Army-Baylor University Graduate Program in Health Care and Business Administration

Ben Taub General Hospital & LifeGift:
Strengthening a Partnership to Save Lives and Improve Healthcare Delivery

Presented to Lt Col Glenn Yap, PhD, MBA, CHE

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Ben Taub General Hospital, working closely with LifeGift, consistently ranks at or near the top of the list of hospitals in the United States that receive informed consent for organ donation from patients' families. Presently, organs are procured from these patients only after they are transferred to nearby hospitals. If these organs were procured within Ben Taub General Hospital, the Harris County Hospital District would be able to capture much needed revenue and, more importantly, enhance patient care by increasing the conversion rate of organ donors and avoiding unnecessary transfers, easing an already difficult time for patients' families. The full implementation of an organ procurement program at Ben Taub General Hospital will involve support from almost every area of the hospital. Successful execution demands involvement from radiology, pharmacy, laboratory, emergency center, accounting, billing, operating room, and executive staff. In addition, extensive effort, in the form of policy and procedure creation and revision, and a reallocation and prioritization of resources is needed to ensure accomplishment of this task.

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Ben Taub General Hospital
1502 Taub Loop
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Ben Taub General Hospital & LifeGift

Executive Summary

Ben Taub General Hospital, working closely with LifeGift, consistently ranks at or near the top of the list of hospitals in the United States that receive informed consent for organ donation from patients' families. Presently, organs are procured from these patients only after they are transferred to nearby hospitals. If these organs were procured within Ben Taub General Hospital, the Harris County Hospital District would be able to capture much needed revenue and, more importantly, enhance patient care by increasing the conversion rate of organ donors and avoiding unnecessary transfers, easing an already difficult time for patients' families.

The full implementation of an organ procurement program at Ben Taub General Hospital will involve support from almost every area of the hospital. Successful execution demands involvement from radiology, pharmacy, laboratory, emergency center, accounting, billing, operating room, and executive staff. In addition, extensive effort, in the form of policy and procedure creation and revision, and a reallocation and prioritization of resources is needed to ensure accomplishment of this task.

A. Introduction

A.1. Background

General

Ben Taub General Hospital (BTGH) is an integral part of the Harris County Hospital District (HCHD) that serves the comprehensive health care needs of nearly 300,000 unduplicated lives out of a potential 6M beneficiaries in Harris County. Over 1M residents of Harris County are uninsured. With more than 600 beds and a Level 1 Trauma Center (personal communication, Wendy Benedict, October 2, 2006), BTGH also serves much of the surrounding counties' indigent and minority population (Shafer, Wood, Van Buren, Guerriero, Davis, Reyes, et al., 1997). BTGH and its subordinate community clinics provide outpatient primary care and occupational health services to its patients; additional specialty care, ambulatory surgery, and ancillary services are provided at BTGH proper. Ben Taub General Hospital (Wikipedia) physician faculty and staff are provided through the Baylor College of Medicine.

Ben Taub General Hospital (Harris County Hospital District, 2006) had more than 31,000 admissions, 161,000 patient days, 93,000 emergency visits, and 202,000 clinic visits in Fiscal Year (FY) 2006. The average length of stay (LOS) at Ben Taub was 5.13 days during this time period. BTGH's FY 2006 budget (personal communication, Donald Morrison, October 12, 2006) was approximately $317M. Budgeted revenue was just under $810M; $824M was collected. The Harris County Hospital District (Men's News Daily, 2006) provided healthcare for more than 57,000 illegal immigrants in 2005 at a cost of approximately $128M. $28M was recouped through reimbursements from the federal and state governments, and an additional $3M was collected from the patients themselves. In all, the district paid an estimated $607M in unreimbursed costs for treating undocumented immigrants between 1995 and 2005.

Mission

Ben Taub's mission is to "improve community health by delivering high quality health care to Harris County residents and by training the next generation of health professionals."

Vision

Ben Taub's vision is "to create a healthier community and be one of America's best community-owned healthcare systems."

Facilities

The Harris County Hospital District (Houston Chronicle, 2006) provides more than 1.1 million health care visits each year to uninsured and underinsured residents of Harris County. The district operates Ben Taub General Hospital, Lyndon B. Johnson General Hospital, Quentin Mease Community Hospital, twelve community health centers, a dental center, eight school-based clinics, thirteen homeless shelter clinics, and four mobile health units.

Accreditation

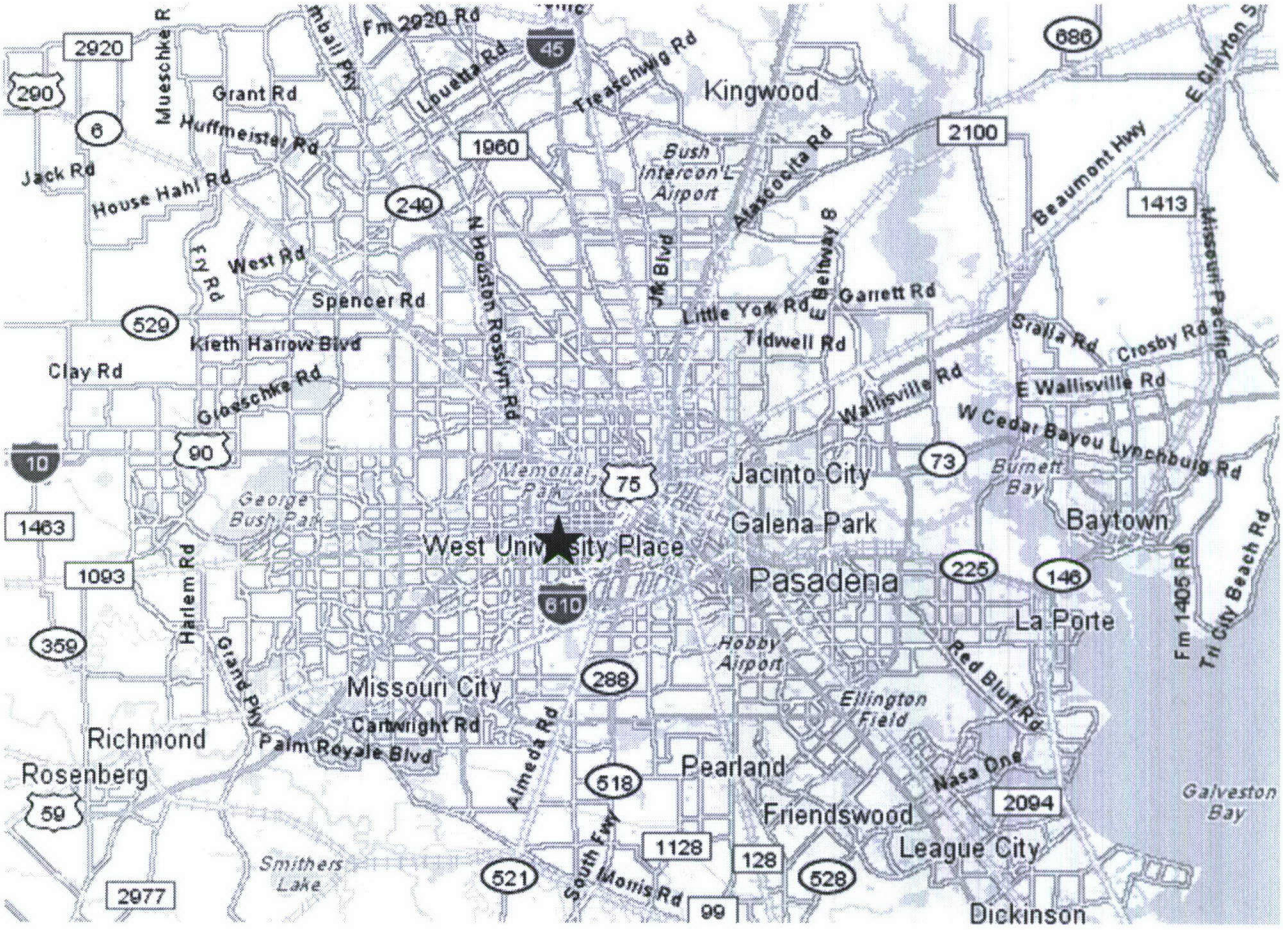
BTGH is accredited by the Joint Commission on Accreditation of Healthcare Organizations, the standard of excellence in quality health care. BTGH's last accreditation survey was conducted in September, 2006. Ben Taub General Hospital (Sharon Wardsworth, personal communication, October 11, 2006) has an 83% board certified physician staff compared to 82% for a typical civilian institution.

Geographic

Ben Taub General Hospital is located in the Texas Medical Center in Houston, Texas. As part of the Harris County Hospital District, BTGH provides health care for Harris County residents. In 2005, Harris County recorded a population of 3,693,000. The high number of

undocumented aliens not counted in the census, estimated to number between 800,000 and 1.2M (Men's News Daily, 2006) pushes the total number of Harris County residents to 4.5M to 5M.

Figure 1. Houston, Texas



LifeGift

LifeGift is a not-for-profit Organ Procurement Organization, or OPO, that was founded in 1987 (LifeGift). It (Shafer, Wood, et al., 1997) is one of three OPOs in Texas, covering slightly more than one-third of the state and serving major population centers such as Houston, Fort Worth, Lubbock and Amarillo. It serves 187 hospitals (1997) in 109 counties (LifeGift) throughout Southeast, North, and West Texas, dedicated to recovering tissue and organs for individuals in need of transplants. The (Shafer, Wood, et al., 1997) population service area for the entire organization is over 7 million people. A model of success, LifeGift is consistently

recognized as a national leader in the industry. In its first twelve years of existence, LifeGift (Shafer, Van Buren, & Andrews, 1999) experienced a 631% growth in the number of organ donors. Much of this success is due to the innovative procedures LifeGift has implemented and the relationships it has cultivated with its partnering healthcare organizations. For instance, LifeGift established a 24-hour communication center and implemented a system of routine notification in 1996. In the next three years, LifeGift faced record growth in many areas of its operation, including a 16% increase in bone donors. This figure represented twice the national growth rate and is even more remarkable when compared to the 2% growth rate LifeGift had prior to the implementation of its new notification process.

LifeGift is involved in every aspect of organ procurement and transplantation. Its dedicated staff members train hospital staff to identify potential donors and make timely referrals. They are also in charge of preserving organs identified for transplant and recovering organs once the donor is stabilized. LifeGift employees are also responsible for meeting with donors' families, informing them of the organ procurement and transplantation process, obtaining true informed consent, and assisting in the bereavement process. Although the job may end for some at this point, LifeGift continues to work to help donors' families, informing them of the destinations of donated organs and publicly recognizing them for helping save lives (Janice Whaley, personal communication, October 13, 2006).

Organ Donation and Transplantation

On average, each organ donor (Schnitzler, Whiting, Brennan, Lentine, Desai, Chapman, et al., 2005) adds almost 56 total life-years to the lives of six organ transplant recipients. Conversely, the life-year losses resulting from a failure to procure or use organs from potential donors are comparable to suicide and homicide rates. Further, each organ donor can offer up to

seven solid organ transplants to those in need: a liver, heart, pancreas, two kidneys and two lungs. Because each organ can go to a different recipient, one solid organ donor can therefore prolong the lives of up to seven others. Including tissue transplantation (LifeGift, 2006), one donor can enhance the lives of up to fifty people awaiting organ donation. In all, an astonishing 250,000 additional life-years (Schnitzler, et al., 2005) could be saved each year if informed consent for organ procurement and transplantation was obtained for all potential donors. Such significant potential gains make organ donation and transplantation one of the most important public health matters for healthcare administrators and practitioners.

Larger hospitals, particularly those with 150 or more beds, (Sheehy, Conrad, Brigham, Luskin, Weber, Eakin, et al., 2003) are much more likely to experience a higher number of potential donors and actual donors than smaller hospitals; in fact, less than 19 percent of hospitals account for more than 80 percent of all potential donors. Failure to obtain informed consent from patients and patients' families is the primary reason potential donors are not converted to actual donors. From a macro perspective, it becomes apparent that maximizing organ donation in the United States healthcare system can best be achieved by investing resources to increase the rate of informed consent in larger hospitals.

Even though more than 25,000 organ transplants are performed every year, there are currently more than 82,000 men, women, and children in the United States (LifeGift, 2006) waiting for a lifesaving transplant, and a new person is added to the organ transplant waiting list an average of every 14 minutes. In other words, approximately 68 people receive transplants from either a living or deceased donor each day while another 106 people are added to the nation's transplant waiting list. In Texas alone, the list of people in need of organ and tissue transplantation totals more than 5,000 people. These statistics coupled with the fact that an

average of 17 people per day, or more than 6,000 people each year, will die waiting for a transplant make it undeniable that the critical shortage of organs and tissue available in this country is a serious public health concern. Successfully identifying potential donors early and engaging in an aggressive practice of soliciting organ donation from all suitable cases (Gortmaker, et al., 1996) can result in up to 1,800 additional organ donors annually.

The decision to give the gift of live (LifeGift, 2006) almost always comes under the most difficult of circumstances. Usually the result of a tragedy, the opportunity to donate a family member's organs presents itself when patients' families are least prepared to handle it. Coping with a sudden and often overwhelming loss of a loved one, family members are often unable to fully grasp the magnitude of their decisions and are hesitant because they are not well informed of the organ donation process. It is therefore important to have staff members available early in the decision-making process to educate patients' families and assist with any questions or concerns they may have.

In 1988 (DeJong, Franz, Wolfe, Nathan, Payne, Reitsma, et al.), several factors were identified as critical to obtaining informing consent for organ donation from patients' families. Some of these factors, such as characteristics of the patient and patient's family and the families' beliefs and attitudes about organ donation and transplantation can be out of the realm of influence of health care practitioners. Others, however, can be affected, providing health care practitioners the opportunity to increase the numbers of available organs. For example, it is important for families to discuss organ donation and other end-of-life issues in advance of such a tragedy. A 1991 Gallup survey (LifeGift, 2006) on public attitudes toward organ donation and transplantation identified one critical factor in solving the nation's shortage of organs — get families talking about donation. An overwhelming majority, almost 94%, indicated they would

donate a family member's organs after death if he or she had talked about wanting to be a donor; less than half said they would be likely to donate a family member's organs if he or she had never discussed the issue.

Organ donation rates (DeJong, et al., 1988) can also be increased by enhancing the quality of hospital care and ensuring that the request for donation is handled in a manner that satisfies the families' informational and emotional needs. Having medical staff available to assist with a family's understanding of brain death, for instance, has proven to increase the rate at which organ procurement organizations obtain informed consent for organ transplantation. Improving patient satisfaction with healthcare received is also instrumental in successfully obtaining informed consent.

Recent efforts to increase discussion and awareness of organ and tissue donation have resulted in positive gains. For example, there were 6,457 deceased and 6,821 living donors (Rosendale, 2004) recovered in 2003; these figures represent a respective 58% and 274% increase over those recovered in 1988. Further, the number of living donors who were either spouses or unrelated to the recipient increased from 5% in 1988 to 33% in 2003. Also in 2003, Texas was listed second most often as the state of residence for deceased donors.

There has also been more encouraging news. For instance, although a considerable gap between organs needed and organs available still exists, the overall increase in the number of organ donations over the last decade has outpaced the number of new patients that need an organ transplant. As a result, the waiting list for organ donations has shortened; in fact, new additions to the Organ Procurement and Transplantation Network (OPTN) waiting list (Davies & Harper, 2004) decreased in 2003 for all organs except kidney. Kidneys (Manninen & Evans, 1985),

donated by half of actual donors, represent the organ people are most likely to donate while skin is the organ least likely offered by donation, available from just over 40% of actual donors.

As of November 30, 2004 (Davies & Harper), approximately 67% of registrations on the OPTN waiting list were awaiting kidney transplantation, and 18% were awaiting liver transplantation. The percentage of recipients receiving organs transplantations within one year following listing increased from 2001 to 2003 for all organs except heart and kidney; among those patients enjoying the highest probability of receiving a transplant within one year are heart, liver, pancreas and intestine recipients.

Although the number of organ donors has steadily increased, patients awaiting kidney and lung transplants have shared some sobering statistics. For instance, annual additions to the United Network for Organs Sharing (UNOS) kidney waiting list (Harper & Rosendale, 1997) grew from 11,916 in 1988 to 18,253 in 1996 while the waiting list for lung transplants suffered the biggest increase, growing almost 1,500% during this same 15-year period. Perhaps most significant, median waiting times have been steadily increasing for almost every organ since 1988, especially for those patients awaiting liver, kidney, and lung transplantations. Furthermore, despite legal and policy initiatives (Gortmaker, Beasley, Brigham, Franz, Garrison, Lucas, et al., 1996), only one third of potential donors become actual donors.

LifeGift and Ben Taub General Hospital

An average of 76% of families contacted by LifeGift gives informed consent for organ transplantation (LifeGift). Teamwork between LifeGift and Harris County Hospital District staff has resulted in an even greater achievement at Ben Taub General Hospital. Over the last couple of years, LifeGift has enjoyed stellar success, obtaining informed consent from potential donors'

families at Ben Taub nearly 91% of the time (Janice Whaley, personal communication, October 13, 2006).

Much of LifeGift's success at Ben Taub General Hospital (Shafer, Davis, et al., 2003) is due to its placement of In House Coordinators (IHC) directly within the emergency center. Because the emergency center at Ben Taub General Hospital is a Level 1 Trauma Center, the number of potential organ donors is much higher than in emergency centers of other hospitals. Level 1 Trauma Center status is the American College of Surgeon's highest level of certification for trauma care. Hospitals must meet strict criteria in services, research, and patient care to attain the certification of Level 1 Trauma Center.

The direct placement of In House Coordinators in Ben Taub General Hospital's Level 1 Trauma Center is one component of LifeGift's CORE strategy. LifeGift's (2006) CORE strategy was launched in 2002 to concentrate resources and donation recovery efforts at the 20 most productive hospitals in its 109-country service coverage area. LifeGift President and Chief Executive Officer Sam Holtzman "envisioned the concept after exhaustively reviewing seven years of donation data." His analysis revealed that 90 percent of LifeGift's organ donors and 40 percent of its tissue donors came from 10 percent, or a total of 20, of its CORE hospitals. The basis of the Mr. Holtzman's CORE strategy is placing and housing donation specialists in each of the 20 hospitals where the greatest potential for future donation exists. By employing staff members within these hospitals, LifeGift continues to make progress as evidenced by its stellar track record in achieving higher donation rates.

An evaluation of the effectiveness of In House Coordinators was conducted (Shafer, Davis, et al., 2003) in 2000. Level 1 Trauma Centers that employed an In House Coordinator converted approximately 44% more of the potential organ donors to actual donors. The biggest

contribution of the In House Coordinator is family support. The In House Coordinator establishes a relationship with the potential donor's family once the patient is identified as a possible candidate for organ donation. The family is then fully informed of the organ donation process; the In House Coordinators thereby maximize organ recovery by greatly increasing the likelihood of obtaining informed consent while the organs are still viable.

Historically, organ donation rates from minority populations have trailed the national average (Shafer, Wood, et al., 1997). More specifically, the rate of obtaining informed consent for organ donation in the African-American community has been much lower than the general population. Transplant professionals are concentrating on improving these statistics, devoting much time and considerable resources to educate the minority community about organ donation. One method employed to help increase consent rates has been to hire community education coordinators that are of the same ethnic group as the population they serve. For instance, LifeGift employed two African-American In-House Coordinators and a Hispanic community education coordinator at Ben Taub General Hospital in an effort to increase the number of donors from both ethnic groups.

The results have been most encouraging. The African-American consent rate (1997) increased 114% in just one year, from 35% between 1993 and 1995 to 73% in 1996. Equally impressive, the Hispanic organ donation rate at Ben Taub General Hospital increased by 82% during the same period. Overall, Ben Taub General Hospital and the community it serves enjoyed a 64% increase in consent rate for organ donation. More importantly, the number of organs recovered increased a remarkable 93%, from 19 in 1993 to 42 in 1996. Although the patient mix remained the same, the conversion rate of potential donors was significantly improved. "Following implementation of the IHC and the use of race-specific requestors the

majority of the time (at BTGH), organ donation nearly double in this institution, making it one of the, if not the largest, donor hospital in the country."

Factors Affecting Organ Donation

One obstacle in the organ donation process involves the difficulty obtaining informed consent for organ donation from patients' families. In 1991(Garrison, Bentley, Raque, Polk, Sladek, Evanisko, et al.), a study was conducted that examined the timing of the organ donation request. In a vast majority of the cases, 92%, "a clear temporal separation of the explanation of death or the certainty of family acceptance of death before the request for donation" led to the successful acquisition of informed consent. In contrast, the concurrent discussion of death and donation led to only an 18% success rate. This research clearly identifies the importance of the In-House Coordinator's role. More specifically, it demonstrates the need to allow a temporal separation between the explanation of death and the request for organ donation to maximize actual organ donation.

In 1998, another research project (Gortmaker, Beasley, Sheehy, Brigham, Lucas, Grenvik, et al.) examined the impact of 3 modifiable elements of the donation request on family consent rates: (1) decoupling (family's understanding and acceptance of brain death prior to discussion of organ donation); (2) participation by the procurement coordinator in the request for consent; and (3) availability of a quiet, private environment in which donation is requested. All three elements proved to be statistically significant factors affecting the rate of informed consent. Multivariate regression analyses indicated that consent rates can be almost 20% higher when all 3 process elements are present. To maximize organ donation, healthcare and organ procurement organizations should incorporate these elements into their standards of practice when

approaching families with a request for organ donation. Increasing family consent, the greatest impediment to organ donation, can only result in more lives enhanced through organ donation.

Sanner conducted a study in 1994 to better understand the factors influencing attitudes toward organ donation and other procedures with the dead body, half of those patients who originally were undecided about whether they wanted to donate their organs after death opted for organ donation when their mistaken beliefs were corrected or when they took time to work through their initial uneasiness (Sanner, 1994). In another study administered in1999 (McNamara, Guadagnoli, Evanisko, Beasley, Santiago-Delphin, Callender, et al), "logistic regression analysis revealed three significant correlates of willingness to donate across all ethnic groups: having had a family discussion about end-of-life issues; the belief that a doctor does all he or she can to save a life before pursuing donation; and concerns about surgical disfigurement of a relative's body after donation." By focusing on these three issues, community education initiatives can significantly improve family consent rates for organ donation.

In 1985, Manninen & Evans discovered that nearly 94% of the population they studied had heard about organ transplantation, but only 19% of these people actually carried donor cards. Their research also revealed another important aspect of organ donation; they found that people are more generous with the organs of a recently deceased relative than with own, electing to donate the organs of a relative 53% of the time while choosing to donate their own only half the time. The majority of patients involved in the study believed that next of kin should be prohibited from overriding their desire, as indicated by an organ donor card, to be an actual organ donor, and only 7% backed the idea of presumed consent (Manninen & Evans, 1985). Kidneys, donated by half of actual donors, represented the organ people were most likely to

donate, and skin was the organ least likely offered by donation, available from just over 40% of actual donors.

A.2. Subject

The donation process (Shafer, Davis, Holtzman, Van Buren, Crafts, & Durand, 2003) is frequently hindered by the burden of demands made on the resources of healthcare organizations and from divergent responsibilities between specialty services within each facility.

Ben Taub General Hospital, working closely with LifeGift, consistently ranks at or near the top of the list of hospitals in the United States that receive informed consent for organ donation from patients' families (Tina LeVert, personal communication, September 14, 2006). Presently, organs are procured from these patients only after the patients have been transferred to nearby Methodist Hospital. The Harris County Hospital District's executive staff wants to provide the best care possible to its patients and best service possible to patients' families; leaders in the organization feel that if patients' organs could be procured while the patient is still hospitalized, the patients' families would be spared the unnecessary inconvenience of patient transfer to surrounding hospitals.

Further, if these organs were obtained within Ben Taub General Hospital, the Harris County Hospital District would be in position to capture much needed revenue that is currently being leaked to other organizations. Mrs. Janice Whaley, Managing Director for Clinical Operations at LifeGift, stated (personal communication, August 14, 2006) that the implementation of this program could generate a minimum of $250,000 in annual revenue for the district. The Harris County Hospital District's executive staff is extremely interested in capturing as much of this "leaked" revenue as possible to increase its very limited health care

resources and, in turn, generate additional services to its community members through the use of the additional revenue.

On August 16, 2006, Mrs. Whaley attended a meeting with Harris County Hospital District staff to discuss the full implementation of an organ procurement program at Ben Taub General Hospital. Mrs. Whaley provided Harris County Hospital District employees with program requirements prior to the meeting, and representatives from all affected Ben Taub General Hospital departments were invited to reveal any potential obstacles to the successful execution of the program.

More specifically, directors and nurse managers from radiology, pharmacy, laboratory, operating room services, and the emergency center were present to identify any specific requirements that might pose a problem for their respective departments. Each representative was asked to simply determine whether the project was feasible. All present indicated that their respective departments could support this program. Several suggested, however, that some work and/or reallocation of resources would be necessary prior to task fulfillment.

This project details the process improvements and implementation resulting from a proposed implementation of an organ procurement program at Ben Taub General Hospital. An organ procurement program will result in better services to donors' families who will no longer have to endure unnecessary transfers of their loved ones; it will also lead to financial benefits for the Harris County Hospital District in the form of additional revenue generated by the program. The main elements of the project include creating accounting and billing procedures specific to LifeGift, establishing and, in some cases, rewriting policies for affected departments, adding

services and products to support the organ procurement program, and analyzing business impacts associated with its implementation.

A.3. Purpose

This project will provide the Chief Executive Officer, Chief Operating Officer, and Chief Financial Officer with a comprehensive analysis of assumptions and business impact necessary to make an informed decision to either accept or decline the proposal.

B. Scope

B.1. Time

BTGH is expected to complete all policy reviews and approve all budget requirements for project execution by late August 2007. As a result, the new organ procurement program should be fully operational by September 1, 2007. Although there are likely more changes in the future, this program has already begun. In fact, many of the new policies and procedures have already been implemented since this project began more than seven months ago. Any significant changes to external conditions will almost certainly impact any individual assumptions identified in this project and the analysis as a whole.

B.2. Organization

This project primarily impacts the Harris County Hospital District from organizational and budgetary perspectives and Ben Taub General Hospital from an operational viewpoint. Expected benefits include increased revenue generated from billing for operating room usage and ancillary support and intangible benefits including increased patient satisfaction and improved continuity of care.

B.3. Geography

Although the case focuses on Ben Taub General Hospital, Lyndon Baines Johnson, Quentin Mease Community hospital, and other Harris County Hospital District healthcare facilities will likely be impacted as the organization increases products and services to support the program.

B.4. Technology

The case is not expected to significantly impact the organization technologically.

B.5. Improved Healthcare Delivery

Eliminating the unnecessary patient transfers currently required for organ procurement at Ben Taub General Hospital greatly enhances the service and support provided to patients' families. Supporting LifeGift's organ procurement process also increases the likelihood of obtaining informed consent from patients' families for organ donation. The number of organs available to patients in need of organ transplantation will rise, potentially saving lives and significantly increasing positive outcomes for this population.

B.6. Increased Revenue

Providing operational support to LifeGift will allow for organ procurement within Ben Taub General Hospital. As a result, revenue generated from the procedures will flow into the Harris County Hospital District.

B.7. Improved Patient Satisfaction

Streamlining the process by which organs are procured from donors and eliminating unnecessary patient transfers will undoubtedly decrease patients' families' anxiety and frustration.

B.8. Increased Number of Organ Donors

Simplifying the organ procurement process for patients' families will likely result in a higher rate of obtained informed consent for organ donation.

C. Business Impact

C.1. Emergency Center

Organ Donor Identification

Most potential organ donors enter the Harris County Hospital District as patients in one of two Emergency Centers, one at Ben Taub General Hospital and another at Lyndon Baines Johnson General Hospital. Hospital staff members are required to notify, in a timely manner, the regional Organ Procurement Organization (OPO), in this case, LifeGift, of all individuals who have died or whose death is imminent (personal communication, Nikki Campos, April 3, 2007). Timely notification for organ donation is defined as time prior to or within one hour of the time the patient is found to meet the criteria for imminent death and prior to any measure taken to decelerate care or implement a Do Not Resuscitate (DNR) order. Once LifeGift has been notified, the time of notification must be documented on a Harris County Hospital District Form 280494 (Request for Organ/Tissue Donation/Autopsy).

LifeGift representatives will determine whether a patient is medically suitable for organ donation (personal communication, Nikki Campos, April 4, 2007). If the patient is deemed medically suitable for organ donation, hospital staff members will record this information on the HCHD Form 280494. LifeGift will then meet with eligible patients' families to discuss the benefits of and request permission for organ and tissue donation. Harris County Hospital District staff members will stand by to support all family members throughout the process and will assist LifeGift staff with the facilitation of the organ donation process. The Harris County Hospital District's Trauma Services department will periodically contact LifeGift to obtain conversion

data. These data are presented on a quarterly basis to the Performance Improvement Committees at each hospital.

For a patient that is classified as a Donor after Brain Death, or DBD, organ donation takes place from a donor who has been declared brain dead according to current standards of practice and applicable hospital policy (personal communication, Nikki Campos, April 3, 2007). For a patient that is identified as a Donor after Cardiac Death, or DCD, organ donation takes place from a donor after irreversible cessation of circulatory and respiratory functions according to current standards of practice and hospital policy. A patient that faces imminent death is defined as one who is severely brain damaged, ventilator dependent with either of the accompanying characteristics: Glasgow Coma Scale of less than or equal to 4, or a plan to discontinue mechanical or pharmacologic support.

C.2. Admissions/Registration

Admissions/Registration (Patient Death Without Organ Donation)

Upon the death of a patient, nursing personnel notify the nursing house supervisor, the admissions department, the chaplain and LifeGift (personal communication, Claudette Taylor, March 27, 2007). The nursing staff will also direct the deceased patient's family members to the admissions department. Admissions personnel print the deceased patient's face sheet. This document includes demographic information, next of kin, the patient's chief complaint and diagnosis. The information contained on the face sheet is then reconciled with patient's family members to ensure accuracy. Additional information, including the patient's social history, medical history, family history, primary care physician, etc. is also gathered and documented at this time.

Once the information on the face sheet is deemed accurate by the deceased patient's family members, admissions personnel complete a status of death report (personal communication, Claudette Taylor, March 27, 2007). This document is used to record official data that will be used to complete the patient's death certificate. Once the death status report is completed, it is attached to the patient's medical chart. If the patient has expired within 24 hours of arrival to the hospital, has died due to a traumatic sudden death, or is a prisoner or crime victim, admissions personnel must notify the Medical Examiner by telephone.

Admission/Registration (Organ Donor – Current Process)

Once a potential organ donor has been identified, the attending nurse or physician must fill out sections 1, 2, and 3 of Harris County Hospital District Form 280494 (Request for Organ/Tissue Donation/Autopsy) and contact the LifeGift Organ Donation Center at 713-523-GIFT (personal communication, Shanett Gaston, March 27, 2007). Once LifeGift validates the potential organ donor, Harris County Hospital District Form 280494, with sections 1, 2, and 3 completed, is forwarded to the Admissions Department. For redundancy, the Admissions Department is also notified of a potential organ donor by telephone. Once EPIC is fully implemented, organ donor notifications will be accomplished electronically. Once this telephone call is received, admissions/registration personnel obtain the patient's Medical Record Number (MRN), location, and demographic information to include next of kin. In most cases, LifeGift will fax a Harris County Hospital District Form 280494 to the admission/registrations department that confirms the patient's family's notification of and consent to organ donation. If this form is not received within 30 minutes of the initial phone call from hospital nursing staff, admissions/registrations personnel contact LifeGift to obtain the form. All information is then relayed by telephone to the Harris County Medical Examiner's office. LifeGift also informs the

Medical Examiner of the pending death. Contact by admissions/registration personnel is simply a redundancy built into the process to ensure accurate and timely passing of information.

Upon notification of organ donor status, Admission Department personnel reregister the patient with a Financial Class (FC) of UO and an Insurance Plan Code of ODP (Organ Donor Program). These actions then link the Medical Record Number (MRN) to the institutional account, and the payor source changes to LifeGift. When the UB-92 (Universal Billing) hospital billing account generates a bill, it 'drops' all charges to LifeGift's institutional account, labeled ODP, instead of billing organ donors' families (personal communication, Shanett Gaston, March 27, 2007). This information can be found in the Harris County Hospital District's Policy and Procedures Manual, Policy No. PAM-004.

Admission/Registration (Organ Donor – Future Process)

Once EPIC, the information systems infrastructure needed for realization of an electronic medical record, is fully implemented, organ donor notifications will be accomplished electronically (personal communication, Nanette Simpson, March 31, 2007). If the patient has not been departed out of the system, Admissions personnel will depart the patient before readmitting him or her as a LifeGift donor. Because a patient can not have two Financial Classes, generating two distinct bills, this step must be accomplished to ensure accurate and appropriate billing. After an organ donor has been readmitted, Admissions personnel can assign the LifeGift Financial Class to the second Medical Record Number. As before, all charges related to organ donation will be billed to LifeGift's institutional account instead of appearing on the patient's primary hospital bill.

C.3. Patient Accounts & Billing

Patient Accounts/Billing

Once LifeGift notifies the Harris County Hospital District's LifeGift Nurse Auditor that a patient has become an organ donor (personal communication, Jacqueline Linnear, March 29, 2007), the LifeGift Nurse Auditor will send a fax list of patient's name, account number, Date of Death (DOD) and time to the LifeGift Patient Account Representative in billing. If not already accomplished, the LifeGift Patient Account Representative will update the financial class to "UO" and change the statement code to "N". The financial class associated with a patient account identifies the responsible payor source (i.e. Medicaid, self pay, private insurance, LifeGift); LifeGift is identified by the financial class "UO". The "N" statement code suspends bill generation and subsequent delivery to organ donors' families (personal communication, Lila Manning, March 28, 2007). Only the insurance company, in this case, LifeGift, will receive a statement that is coded "N." The suspended bill generation also allows the LifeGift Nurse Auditor to complete an audit review of the account prior to billing patients' families.

After the LifeGift Nurse Auditor has reviewed the organ donor's patient account, he or she will add comments. The LifeGift Patient Account Representative will then rebill the organ donor's patient account by entering an "RB" code. This code instructs the computer operating system to generate and print a claim and an itemized bill. The claim and itemized statement will not be generated until the following day, however. All information entered daily is processed and batched throughout the night. Otherwise, the sheer number of transactions entered during normal business hours would drastically slow the computer operating system. Next, the LifeGift Patient Account Representative sends the entire packet of information to LifeGift via certified

mail before documenting in the organ donor's patient account that the claim has been processed and mailed.

The LifeGift institutional account provides a mechanism by which the Harris County Hospital District can bill for all services provided after brain death (personal communication, Janice Whaley, November 16, 2006). This includes all healthcare services provided to care for the organ donor prior to organ placement. LifeGift will need to receive copies of both donor and pre-donor bills to ensure the organ donor is not billed for any organ donation-related services. The LifeGift account also serves as a flag, identifying patients as organ donors for hospital staff members.

LifeGift will process the claim and send a payment in the form of a check along with a highlighted itemized statement to the Patient Account Services Department at the Harris County Hospital District's corporate office. It is then forwarded to the LifeGift Patient Account Representative. The LifeGift Patient Account Representative will add the following information to the organ donor's patient account: LifeGift check number, amount, and date of payment. The check is then forwarded to the Payment Posting Department for immediate cash posting.

After the payment posted, the LifeGift Patient Accounts Representative sends the LifeGift nurse auditor a photocopy of the check and a list of itemized charges (personal communication, Lila Manning, March 28, 2007). The LifeGift nurse auditor will then audit the results and adjust the organ donor's patient account, removing any and all LifeGift related charges and ensuring that patients' families and estates are not billed for charges incurred during organ donation. The LifeGift nurse auditor posts LifeGift's payment to the Harris County Hospital District's LifeGift account, account #017367684-9999. Once the payment is posted, the LifeGift account will have a negative balance. All charged healthcare services are then

transferred to the LifeGift account, in effect, zeroing it out. After all charges related to organ donation have been removed from the organ donor's patient account and transferred to the LifeGift account, the LifeGift Patient Accounts Representative changes the statement code for the organ donor's patient account to "M." A statement code of "M" instructs the computer operating system to generate and mail a bill to the patient.

Education and training constitute an important piece of the billing solution. Physicians and nurses must be trained of the new process (personal communication, Artemio Mier, February 12, 2007). First, the hospital staff needs to be sure that none of the charges related to organ donation appear on the patient's family's hospital bill. Second, physicians and nurses need to ensure that all appropriate LifeGift charges are posted to the organ donor's LifeGift account, allowing the Harris County Hospital District to capture all revenue possible. Once Patient Accounts personnel and hospital staff are trained, the Patient Accounts director must be made aware of the effective date. Upon notification, Patient Accounts personnel can monitor and update their processes as necessary.

C.4. Operative Services

Operative Services Support Requirements

For each organ procurement case, LifeGift will require the following personnel and equipment support: scrub nurse, circulating Registered Nurse (RN), anesthesia support, pathologist, and a bronchoscope (personal communication, Janice Whaley, November 15, 2006). Everything provided by the Harris County Hospital District throughout the organ procurement process is billable. This not only includes all services and support provided in the operating

rooms but consults, lab work, pharmaceuticals, radiological assessments, etc. needed to maintain viability of organ until procurement.

The LifeGift physician team charged with organ procurement will require anesthesia support from hospital staff while in the operating room. Because Ben Taub General Hospital is a teaching hospital, anesthesia support will be provided by anesthesia residents or student registered nurse anesthetists (personal communication, Cindy Domenici, April 3, 2007). An attending anesthesiologist will always be involved, however, in the plan of care and will be present during critical moments of the organ procurement. If a donor is in stable condition, a minimum of two anesthesia support personnel will be required. If a donor is or becomes unstable at any time, four anesthesia care providers will be required.

Anesthesia support is needed until cross clamping of the aorta, typically performed at least two hours into the procedure (personal communication, Janice Whaley, November 15, 2006). Depending on the number of organs being harvested, anesthesia care providers may be required for up to eight hours. In any case, anesthesia support will provide continuous perfusion/ oxygenation to the donor's organs until the point of procurement.

Immediately following cross clamp, anesthesia care providers may turn off any ventilators and leave the operating room (OR). There is one exception, however. If the donor's lungs are to be procured (personal communication, Cindy Domenici, April 4, 2007), a lung recovery team will assist LifeGift by determining and maintaining lung inflation parameters. If tissue or bone is procured, it is accomplished immediately after organ procurement. Harris County Hospital District support staff members are not required for tissue and bone procurement. Only the availability of an OR suite is necessary; the Harris County Hospital District can bill and receive reimbursement on an hourly basis for the use of an OR suite. Reimbursement rates occur

at case rates identified beforehand by Harris County Hospital District staff. After organ and/or tissue procurement, the attending anesthesia care provider must complete LifeGift Form 207 (CONFIDENTIAL DONOR FORM ANESTHESIA INFORMATION). This form is provided by LifeGift following each procedure.

The LifeGift surgical team will also require the support services provided by a circulator RN and a scrub nurse. The circulating RN will be responsible for coordinating all aspects of the surgical procedure (personal communication, Cindy Domenici, December 7, 2006). Specific support includes but is not limited to obtaining and opening instruments and supplies, maintaining a sterile environment, and completing an electronic intraoperative nursing record. During organ procurement Ben Taub General Hospital supplies, with one exception, will be used. If needed, a chest retractor is provided by LifeGift. All HCHD supplies used during organ procurement are billed to LifeGift through the organ donor's Medical Record Number that is associated with organ donation.

The scrub nurse is charged with organizing and counting all instruments need for the procedure (personal communication, Cindy Domenici, April 4, 2007). He or she must also remain within a three-foot radius of the patient, assisting the surgical team with anything it needs throughout the procedure. For instance, the scrub nurse must actively observe and listen to the surgical team, anticipate its needs, and provide surgical team members with instruments and supplies during the procedure.

Operative Services Business Impact

OR suite availability for organ procurement is a major concern (personal communication, Cindy Domenici, November 15, 2006). Because organ procurement procedures are not scheduled in advance, Ben Taub General Hospital's ability to perform elective and

emergency cases in the OR will impacted. Ben Taub General Hospital has two shifts for its OR procedures. The day shift, during which Operative Services is staffed to run ten rooms, is from 7:00AM to 3:00PM on weekdays; the trauma shift, during which Operative Services is staffed to run three rooms, occurs from 3:00PM to 7:00AM on weekdays and twenty-four hours a day on weekends and holidays.

During the day shift, organ procurement cases will occur in rooms scheduled for elective procedures (personal communication, Cindy Domenici, April 3, 2007). As a result, elective cases will be delayed in this scenario. If organs are procured during the trauma shift, the organ procurement will be prioritized among current emergency procedures. Nursing, medical, and anesthesia staff will triage the case and schedule accordingly. Organ procurement usually occurs within twenty to twenty-five hours after consent to donate is obtained. LifeGift will accommodate Operative Services as much as possible, delaying cases when able to allow for optimum and appropriate utilization of operating rooms.

New changes to the admissions process help ensure that organ procurement cases will not impact pre-op or recovery rooms (personal communication, Nanette Simpson, April 13, 2007). Until April 13, 2007, an organ donor was assigned to an inpatient account within the current software system used in the Harris County Hospital District. Patients, organ donors or otherwise, could not be assigned to an inpatient account without simultaneously and automatically being assigned a bed number in the hospital's bed management software system. All organ donors have since been assigned to an outpatient account that was created specifically for donors. This account frees beds for admitted patients by eliminating the automatic assignment of a bed to the organ donor. Further, it labels organ donors as DONR, the four letter abbreviation used by HCHD for organ donors. When hospital staff retrieve patient information

from the software system, the DONR identification tag will precede a patient's first and last names.

Patients will arrive in the OR from the Emergency Center or inpatient unit (personal communication, Cindy Domenici, November 15, 2006). LifeGift personnel will stay with the organ donor's body until it is transported to the morgue. LifeGift, in most cases, will provide organ donor's transportation to the OR, but Operative Services nursing staff is responsible for transportation to the morgue.

Each OR suite also has a medication tray that is secured and inventoried by the pharmacy department. All pharmaceuticals necessary for general anesthesia administration and adverse drug events are kept in each medication tray. The satellite pharmacy located on the same floor as the operating rooms at Ben Taub General Hospital also has an organ donor kit. This kit provides OR staff with mannitol, lasix and heparin. These drugs must be administered before cross clamp; the administration of any drugs during organ procurement is closely coordinated with the LifeGift surgical team.

C.5. Laboratory

Laboratory

Specimens and their accompanying lab work requisitions are received in the Ben Taub General Hospital laboratory by one of two methods (personal communication, Patricia Johnson, November 28, 2006). They are transported to the lab from the EC via a vacuum tube system, or they are hand carried by a unit representative, usually a clerk or a nurse, and dropped off at the customer service window. If a LifeGift specimen is dropped off at the customer service window, the unit representative must apply time-date information to the lab requisition form by placing

the requisition into a time-date stamp machine. They must also sign the Life-Threatening Requisitions log, including the following the information: date, time, patient name, chart number, location, tests requested, and name of unit representative dropping off requisition.

LifeGift requires that all laboratory results are received within one hour (personal communication, Janice Whaley, August 16, 2006). Many of the laboratory tests, electrolytes, arterial blood gas, and liver and cardiac panels are ordered multiple times for each donor. Electrolyte and oxygenation problems can quickly lead to organ failure and, therefore, must be identified and remedied promptly. As a result, an organ donor's plan of care is directly affected by the results of these laboratory tests. Specimens identified as LifeGift or associated with a Medical Record Number that belongs to organ donor will be processed on a stat basis, receiving a thirty-minute turnaround time (personal communication, Sylvia Waller, November 30, 2006). A thirty-minute turnaround time only includes the amount of time required for laboratory staff to perform the requested procedures. Medical staff from both the Emergency Center and individual inpatient units must ensure that LifeGift personnel receive laboratory results from tests that have already been processed. All laboratory tests ordered for an organ donor are charged to his or her associated LifeGift account and reimbursed accordingly.

C.6. Pharmacy

Pharmacy

To place an order with the Ben Taub General Hospital Pharmacy Department, a patient's physician must first document the order on the patient's chart. He or she must then complete an order sheet before scanning it into the computer system (personal communication, Stevenson Thomas, April 5, 2007). Once an order is scanned to the pharmacy, a pharmacist can immediately view its image. The pharmacist will first assess the patient's medication profile

using the individual account number included on the order sheet. Afterwards, the patient's regimen and demographic information are reviewed. Next, the pharmacist will check to ensure the order is prescribed correctly by the physician.

If written correctly, the pharmacist enters the orders in the Horizon Meds Manager (HMM) computer system. If the medication is available in the patient's unit, the patient's physician or nurse can immediately obtain it from the Pyxis automated dispensing device. If the medication is not available in the patient's unit, HMM will automatically generate labels in the main pharmacy. These labels are processed by pharmacy technicians. Final prescriptions are verified by pharmacists, and the medications are sent to the patient.

When placing a LifeGift order, an organ donor's physician must fill out a LifeGift T4 Protocol order sheet before scanning it into the computer system (personal communication, Stevenson Thomas, April 6, 2007). Once received, the pharmacist will check the organ donor's serum potassium level. If the serum potassium level is less than four milliequivalents per liter, 40 milliequivalents of potassium chloride in 250 milliliters of 0.9% sodium chloride will be prepared, dispensed, and administered intravenously to the organ donor.

Subsequent to the initiation of the potassium chloride infusion, the following medications will be administered to the organ donor through a direct intravenous injection: 50 mL of 50% dextrose, 1 gram of methylprednisolone, 20 units of regular insulin, and 20 micrograms of levothyroxine. The dextrose and insulin are contained within vials that can be obtained from the Pyxis pharmaceutical dispensing machine. Methylprednisolone and levothyroxine are contained in vials in the main pharmacy. Once these medications are injected into the organ donor intravenously, the pharmacist will begin Levothyoxine, or T4, infusion.

T4 infusion involves administering 200 micrograms of Levothyoxine mixed in 500 cc of 0.9% sodium chloride to the organ donor (personal communication, Stevenson Thomas, April 5, 2006). If vasopressors are needed, the same steps above are employed. Vasopressors are medications that increase blood pressure. Examples include Dopamine, Dobutamine, Phenylephrine, Norepinephrine, and Epinephrine. Each is mixed by the pharmacist that receives the order.

It is important to note that all of these medications are delivered STAT at one time and not staggered. The turnaround time for a STAT medication order is less than or equal to 30 minutes; the turnaround time for a routine medication order is less than or equal to 120 minutes. To ensure all medications are billed appropriately, the pharmacist must access the organ donor's patient profile via his or her LifeGift account number.

C.7. Radiology

Radiology

From the beginning of project implementation, the radiology department was able to meet all of the requirements set forth in the LifeGift needs assessment. For example, LifeGift asks that chest x-rays, ordered for all organ donors, be completed with radiologist interpretation within one hour from the time of request. When ordered, a chest x-ray must be identified by the ordering physician as "EMERGENCY" and immediately transmitted verbally by telephone to the ultrasound department (personal communication, Andre Guillory, April 17, 2007). Available twenty-four hours a day, a diagnostics radiographer will capture an image of the organ donor within one-half of an hour. A radiologist will immediately interpret the image and provide a preliminary reading within the requested one-hour time frame. Both the report and the

associated images are available real time via the EPIC and Synapse PACS systems within twenty-four hours.

Although an order of an ultrasound for an organ donor is rare, the Radiology department can accomplish this task in under two hours (personal communication, Andre Guillory, April 7, 2007). When ordered, an ultrasound must be identified by the ordering physician as "EMERGENCY" and immediately transmitted verbally by telephone to the ultrasound department. For emergent cases, there is always a sonographer on call. If not present at the time of the order, a sonographer may be recalled by radiology staff members. Ultrasound imaging is performed within one-hour of the order or sonographer's arrival, and interpretation is provided immediately thereafter by a radiologist. Once interpreted, ultrasound reports are transcribed, signed, and recorded into the organ donor's electronic medical record. Both the report and the associated images are available real time via EPIC and Synapse PACS. Because an electronic radiology report is automatically generated and sent to the organ donor's electronic medical record, hard copies are not provided to the ordering unit.

Another rarely ordered procedure for organ donors, CT scans are also needed within two to four hours of LifeGift's request. The Radiology department currently provides CT imaging and interpretation within the requested two-hour time frame (personal communication, Andre Guillory, April 10, 2007). When ordered, a CT scan must also be identified by the ordering physician as "EMERGENCY" and immediately transmitted verbally by telephone to the ultrasound department. Because CT personnel are available twenty-four hours a day, imaging is almost always performed within one-hour of the order. The only possible delay is the unavailability of a CT scanner due to other emergent cases. Once interpreted, CT reports are

transcribed, signed, and recorded into the organ donor's electronic medical record. Both the report and the associated images are available real time via EPIC and Synapse PACS.

D. RESULTS

Although this project continues to experience growing pains, the results for the first three months of 2007 have been outstanding. In January 2007, (personal communication, Tina LeVert, April 18, 2007) LifeGift procured thirteen organs from four donors at Ben Taub General Hospital. In the following month, five organs were procured from one donor, and in March, eleven organs were procured from two donors. In all, LifeGift has procured twenty-nine organs from seven donors at Ben Taub General Hospital in the first three months of 2007. As business processes and lines of communication are improved, the already strong and effective relationship shared by the Harris County Hospital District and LifeGift will continue to save an increasing number of lives while improving the level of service provided for the families of organ donors.

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