enhances healthcare quality, reduces medical errors, and improves patient satisfaction. Healthcare staff can access pertinent information through a wide variety of devices from tablets, to laptops, and mobile devices.

Bruce knew that the future of healthcare IT relied on the proper adoption of wireless mobile applications to support context based computing. The goal would be to provide instant access to vital patient information, treatment consultation and additional support throughout the provision of care.

5. POINT-OF-CARE SOLUTIONS

With the consistent growth in technology, healthcare record keeping and data management is becoming more and more digitized. Paper medical records are being replaced by Electronic Medical Records (EMR) systems. Hospitals already enjoy the benefits of having a reliable IT infrastructure that would allow fast and efficient access to patient data in order to ensure quality and efficiency in healthcare delivery with improved patient outcomes.

Point-of-Care solutions are the next phase in enhancing healthcare provision. Systems in the category of Point-of-Care Solutions include barcode scanners, clinical decision support systems, mobile health solutions and others.

The idea behind the concept "point-of-care" is to have reliable technology for any point of care in the patient's treatment. From the access to

medical record of the patient to follow-up communication after discharge or physical exam, the link between patients and physicians and the efficient access to pertinent information improve patient satisfaction and healthcare quality of care.

According to statistics, 88% of health systems have already implemented or plan to implement point-of-care data management systems. (Modern Healthcare, 2012)

Additional Solutions:

Bruce also reviewed Motorola's health systems report again. Motorola offered various technological solutions to healthcare providers, including mobile computers and barcode scanners for better medication administration. A sample list of some of the solutions is provided in [Figure 5](#).

Bruce wondered whether he could suggest combining any of Motorola's Point of Care systems with the current IT infrastructure.

In addition, Bruce had also heard about cloud computing and his inner sense immediately recognized an opportunity to integrate the whole IT infrastructure on a cloud space and provide an easy access to all components of the system from this space.

Bruce knew that cloud computing was the future of IT. He also knew that healthcare technology solutions will see rapid development with the implementation of electronic medical records and point-of-care solutions. He just did not know how much of this information he should present at the emergency executive meeting that was the following week. He did not want to overwhelm the other leaders and at the same time he wanted to provide a solid recommendation for an effective, properly integrated IT infrastructure solution in correspondence to the pace of healthcare technology development.

His recommendation had to satisfy three goals:

- Consistent with the hospital's mission of providing excellence in patient care;
- Increasing efficiency in healthcare delivery while reducing medical errors, costs and reflecting top notch IT trends in healthcare;

- Protecting privacy and enhancing security of patient information, following all HIPAA standards and regulations.

6. SECURITY ISSUES

Bruce knew that among the main questions that James and Jonathan would have included taking proper security measures with the new system.

Security issues remain the main concern for healthcare providers utilizing digital healthcare systems. However, Bruce was aware of the latest trends in security measures. Enhanced practices ensured that proper security standards would be implemented in the adopted systems.

Intel also touched upon this area in their report, stating that "Wireless security has made great advances over the past few years thanks to the efforts of the IEEE (Institute of Electrical and Electronic Engineers) and the Wi-Fi Alliance. New security standards like IEEE 802.11i and the Wi-Fi Alliance Wi-Fi Protected Access 2 (WPA2) have emerged to match the robust protection previously found only on wired networks."

7. CONCLUSION

Bruce came into the meeting 10 minutes late holding a bunch of copies containing his major recommendations, mainly consisting of charts and bullet-points listing the advantages and disadvantages of each recommendation. "Sorry I'm late. I had to print these from Jill's printer because mine was out of toner, can you believe this?" Bruce started laughing, "Where is Lisa?"

"Lisa is not coming," said James. "I wanted us to have a limited senior executive meeting this time, including only us."

Bruce was surprised. He was not sure whether he liked James' management style. Lisa had worked for the hospital for 5 years and although she often came across as being critical and skeptical about most things, she had been a part of the senior leadership team since before James joined the hospital as the new CEO two years ago. Bruce knew that Lisa would not like it if she heard of this meeting being held without her. He wanted to say something to James but did not want to do it in front of Jonathan. He just decided to start on his presentation:

"Well, gentlemen, I would like to talk to you about three main recommendations that I have designed with the goal of the future improvement of our system. Each of these has its own advantages and disadvantages, which I will expand on more later on. I have several vendors who would bid for us, but overall I am using our own customized solution that will combine several ideas. Please take a look at the first graph of this report..."

8. REFERENCES

Administration Implements Affordable Care Act Provision to Improve Care, Lower Costs (April 29, 2011). U.S. Department of Health and Human Services News Release. Retrieved June 15, 2012 from:

<http://www.hhs.gov/news/press/2011pres/04/20110429a.html>

Consumers would Embrace Email Communication with Their Doctor (September 2009). Lightspeed Research. Retrieved June 16, 2012 from:

<http://www.lightspeedresearch.com/press-releases/consumers-would-embrace-email-communication-with-their-doctor/>

Delivering Mobile Point of Care with Pervasive Wireless Networks (2007). Intel Inc. Retrieved June 16, 2012 from:

http://download.intel.com/healthcare/pdf/Mobile_Point_of_Care_with_Wireless_Networks_FN_L.pdf

Hospital Value-Based Purchasing. The Official Website for The Medicare Hospital Value-Based Purchasing Program. Centers for Medicare and Medicaid Services. Retrieved June 7, 2012 from:

<https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/hospital-value-based-purchasing/index.html?redirect=/Hospital-Value-Based-Purchasing/>

Improving Patient Safety at the point of care in theatre and in hospitals (December 2009). Motorola. Retrieved June 22, 2012 from:

http://www.motorola.com/web/Business/Solutions/Federal%20Government/_Documents/Static%20files/Fed_Healthcare_AB_FINAL.pdf

Meyer J, Rybowski L, Eichler R. (1997). Theory and Reality of Value-Based Purchasing: Lessons from the Pioneers. Agency for

- Health Care Policy and Research; AHCPR
Publication No. 98-0004.
<http://s3.amazonaws.com/wwhi.org/howsmartphoneschanginghealthcare%204.10.pdf>
- Mobile Computing (2011). Space Saving
Solutions. Retrieved June 23, 2012 from:
<http://www.spacesavingsolutions.com/markets/healthcare/it-mobile-computing/>
- Mobile Information Technology at the Point-of-
Care (November 2000). PDA Cortex.
Retrieved June 23, 2012 from:
<http://www.pdacortex.com/mitatpoc.htm>
- (Private hospital data annual report)
- Point of Care Computing for Physicians (2012).
Spyglass Consulting Group. Retrieved June
6, 2012 from:
http://www.spyglass-consulting.com/wp_PCOMP_physician_2012.html
- Sarasohn-Kahn, M.A., M.H.S.A. (April 2010).
How Smartphones Are Changing Health Care
For Consumers and Providers. California
Healthcare Foundation. Retrieved June 23,
2012 from:
- Theory and Reality of Value-Based Purchasing:
Lessons from the Pioneers (2011). Agency
for Healthcare Research and Quality.
Publication No. 98-0004.
- Understanding CDS Interventions: Using Clinical
Informatics to Drive Quality (2012). HiMSS
12 Annual Conference & Exhibition.
Retrieved June 22, 2012 from:
http://69.59.162.218/HIMSS2012/Venetian%20Sands%20Expo%20Center/2.20.12_Mon/San%20Polo%203504/Mon_0915/PHY3_Christopher_Longhurst_San%20Polo%203504/PHY3Sittig.pdf
- Value-Based Purchasing Calculator. Press Ganey.
Retrieved June 30, 2012 from:
http://www.pressganey.com/ourSolutions/hospitalSettings/clinicalSuite/vbp_calculator.aspx

Appendices

Student Questions

1. What is point-of-care?
2. What were Bruce's three main recommendations in your opinion? Imagine that you are Bruce - what would you recommend for Saint Philip's Hospital for point-of-care solutions?
3. How might James react to the proposal? What other alternatives can the hospital consider in order to improve patient care and patient satisfaction?
4. How might cloud-computing help in the integration of all the healthcare IT solutions listed in the case?
5. How would you handle potential conflicts with Lisa? What might happen after the emergency executive meeting and what would you recommend James to do?
6. Considering all the changes in healthcare regulations, what actions should James take as a CEO to keep up with these changes along with the changes in technology? How can the hospital fund such technology changes?
7. What are some benefits and drawbacks in the change of the IT infrastructure within the hospital? Would that affect patient care? How would you deal with the changes in order to ensure smooth transition without affecting patient treatment?
8. Devise a plan of action that any hospital could use when implementing a new system. List all the important steps and include possible risks/complications along with relevant recommendations.

Figure 1: Summary on Saint Philip's Inpatient Statistics

Statistical Summary

Inpatient Statistics	2008	2009
Patients Discharged	107,283	110,466
Westchester Division	4,443	4,162
Total	111,726	114,628
Surgeries	29,641	29,211
Deliveries	12,369	12,662
Average Length of Stay (including Westchester Division)	6.65 days	6.41 days

Distribution of Beds

Medical/Surgical	1,591	1,627
Pediatrics	127	127
Maternity	146	146
Newborn Bassinets	111	111
Psychiatric	378	378
Total	2,353	2,389

Outpatient Statistics

Ambulatory and Outpatient Surgeries	66,453	67,196
Cardiac Catheterizations	8,830	8,763
Dialysis	4,813	5,004
Visits to Outpatient Clinics	688,524	705,874
Visits to Emergency Facilities (excluding admissions)	186,688	200,245

Services to Patients

Laboratory	9,673,687	10,012,179
Blood Bank	450,487	433,284
Radioisotopes Services	16,239	17,936
X-ray Procedures	530,281	567,333
Electrocardiograms	217,923	223,525
Electroencephalograms	33,246	35,630
Therapy Treatments (Physical, Occupational)	324,017	297,720
Transfusions	84,555	81,726

Average Number of Full-Time Equivalent Employees (including House Staff)	18,029	18,322
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Figure 2: Summary on Saint Philip's Financial Performance:

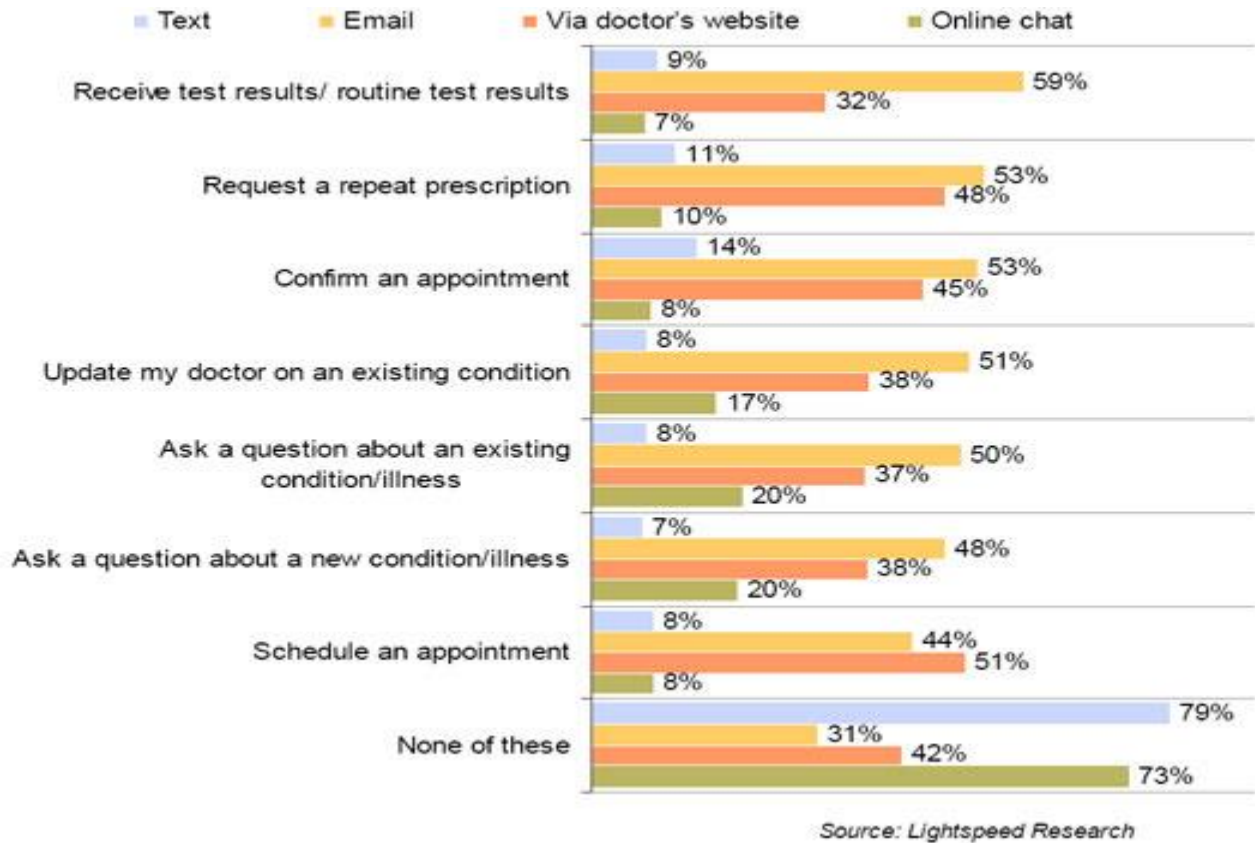
**Saint Philip's Hospital
Financial Summary**

	January 1 - December 31 2008	January 1 - December 31 2009
Revenues	\$ Millions	\$ Millions
Net Patient Revenues	2,927.0	3,049.6
Other Revenues	159.1	171.6
Total Revenues	\$ 3,086.1	\$ 3,221.2
Expenses	\$ Millions	\$ Millions
Salaries and Benefits	1,737.7	1,863.1
Supplies and Other Expenses	962.1	987.6
Depreciation and Amortization	181.7	192.0
Leases and Rentals	61.7	60.5
Interest	40.1	35.9
Total Expenses	\$ 2,983.3	\$ 3,139.1
Operating Income	\$ 102.8	\$ 82.1
Investment Income (loss)	\$(90.8)	\$92.8
Excess of Revenues over Expenses	\$ 12.0	\$ 174.9

Figure 3: Saint Philip's Environment



Figure 4: Lightspeed Research on Patient's Preferences



(Statistical graph is based on a survey study conducted by Lightspeed Research. Retrieved from: <http://www.lightspeedresearch.com/press-releases/consumers-would-embrace-email-communication-with-their-doctor/>)

Figure 5: Motorola's Solutions

Mobility at work in healthcare

Healthcare facilities around the world utilize our comprehensive portfolio of wireless solutions to improve the accuracy and efficiency of every day tasks, track medical information and equipment and increase the quality of patient care. our healthcare mobility portfolio includes:



mobile Computers

Whether you need rugged enterprise class PDA style mobile computers, single and dual-mode Voice-over-WiAn phones or other data capture devices, our portfolio offers the features required for use in federal government healthcare applications — from FIPS 140-2 certification (certain models) to the ability to withstand the frequent device wipe downs necessary to protect the health and safety of both patients and healthcare providers.



Radio Frequency Identification (RFID)

RFID infrastructure enables complete automation of asset tracking. Fixed RFID readers at entry and other key points enable the automatic capture of information on RFID tags. As a result, assets such as monitors, IV pumps or a specialized piece of equipment for an upcoming operation can be tracked in real time.



Bar Code Scanners

Motorola's bar code scanners provide the ability to capture 1D/2D bar codes and direct part marks as well as images that can be attached to a medical record, all with a single device. The need to purchase, manage and maintain multiple devices to accommodate multiple bar code symbologies is eliminated. Since one device does it all, capital and operational costs are reduced — and productivity is increased.



Wireless Network Solutions

Motorola offers the industry's most comprehensive wireless portfolio, capable of delivering the real indoor and outdoor coverage required to reliably and securely extend wireless communications to and from every employee in every inch of your facility. FIPS 140-2 certified, common criteria EA14, PCI and HIPAA compliance combine with our best-in-class AirDefense wireless intrusion prevention system, providing the advanced security required when and where you need it.



Centralized mobility management

one of the biggest costs associated with a mobility solution is the ongoing daily management of the wireless infrastructure. our family of powerful management solutions provide the tight integration required to create a single command center for end-to-end control over virtually every aspect of your mobility solution — from wireless WiAn infrastructure to mobile devices and the applications and data resident on those devices. This easy to use comprehensive toolset drives management costs to a new low, delivering the peak performance and maximum uptime required to maximize the total cost of ownership (TCO) for your end-to-end mobility solution.



mobile applications

our award-winning channel partners offer deep vertical industry expertise and best-in-class applications that have been tested and validated on Motorola technology. And since our devices are built on a common technology platform, the applications you invest in today can be easily migrated to the Motorola devices of tomorrow. You can easily support changing business needs without the substantial costs associated with new application development — future proofing your solution and providing superior investment protection.

(Source: Retrieved from:
http://www.motorola.com/web/Business/Solutions/Federal%20Government/ Documents/Static%20files/Fed_Healthcare_AB_FINAL.pdf)