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EXECUTIVE SUMMARY

Over the past thirty years, various efforts have been made to align the incentives of hospitals and physicians to control healthcare costs while assuring the provision of high-quality patient care. One innovative strategy used by some hospitals involves the creation of technology assessment programs to develop a more thorough and objective review process for new clinical technology. The University of California–San Francisco Medical Center has been a pioneer in this area. Its physician-led healthcare technology assessment program has been successful in changing the culture of how innovative technology is evaluated and adopted by the hospital and fostering an increased awareness among physicians of the clinical, financial, and programmatic implications of their technology decisions. We explore the operational characteristics and various effects of this program and highlight the key components to its success and opportunities for improvement in the context of its reproduction at other medical centers.

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INTRODUCTION

The medical field has witnessed a movement toward greater alignment of incentives between hospitals and physicians in recent decades (Buschmann and Bozic 2009). Since the 1980s, various initiatives have attempted to control healthcare costs without affecting high-quality patient care (Wachter 2004; Uphoff and Matuszewski 1996). Recent efforts to align incentives among hospitals and physicians include physician gain-sharing programs, bundled payment initiatives, public reporting of outcomes, employed-physician models, and physician-owned hospitals (Ketcham and Furukawa 2008; Casale et al. 2007). One strategy used by hospitals to control escalating costs and engage physicians in quality improvement efforts entails the creation of technology assessment programs to better inform hospital purchasing decisions (Uphoff and Matuszewski 1996; Juzwishin and Poole 1995; Gordon and Tan 1992; Uphoff and Krane 1998; Fine 2003). These programs have become increasingly popular as a result of the need for more comprehensive and objective review and evaluation of new technologies (Fine 2003; Eisenberg 1999; Perry and Theymer 1999). These trends exist in the context of rapid innovation in the healthcare technology sector, the current status of minimal management of technology adoption practices within many hospitals, pervasive marketing pressure on physicians from manufacturers (through sales representatives), demand for state-of-the-art care from patients, and increased emphasis placed on evidence-based medical decision making (Gordon and Tan 1992; Eisenberg 1999). Hospitals are challenged to capture the attention and allegiance of physicians as compared to technology vendors with regard to adoption of new products. Surgeons often have long-standing relationships with vendors and report closer alignment with these stakeholders than with their hospitals' purchasing departments over their technology decisions (Burns et al. 2009). Many hospitals are now looking to physician-led technology assessment programs to oversee the introduction of new medical devices and equipment proposed by clinicians, thereby fostering greater physician awareness of the effects of new technology on the hospital (Gordon and Tan 1992).

In our investigation of the University of California–San Francisco (UCSF) Health Technology Assessment Program (HTAP), the international experience with technology assessment was considered. The United States is somewhat unique in its scale and methodology of technology assessment; internationally, the process has evolved in several different settings, including government agencies, health plans, and hospitals. The United Kingdom's National Institute for Health and Clinical Effectiveness (NICE) represents oversight on the broadest scale; the organization appraises medical technology and standardizes access to technology across the country by mandating the National Health Service to fund treatments recommended by NICE evaluations (NICE 2010). China is also evaluating a federal approach and anticipates the need for multiple government agencies (such as the Ministry of Health, State Food and Drug Administration, and Ministry of

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Labor and Social Security) to play a role in emerging health technology assessment (Chen, Banta, and Tang 2009). Canada has experimented over the past decade with decision making at a level closer to that seen in the United States, by establishing agencies to function within individual regional healthcare systems or within large multihospital complexes (Lee et al 2003; Juzwishin and Poole 1995).

In comparison, the United States has seen development of its health technology assessment effort on a much smaller scale, such as within a regional health system (Gordon and Tan 1992) or individual hospital. Hospital-based programs are unusual—they allow practicing physicians to suggest adoption of a new technology to their peers, representing self-governance within an institution instead of control originating from a nonclinical entity. A key to success is to assemble a combination of clinicians, administrative personnel, and experts in the health technology assessment process (Uphoff and Krane 1998), facilitating a systematic practice of peer review consistent with a hospital's unique culture and values (Gordon and Tan 1992). By including representatives from various clinical and administrative departments, this multidisciplinary committee is able to offer broad expertise and a comprehensive perspective on the effects of a new technology (Uphoff and Krane 1998).

The privilege to serve on a hospital's technology assessment committee does entail key responsibilities and challenges. Physician members may be unfamiliar with diagnoses and the clinical indications outside their area of practice, rendering them unable to fully assess the need or merit of a technology. Conflicts of interest by members who may compete for patients with the presenter (e.g., neurosurgical and orthopedic spine surgeons) must be disclosed. Furthermore, financial effects of the technology adoption are not always entirely available, as many of the proposals are for new products where data is limited, or the extent of its use cannot be exactly predicted. Therefore, the committee is required to sometimes use projections and estimations in decision making. Many of the most efficient and effective hospital-based technology assessment programs overcome some of these challenges by including clinical experts and representatives from hospital administration, finance, purchasing, reimbursement, and nursing. Additionally, applying a systematic method of evaluation to each proposal can aid the committee in making an objective decision (Uphoff and Krane 1998).

Although several studies have generally outlined the necessary components of a health technology assessment program (Uphoff and Matuszewski 1996; Gordon and Tan 1992; Uphoff and Krane 1998; Fine 2003; Goodman 1998; Lumsdon 1992), no recent reports of the characteristics of a successful hospital-based program have been published in the current era of resource constraints and evidence-based medicine. Using information collected through research and personal interviews, we describe the operation of such a committee at an academic medical center, investigate the committee's multi-dimensional effects within the institution, and outline the

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key components needed to create a program at another institution.

UCSF HTAP

UCSF HTAP was created in 2006. Its goal is to facilitate the appropriate adoption of healthcare technologies by objectively evaluating issues related to their safety, efficacy, financial impact, and fit within the culture and strategy of the institution (see Exhibit 1). As an academic medical center, UCSF participates in several multicenter trials and experimental clinical trials that are overseen by an institutional review board that seeks to balance patient safety with access to pioneering innovative new treatments. Simultaneously, UCSF serves as a teaching hospital dedicated to the care of complex and costly cases that are referred from other hospitals in the northern California region, regardless of the patient's ability to pay for care. To promote the academic credibility and financial viability of the institution, HTAP seeks to balance the clinical evidence related to new technologies with appropriate considerations of cost and programmatic effect and achieve widespread acceptance among clinical staff as a result. The program was not created to function as a cost-control gatekeeper against the adoption of innovative technology, and today continues to serve as a forum for physician-led discussion and sharing of ideas, experience, and opinions. However, the consideration of a technology's cost effectiveness and alignment with the hospital's overall financial strategy are included as a part of its comprehensive evaluation. The committee members are sophisticated enough to understand that almost all new technology will increase costs to the hospital, and their challenging task is to decide whether this is justified by the technology's promise of improved clinical outcomes—whether its cost effectiveness is sufficient to warrant its adoption.

The structure of the committee is largely physician-centered: the clinical director and all voting members are clinicians (see Exhibit 2). The voting body is composed of one representative from each service line, and representatives are nominated by their department chair. Key administrative personnel, including the chief medical officer (CMO), the chief financial officer, the director of materials management, and the director of supply chain management, serve as nonvoting members and provide input essential in supporting the physicians' deliberations.

The "appropriate" level of physician control over the management and utilization of healthcare in general has been debated in the literature, especially in reference to the effects of financial incentives and the impact on quality of patient care. Some studies show that physicians respond to financial incentives, and suggest the manifestation of supplier-induced demand when discussing the possible inefficiencies that develop as result of increased physician power (as in the establishment of physician-owned hospitals) (Mitchell 2007). Other studies dispute this claim, citing evidence of little or no significant difference in utilization, cost, and clinical outcomes as result of expanding physician control in hospitals (Stensland and Winter 2006). The possibility of including either a patient advocate, member of the hospital board

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EXHIBIT 1
Program Goals

Clinical	• To facilitate the adoption and use of safe and efficacious healthcare technologies to improve patient care • To develop a technology assessment process that is transparent, flexible, and responsive to the needs of UCSF clinicians and patients • To provide clinicians with a framework for applying an evidence-based approach to the adoption and use of healthcare technology
Financial	• To evaluate the cost effectiveness and financial impact of new healthcare technologies at UCSF • To develop a technology assessment process that will enable appropriate prioritization of scarce healthcare resources • To identify opportunities to proactively seek additional reimbursement for new healthcare technologies prior to their introduction into clinical use
Academic	• To foster an environment for the evaluation of new healthcare technologies that will enhance the academic and programmatic missions of UCSF Medical Center

of directors, or a member of the insurance industry have been considered at UCSF to address this challenge. The model we describe is heavily physician-centered and ultimately driven by the votes of practicing clinicians, which raises the concern that the committee would serve physician interests unfairly. However, this concern has not manifested itself at UCSF. Sufficient inclusion of non-clinical representatives in committee deliberation has prevented self-serving conflicts of interest by physicians, as demonstrated by several denied proposals (including one endorsed by the clinical director himself). As a result of the fair and reasonable decision making by the committee, administrative leaders have not raised significant concerns regarding control over purchasing decisions.

At UCSF, all noncapital new product requests are first reviewed by the purchasing department. Routine requests (such as the addition of new sizes to a product already in use) are approved and processed without input from HTAP. However, if a technology is deemed to be sufficiently innovative or to have a significant financial impact on the institution, the request is forwarded to HTAP for a more thorough review. Specifically, if using the product constitutes more than a $100,000 annualized cost increase or more than a $1,000 cost increase per procedure, or if it represents a new clinical treatment paradigm, it is referred to HTAP. Although the HTAP committee's decision is final and binding, there is an appeals process for denials. The credibility and finality of these decisions have overcome the previous practice of physicians or department chairs circumventing protocol by taking their request directly to the CEO's or CMO's office. New technology decisions

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EXHIBIT 2
UCSF HTAP Committee Member Representation, by Specialty/Department

Steering Committee	Gastroenterology
Administration: Chief Medical Officer (2 representatives)	General Surgery
Administration: Chief Financial Officer *	Hospitalist Medicine
HTAP Administrative Director *	Electrophysiology
Internal Medicine (2 representatives)	Intensive Care Medicine
Institute for Health Policy Studies*	Neurosurgery
Material Management *	Obstetrics/Gynecology
Orthopedic Surgery §	Orthopedic Surgery
Patient Care Services *	Otolaryngology
	Pediatric Surgery
	Perioperative Services
General Committee	Plastic and Reconstructive Surgery
Administration: Chief Nursing Officer *	Radiation Oncology
Anesthesia	Radiology
Cardiology	Revenue Management Services *
Cardiothoracic Surgery	Urology
Committee on Human Research*	Vascular Surgery

§ = HTAP clinical director; * = non-voting committee member

are based on the merits of the request instead of the influence of the requestor.

UCSF has a separate capital budgeting process for larger budgetary decision making. Since its inception, HTAP has been increasingly consulted to provide evidence-based advisory recommendations to the capital budget committee regarding clinical technologies. In this role, HTAP provides the capital budget committee with an objective physician opinion from a cross section of practitioners who are not vested in the capital budgeting process.

In monthly meetings, the committee reviews proposals from clinicians requesting the acquisition of a new technology. Before each meeting, the administrative director assembles information on the proposed technology into a packet (the long version is approximately 60 pages; an abbreviated version is also created) and distributes the material electronically for review. The packet explains the technology's structure and function, FDA approval status, financial analysis and reimbursement policy, results from previous clinical evaluation at UCSF, published studies regarding efficacy, target patient population, and adverse effects. Also included is the administrative director's opinion of the quality of the evidence, based on the consistency and merits of the available literature. The presenter's statement of financial disclosure is also

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attached. The administrative director also guides the presenting physician in the creation of their presentation, making certain that information relating to critical criteria is included (Exhibit 3). A committee member is designated as moderator to facilitate discussion at the meeting.

Two technologies are reviewed during each hour-long session. In a 10-minute presentation, the requesting physician comments on the technology's effect on clinical outcomes, safety, costs and reimbursement, patient demand, market forces, programmatic fit, and workforce or operations implications. This presentation is supplemented by the material distributed by the director before the meeting, which is referenced during discussion. After discussion and a question-and-answer period, the requesting physician is excused and discussion continues, with a closed ballot vote concluding the meeting. The technology is then either deemed (1) approved, (2) provisionally approved, (3) denied, or (4) tabled until more information can be obtained. The final decision is based on plurality within these four options, not majority rule. If voting for provisional approval, the committee member may write additional comments on the ballot. Examples of past provisions have included, "small data set presented, therefore approve but continue to record data on patient length of stay," and "approve, but monitor use by other service lines or develop a rollout process for other service lines." Each HTAP-approved technology is monitored for utilization, efficacy, costs, complications, and reimbursement by the administrative director and the supply management team over the subsequent 12 months. If a significant discrepancy is found between actual and projected costs, utilization rates, outcomes, and so forth, over the 12-month monitoring period, HTAP is permitted to terminate the provisional approval of the technology. This has not yet occurred at UCSF.

EXHIBIT 3
HTAP Decision-Making Criteria

Efficacy data and strength of clinical evidence
FDA approval status and safety/adverse effects
Target patient population
Operational implications within hospital
Financial analysis and reimbursement policy

THE IMPACT OF HTAP

Detailed personal interviews were conducted by the authors with several members of HTAP, past physician presenters, and hospital leadership. The discussion focused on the details of HTAP operation, the motivation behind its design and creation, the effect on the medical center, and areas for potential improvement. After all interviews were completed, the authors qualitatively assessed all information gathered, and the most noteworthy effects of HTAP reported in these interviews are presented here.

Improved Awareness and Analytical Mindset Among Physicians

During the year-long planning phase preceding the launch of HTAP, a concern was raised that the committee

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would be inundated with a backlog of physicians seeking approval for new technologies. This has not occurred, as the rate of incoming new technology requests (about two per month) has aligned well with the committee's capacity for review. This may be a result of a self-vetting process that now occurs in the minds of physicians who now understand that they will need to justify to a committee of their peers the purchase of a new device that may be costly and have limited incremental clinical value. One member stated that "only truly efficacious and deserving technologies are presented in the first place," and this may explain the high approval rate for proposed products: 24 out of the 41 technologies reviewed received full approval, and 13 have been granted provisional approval (Exhibit 4). The appeals process has not been used.

This physician self-vetting phenomenon is one of the most valuable consequences of HTAP, and appropriately inserts the importance of financial analysis into the new technology evaluation process without alienating the clinical staff. HTAP has succeeded where past initiatives such as value analysis have failed, because it represents self-regulation on part of the physicians as opposed to the imposition of a budgetary target by administration. It provides a mechanism to protect frontline clinicians from overstated claims of efficacy by sales representatives and to defend the institution from entering unfavorable purchasing agreements. In certain instances, by comparing the costs of an existing technology with the newer device under consideration, the physician realizes that better negotiations with the manufacturer are necessary, or that introduction of the technology does not justify the increased cost.

Relationship Between Clinical and Administrative Staff

The HTAP committee has also enhanced the relationship between clinical staff and administration. Awareness has increased among physicians of the financial impact that new technologies have on the hospital operating budget, and this awareness promotes greater transparency. Committee members and physician requestors explain that this has allowed requestors to accept the committee's decision in a more thoughtful and understanding manner, and this phenomenon may partly explain why the appeals process has never been used. Decisions of denial are also viewed as more credible when coming from a physician committee rather than from one representative in the purchasing department (as was the case prior to HTAP establishment) or from a group of administrative executives who aren't as familiar with the hospital's clinical needs for new technology. The financial components of the decision are discussed openly and honestly in the presence of the requesting physician, in contrast to other programs where financial implications may be considered behind closed doors. As a result of this open dialogue, an environment of improved cooperation and understanding between clinicians and administration has emerged. Some physicians have also used HTAP as a forum for

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EXHIBIT 4
Technologies Reviewed by UCSF HTAP Since Inception

Specialty Requestor	Approvals	Provisional Approvals	Denials
Anesthesia/Pain Management	1	1	0
Cardiology	2	0	0
Cardiothoracic Surgery	5	4	1
General Surgery	4	2	1
Neurology	2	1	0
Neurosurgery	2	0	0
Ophthalmology	2	0	0
Orthopedic Surgery	2	3	2
Otolaryngology	1	1	0
Plastic Surgery	1	0	0
Radiology (Diagnostic and Interventional)	2	0	0
Urology	0	1	0

clinical dialogue about a new technology, without requesting an official vote on the product, demonstrating a culture of receptive, multidisciplinary, team-based decision making.

An unanticipated benefit of HTAP has been the redefined relationship between administration and clinicians in the selection of new technologies. Whereas administrators previously were called upon to make clinical decisions without the important input of physicians, a new model of shared responsibility and accountability now exists where physicians and administration work together toward the final decision. As administrators haven't surrendered complete control of capital budgets or overall spending by the purchasing department, the sense of restraint and regulation on the part of administration has been maintained despite the transition of decision-making power.

Improvements in Safety, Speed, and Motivation Behind Technology Adoption

Hospitals and physicians are under immense pressure to quickly adopt innovative devices and technologies—pressure to remain competitive in the market, and pressure from sales representatives to enroll patients in clinical trials of new devices. In the latter case, the clinician is often convinced to participate in a study without understanding the true costs to the institution, is led to believe that the new device will be provided without charge to the institution, or is contracted to receive payment for referring a patient to a clinical trial (Gelberman et al. 2010). Hospitals, physicians, and patients deserve full

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transparency (of both expected and unanticipated costs) about participating in a clinical trial before deciding to enroll. A technology assessment program ensures that this necessary discussion occurs before new technology is introduced, and that physicians think more critically about their endorsements of clinical trials, thereby ultimately preserving the institution's academic integrity and protecting its financial interests. The program may also serve as a deterrent to medical ghostwriting, the practice in which prominent researchers are added as authors for scientific articles promoting pharmaceuticals or medical devices that have been prepared without their appropriate involvement in the study. In the era of increased regulation and cost containment in medicine, academic medical centers can emerge as leaders in the area of efficient healthcare delivery by serving as key drivers to enable other institutions to avoid the adoption of ineffective new technologies.

LOOKING AHEAD: RECOMMENDATIONS FOR DISSEMINATING HOSPITAL-BASED TECHNOLOGY ASSESSMENT

Hospitals that wish to establish a healthcare technology assessment program can benefit from valuable lessons learned from the UCSF model. In general, technology assessment programs are challenged by the dearth of direct comparative effectiveness research between various interventions, although this looks to improve in the next few decades. Data, when available, do not allow easy translation of clinical effectiveness into value or the application of information gleaned from clinical trials to real-world purchasing decisions (Young, Olsen, and McGinnis 2010). UCSF HTAP has met these fundamental challenges and is exploring ways to overcome them, including conducting a thorough literature review and the multidisciplinary consideration of all factors in the technology evaluation process in order to convert available data into a decision that is judicious clinically, financially, and programmatically.

Additionally, most efforts at creating organizational change encounter barriers, and the implementation of a novel technology assessment process is no different. Resistance is often rooted in misunderstanding, lack of trust, lack of strong leadership, and fear of the unknown future state of the changed organization (Kotter and Schlesinger 2008). UCSF HTAP has continuously evolved over the past five years based on the lessons learned while creating, maintaining, and improving the technology assessment and adoption process at the medical center. Over the course of interviews conducted with members of the committee and physician presenters, three key principles were identified as essential to HTAP's success: (1) membership, (2) leadership, and (3) systematic objectivity in operation.

Membership

The committee's credibility largely comes from being composed primarily of physicians; however, the involvement of nonphysician representatives from administrative departments also allows for a comprehensive evaluation of each proposal based on clinical, financial,

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market-based, and programmatic data. This multidisciplinary approach provides varied expertise to the discussion of each technology, and the technology's effect on hospital operations, patient care, budget, and nursing are all explored. Furthermore, the multidisciplinary approach has helped to establish a sense of teamwork among clinical and administrative staff, involving representatives from both groups in important hospital decision making. When determining the committee membership structure, the charter members must acknowledge the important union of clinical credibility and breadth of expertise that must exist. Equally important, however, is awareness that the desire for adequate representation of services and interests must also be balanced with the practical need for a committee small enough to efficiently discuss issues (Chen, Banta, and Tang 2009). Several valuable adaptations were made during the evolution of the program. As members retired, moved to other institutions, or became unable to serve on the committee, a procedure for their replacement became necessary. The replacement process involves a recommendation by the chief of the retiring member's division, followed by an interview between the clinical director and the nominated individual.

Leadership

Leadership is also extremely important in the successful operation of HTAP, which has separate clinical and administrative directors. The clinical director (and founder) is an established practicing surgeon whose commitment to hospital efficiency is evident in his everyday practice. He is dedicated to improving the alignment of hospital and physician incentives in technology assessment, and his approachability and fairness contribute significantly to the program's credibility. The administrative director has extensive experience in bioengineering, technology assessment, and data analysis. His ability to work closely with physician requesters, review the available literature, provide a concise summary, and comment on the quality of evidence is critical to the functioning of the committee. Together, the two directors offer the necessary clinical credibility and expertise in evidence-based evaluation of technology for the program to succeed. Similar qualities would be desirable in the leadership of such a committee in an institution elsewhere.

Additionally critical to the success of UCSF's program was the preparatory phase that preceded its implementation. The two leaders were selected early in the planning phase and began communicating the plans for the program's establishment to clinical staff long before its commencement. Consequently, physician champions and committee members could be recruited, buy in was secured ahead of time, and misunderstandings could be anticipated among all those to be affected by the program. The design of the program incorporated feedback from administration, finance and purchasing departments, and many clinical departments. Achieving success in establishing an HTAP at another institution would be promoted by a similar preparatory phase coordinated by the program's leadership.

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Systematic, Objective Process

The systematic and objective process employed by HTAP is the third reason for its success. As the program evolved, HTAP learned that having a fair, transparent, and objective process for determining which technologies are referred to the committee is important to maintain physician buy in. The criteria are updated each year during the strategic planning process, but they are always made transparent to stakeholders who are affected by HTAP. At the next step in the process, physician presenters are instructed on the information they must provide and present, then balanced discussion among members acknowledges the multidimensional effect that the technology will have on the hospital. By using a closed-ballot voting system and the same standards for all proposals, the credibility of the committee's decisions is further strengthened. The importance of outlining a systematic and reproducible approach to evaluation should not be overlooked by other institutions that wish to establish a novel technology assessment program.

Full disclosure of conflicts of interest on behalf of the physician presenter is also essential to the program's objective methodology. In addition to self-disclosure, the administrative director also searches publicly available information to further investigate financial ties between the requestor and the proposed technology; this step may influence the physician to reflect on, and offer all details regarding, his relationships from the beginning of the process. The possibility also exists of imposing a penalty if an undisclosed conflict of interest is discovered after the proposal of a product, and this option could be considered by an institution in the design of its program.

Future Directions

As the UCSF program continues to evolve over time, there are still numerous opportunities for improvement. One area relates to establishing a protocol for implementation and monitoring of technologies that are approved by the committee. A breakdown in communication between the committee and purchasing, between the hospital and the vendor, or among the necessary distribution channels within the hospital (inventory/supply departments) could delay introduction of a newly approved technology. An implementation protocol for approved devices is helpful in the operation of an institution's technology assessment program. Additionally, a pharmacist and/or nurse educator could be included as a nonvoting member on the committee and liaison to these departments, because many new products involve training of pharmacy and nursing staff, and this is often where a delay occurs.

Attributing a monetary value to the program is extremely challenging in terms of cost savings as compared to the amount the hospital would have otherwise spent on technology in absence of the program. Ideally in the future, new methods of cost accounting and financial modeling will be included in HTAP's operation such that these estimates can be calculated. These metrics will provide quantitative assessment of the program, further increasing its

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credibility within the institution and beyond.

Another opportunity involves the creation of subcommittees modeled to evaluate technologies specific to a certain service line and to build consensus among physicians as to which products might be removed from the formulary as new technology is introduced. Subcommittees would allow clinical input to be incorporated into the decision-making process for a wider variety of technologies that may otherwise not be reviewed by HTAP under the current model, broadening physician involvement in the technology assessment process at UCSF. In establishing a technology assessment program, a tiered structure is worth considering, as it would further build the culture of teamwork, understanding, and alignment of incentives within the institution.

In addition to delegating responsibility within the hospital to smaller-scaled committees, it is also worthwhile to consider approaching issues of technology assessment on a larger scale. As more institutions establish health technology assessment programs in the future, representatives from these programs could meet periodically and discuss expanded approaches to local/regional adoption of innovative health technology. UCSF has already begun the process of reaching out to technology assessment programs at other institutions and developing a peer group to address these important issues. Additionally, the establishment of a national forum to investigate and track emerging technologies has already been proposed in the literature (Coye and Kell 2006).

Limitations

The limitations to the model are important to distinguish. The costs of creating and sustaining such a program can be significant, as staff time and supporting materials (access to clinical and financial data for evidence-based assessment) are necessary for meaningful operation of the program. Membership and leadership are also critical, and the dedication of committee members must be maintained over time or the effort at creating meaningful, sustainable change may fall victim to aforementioned sources of resistance within the organization. The model's generalizability may be limited as UCSF is a large academic medical center that possesses financial, operational, and technological characteristics that may not be reflective of other hospitals in the country. Some institutions may lack the physician culture or financial resources to support such a program, while others may lack a leader willing to champion this initiative and assume the role of director. The unique financial situation and clinical culture at institutions considering this model will need to be carefully considered.

CONCLUSION

Aligning the incentives of hospitals and physicians with regard to healthcare technology adoption continues to be a challenge. The UCSF HTAP model is an innovative way to foster improvement in this alignment, enhance the communication and relationship between hospital administration and clinical staff, and increase efficiency in the safe adoption of innovative new clinical technologies. The increased awareness

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among physicians of the clinical, financial, and programmatic effects of their technology decisions can have important implications on contract negotiations with manufacturers and on hospital cost savings. The program has stimulated a self-vetting process among physicians, who now have a better appreciation for the impact of their decisions on the institution and who have begun to think critically and with integrity when presented with a new technology. Furthermore, the program represents the evolution of a leading academic health sciences center toward more analytical, cost-effective clinical decision making; the review of clinical literature is incorporated with financial consideration to provide integrity and legitimacy to the technology evaluation process. Given the challenges that the healthcare system faces in delivering high quality, cost-effective healthcare, a culture of hospitalwide collaboration resulting from physician self-governance within the institution will be increasingly valuable.

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PRACTITIONER APPLICATION

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The concept of the Health Technology Assessment Program (HTAP) presented in this article should be of great interest to most healthcare executives because it addresses two issues that are almost always diametrically opposed: cost containment that actually promotes positive professional relationships between the medical staff and hospital administration. The concepts of the model presented by the authors, whether implemented in part or in whole, should have practical applications in encouraging aligned decision making between hospitals and physicians.

Many hospitals have had a longstanding "us versus them" attitude when it comes to relationships with their medical staff, and that same attitude is often reciprocated from the medical staff's perspective. However, in an environment of increased competition and dwindling reimbursements, developing and fostering trust between hospitals and physician partners will help ensure organizational longevity. Over the next few years, external financial and operational pressures will place the relationship between a hospital and its medical staff in a crucible. Hospitals must cultivate mutual trust now, or face further division between the administration and physicians.

The sheer size of HTAP, and its need for objective financial projections, make it very resource intensive. However, the committee has demonstrated an ability to make thoughtful, impartial, high-stakes decisions that have a direct positive impact on the hospital's bottom line, and, more important, because the committee

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is physician-led, its decisions are respected by the entire medical staff. This is clear because no physicians have challenged an HTAP decision in an appeal. The underlying element of HTAP's success is the hospital trusting its physician leaders to make decisions that add value to the organization, and the medical staff trusting the committee to evaluate technology proposals in a greater context.

UCSF's HTAP is a considerably advanced committee, and replicating an identical model in every healthcare organization would not be advantageous. Barriers to implementation would likely be up-front costs or a highly fragmented medical staff, but steps can be taken by any organization to create an environment of trust and alignment. For instance, committees like HTAP must be led by physician leaders who are excellent care providers and have a strong understanding of the business of healthcare. This type of physician leader is almost always created, not found, and every hospital should make the effort to identify, educate, and retain their top physician talent. Endeavors like HTAP become increasingly easy to initiate when homegrown physician leaders are willing to champion the cause.

This article should serve as a reminder for all healthcare leaders to take a long, hard look at their relationship with their medical staff and identify steps that can be taken to bring the relationship into alignment with their organization. Doing so, while a challenging undertaking, will pay dividends in the next few years as decisions become more difficult to make and the stakes become larger. Alignment like that of UCSF is rare, but developing and engaging physician leaders now will provide healthcare executives an additional, and valuable, tool to help navigate an uncertain future.

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