TOP 10 HOSPITAL TECHNOLOGY ISSUES:
C-Suite Watch List for 2009 and Beyond
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TOP 10 TECHNOLOGIES

1. Electronic Medical Records: What Should You Be Doing Now?
2. Ultrahigh-Field-Strength MRI and Premium Performance CT: Do You Really Need Them? Now?
3. Physician Preference Items: Do Your Docs Know the Costs?
5. Radiation Oncology: Will Proton Centers Fulfill Their Promise?
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8. Hybrid Operating Rooms: How Many of Your ORs Should Have Imaging Capability?
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INTRODUCTION

ECRI Institute experts compiled a Top 10 list of important technologies and technology-related issues that hospital leaders should pay close attention to this year. The list compiled takes into account the convergence of critical economic, patient safety, reimbursement, and regulatory pressures. The effort began with an open call throughout the Institute for nominations. This resulted in a nominated list of more than 40 technologies and related issues. The list was then circulated among key Institute thought leaders who individually ranked his/her Top 10. Rankings were compiled, and the top 5 clearly emerged in ordinal ranking of importance. Several technologies competed for rankings 6 through 10, so we convened a ratings consensus panel to reach agreement. During that session, experts in each area commented on why the final Top 10 topics that made it to the list are especially important now and offered guidance on important considerations for hospital leaders.
1. ELECTRONIC MEDICAL RECORDS: What Should You Be Doing Now?

For several years, electronic medical records (EMRs) have been hailed as the Holy Grail (or so some say) for improving patient care and safety. The costs associated with their implementation have been, and continue to be, a major challenge for hospitals and health systems. In its recent report Recommendations for the Obama Administration and 111th Congress, the Healthcare Information and Management System Society (HIMSS) called for a $25 billion commitment to help hospitals and physician practices adopt EMRs. However, $25 billion will only dent the capital required. The $787 billion stimulus package that Congress approved in February promises more than $20 billion for health information technology, which will be a good start. But the total cost of what’s needed could easily exceed $100 billion. For example, the Wall Street Journal reported recently that installation of Dell computers and staff training by a well-known EMR provider, eClinicalWorks, will cost a single physician $25,000 for the first year, and adding other doctors in a practice will cost about $10,000 each. After the first year, the price goes down to about $5,000 per doctor annually. The stimulus funds are expected to be allocated mostly between 2011 and 2015, according to the Congressional Budget Office. Starting in 2011, physicians using EMRs will be eligible for more than $40,000 each in Medicare incentive payments over several years. Hospitals will be eligible to qualify for millions of dollars in incentive payments also. A recent survey of American Hospital Association CEO members (63% survey response rate) assessed implementation of EMRs (New Engl J Med online publication March 25, 2009) reported that “less than 2% of acute care hospitals have a comprehensive electronic-records system, and depending on the definition used, between 8 and 12% of hospitals have a basic electronic-records system. With the use of the definition that requires the presence of functionalities for physicians’ notes and nursing assessments, information systems in more than 90% of U.S. hospitals do not even meet the requirement for a basic electronic-records system.”

Hospital chief information officers and administrators must figure out which of the myriad IT projects they need to accomplish to prepare for EMR implementation or to continue along the adoption path if they’ve already begun. Doctors and hospitals not going electronic by 2015 will be subject to penalties, according to the terms of the federal stimulus package. Planning for EMR implementation might include projects such as establishing a fully closed-loop medication administration record, implementing a systemwide clinical data repository, and using clinical decision support systems that are based on evidence-based medicine, to name just a few. Planning for staff buy-in and training to use such systems is also critical to implementation. The pressure is on to move toward EMRs with the U.S. Centers for Medicare and Medicaid Services policy to not reimburse for their designated and expanding list of “never events” and with the U.S. Agency for Healthcare Research and Quality’s designations of Patient Safety Organizations. Every hospital and healthcare facility’s ability and requirements to manage vast amounts of information is only increasing.

The c-suite must have these issues as a #1 priority on their radars for planning throughout 2009 so they can move their institutions along the EMR adoption continuum. Even if only small steps are taken this year, they better start planning to take giant steps so they can begin running full tilt very soon!
2. ULTRAHIGH-FIELD-STRENGTH MRI AND PREMIUM PERFORMANCE CT: Do You Really Need Them? Now?

The magnetic resonance imaging (MRI) market has been moving toward use of more ultrahigh-field-strength (UFS) and open high-field-strength (HFS) systems. UFS is defined as a system with a 3.0 Tesla (T) or stronger magnet. Such systems provide higher signal-to-noise ratio (i.e., more signal, less noise) than lower-field-strength (i.e., 1.5 T) systems, enabling clinicians to obtain faster imaging times and higher quality images. Few studies have been done, however, on how 3T MRI changes patient management and outcomes. Specialized applications of 3T MRI include functional MRI (fMRI) and spectroscopy. Functional MRI maps changes in cerebral blood flow that accompany local changes in neural activity and is used to study brain function in conscious patients as they speak, move, feel, and remember. MR spectroscopy measures the amount of elements (such as phosphorus or sodium) in specific chemical states to provide chemical, functional, and physiologic information. MR spectroscopy has been used clinically to evaluate dementia, multiple sclerosis, and encephalopathy; to monitor the progression of cancer; to plan surgical treatment of epilepsy; and to assess comatose patients, patients with acute cardiovascular disease or stroke, patients with head injuries, and patients with muscular disorders.

Open HFS systems are particularly useful for claustrophobic and obese patients, with image quality similar to 1.5 T systems. However, such advanced performance comes with a significantly higher price tag.

Considering that most MRI magnets last 10 to 12 years and that it is likely that today’s high-end scanners will predominate in the next 5 to 8 years, hospitals considering acquiring MRI systems in 2009 will have a difficult choice to make. Should they go with the very high cost UFS or open HFS systems or the lower priced and lower performing 1.5 T systems that may be outdated well before reaching the end of their expected life cycle? Although quicker procedure times and larger numbers of clinical applications available with new systems can increase revenue and while certain service-related costs are lower (i.e., for cryogen cooling), hospitals’ net costs for these systems will significantly exceed those of the standard 1.5 T systems. With limited access to capital funds in 2009, we believe that most hospitals that need a new or replacement MRI system will not be able to consider 3.0 T or open HFS systems in 2009.

Several reasonable alternatives exist. The most affordable option is to purchase a refurbished 1.5 T system. These systems, which cost about $1 million, can be very reliable and will meet most of today’s clinical applications. Older 1.5 T systems can be upgraded, for about $500,000, with features like an expanded number of radio-frequency channels that can achieve procedure time performance comparable to that of high-end 1.5 T systems. Or, hospitals can purchase a new 1.5 T system that can subsequently be upgraded to a 3 T system. Currently only one vendor, Philips Medical Systems, offers an upgradeable 1.5 T system.

CT technology has made tremendous advancement over the last few years. As a result, today’s CT technology can no longer simply be categorized in terms of the number of slices. Instead, manufacturers are developing different approaches to their CT scanner designs including dual source, wider detectors (with up to 320 slices), new x-ray detector materials, and new image reconstruction techniques. Not surprisingly, the cost of some of these technologies is considerable. However, some of these new technologies are available to existing scanners as simple upgrades, so a significant investment is not always necessary.

A key consideration for all new CT scanners is its ability to lower x-ray dose. All manufacturers have taken steps to do this, with varying levels of effectiveness. The newer technological developments can deliver a lower dose without affecting image quality and require little or no user intervention to achieve the lower dose. In addition, the clinical applications for CT scanners are being extended or improved. For example, cardiac imaging, which is one of the most technically demanding CT applications, can now be routinely performed—with the added benefit of about 80 % less dose compared to the technology used in the earliest 64 slice scanners (produced from around 2005 to 2006).
“However, because of the high cost of 64-slice and higher-slice systems at $1.5 million and up, ECRI Institute does not expect many hospitals to buy CT scanners in 2009 except to replace systems that are not working, are extremely inefficient, or do not meet accreditation requirements.”

We believe that given the current economic climate, most hospitals should consider purchasing the basic systems because they will meet the vast majority of clinical needs. Hospitals with the most serious budget restrictions should first consider purchase of refurbished systems with at least 8 slices. Refurbished units should include a new x-ray tube and a complete recalibration and inspection of the system. Buyers should only consider refurbished systems from original equipment manufacturers or companies that are capable of installing and maintaining the equipment and providing full warranties. The cost of refurbished equipment will depend on the age and warranty offered. Prices of $500,000 or less can be expected for refurbished systems. Hospitals with access to more capital should consider acquiring a new system or an upgrade to an existing system. Costs for new 16-slice systems start at $500,000. A basic 64-slice system will start at around $1,000,000, while the latest high-end systems cost from about $1,600,000 to $2,500,000.

### 3. PHYSICIAN PREFERENCE ITEMS: Do Your Docs Know the Costs?

The trend of rising costs for physician preference items (PPI)—implantable items that come in many brands from which a physician can choose—such as cardiac stents, pacemakers, orthopedic implants, and orthobiologics, shows no signs of slowing in 2009. As hospital administrators navigate an environment of decreasing reimbursement, they need to be ever vigilant to manage the shrinking profitability of key service lines such as cardiology and orthopedics, which traditionally have been financial winners. For example, the costs of PPIs such as pacemakers, drug-eluting stents, and hip or knee implants have grown to represent as much as 50% of a hospital’s total supply costs.

Hospitals have a number of options for managing PPI costs and utilization. First, an effective value analysis process that engages and educates physicians is an important first step. Too often, physicians lack the full picture and simply rely on persuasive information provided by astute implant sales representatives. Arming physicians with objective information about the clinical evidence, safety, and costs so that they can sift hype from real evidence-based clinical benefits is essential. Hospitals should also be benchmarking their PPI pricing. Most physicians believe that they are receiving special treatment and pricing as part of their manufacturer relationship. However, they may not be, and providing physicians with industry benchmark pricing data can be a real eye-opener. Regional benchmarking of PPI pricing data is just one of many services available through ECRI Institute.

“The resulting lack of transparency of pricing often leaves hospitals holding the bag for the high cost of implants, but all too often in the dark about what it should pay for the devices.”
4. ROBOTIC-ASSISTED SYSTEMS FOR SURGERY AND ENDOVASCULAR CATHETERIZATION: How Many Should You Have?

Advancements in medical robotics have risen steadily for surgical and endovascular interventions. The da Vinci surgical robot represents the best-known application of robotics in the operating room (OR), where surgeons trained in its use now routinely perform robot-assisted prostatectomy, mitral valve replacement, hysterectomy, coronary artery bypass, and other procedures. New surgical applications are emerging, and the pressure to acquire a robot has increased with the new generation of surgical residents in training, requirements of residency programs to offer robotic surgery training on a da Vinci system, and requirements at some medical schools that applicants take hand/eye coordination testing to assess their ability to use robotic systems. Emerging surgical applications include pediatric, gynecologic, and general-surgery procedures such as pyeloplasty, gastric bypass, nephrectomy, colectomy, hysterectomy, myomectomy, and sacrocolpopexy. Hospitals should also be mindful that many of the applications for robot-assisted surgery have outpaced supporting clinical evidence for improved patient outcomes, cost-effectiveness, and commensurate reimbursement.

Constrained access to capital may dampen wider diffusion in the near term, however, given the $1 million to $3 million cost of these systems, annual maintenance contracts upwards of $100,000 per system, and the 5- to 6-year life cycle of the equipment. Dampered diffusion could be a good thing to allow time for evidence to accumulate to determine which procedures are best to perform with robotic assistance. No additional reimbursement is provided when using the system, and the procedures often take longer than traditional laparoscopic surgery, subjecting patients to longer times under anesthesia and slowing OR turnover times. Hospital leaders will need to carefully assess the high capital and consumable costs of a second or possibly third robot against the possible growth of surgical volumes, the ability to accommodate the robots in OR suites, the resultant OR scheduling issues, and the market advantage of providing robot-assisted surgery.

Procedure or specialty-specific robotic systems—such as those for orthopedic or neurologic procedures—also provide options that hospitals will need to consider. These systems are typically smaller and less expensive (under $1 million) than general-surgery robots. Specialty systems focus on a single surgical task that requires ultrahigh precision. The ROBODOC, for example, received FDA marketing approval in late 2008 for total hip arthroplasty procedures. ROBODOC uses computerized 3-D imaging to preplan the exact movements required during surgery and then utilizes this information to guide a robotic arm during the actual cutting and resurfacing portion of the procedure.

Robotic advancements have not been limited to the operating theater. They are also emerging in areas such as electrophysiology with technologies like the Hansen Medical Sensei/Artisan robotic catheter system. The increasing complexity of procedures performed in electrophysiology labs requires precise control over a catheter tip. The Sensei/Artisan system provides more accurate control of catheter tips, which theoretically should lead to more effective treatments and reduced procedure times. The Hansen system provides an alternative to the Stereotaxis NIOBE catheter navigation system that requires the more costly installation of magnets in an electrophysiology lab.

Thus, hospitals wanting to position themselves “on the cutting edge” with robotics will need to strategically assess how they want to position their clinical service lines and how they want to allocate clinical expertise, capital, and infrastructure to support acquisition of these expensive technologies.

“...many of the applications for robot-assisted surgery have outpaced supporting clinical evidence for improved patient outcomes, cost-effectiveness, and commensurate reimbursement.”
5. RADIATION ONCOLOGY: Will Proton Centers Fulfill Their Promise?

Proton therapy has been around for decades but has garnered much attention in the past 2 to 3 years with the number of high-end facilities in the United States expected to quadruple between 2009 and 2012. Now a commercially available “low cost” (i.e., $20 million) single-room proton therapy system is on the horizon, and hospitals concerned about being able to offer the “most advanced” radiation technology may be considering whether a proton system is appropriate. Concurrently, significant technical advances have been made in traditional linear accelerator radiation technology (e.g., CyberKnife) and radiation oncology applications (e.g., image-guided applications, and accelerated partial and whole breast irradiation technologies). These traditional technologies are less than one-fifth to one-thirtieth the cost of proton therapy. All these technologies offer the same promise: the ability to precisely deliver a higher radiation dose to the target tissue while lessening damage to collateral healthy tissue — tissue that surrounds or is on the radiation beam’s pathway to the target. There is particular interest in proton therapy for pediatric patients because of the serious short- and long-term side effects of traditional radiation therapy on growth and cognitive abilities.

Proton therapy systems, however, have extremely high upfront capital and implementation costs as well as high operating costs. The reimbursement climate is limited to a few specific clinical applications, and it is uncertain for other applications because evidence to support improved clinical outcomes over conventional radiation modalities is not available and no randomized controlled trials making the appropriate comparisons are planned. Yet the cost of proton therapy is 2 to 3 times higher per patient than other methods of external beam radiation therapy, such as 3-D conformal radiation therapy. At the U.S. Centers for Medicare and Medicaid Services, Medicare has listed proton therapy as one of its top 10 priorities this year, an indicator that it will be taking a close look at the evidence for the burgeoning indications with an eye toward coverage policies. What Medicare does, private payers often follow as well. Some of the skeptics about proton therapy who want to see the evidence have advocated that it be reimbursed at the same rate as standard photon radiation therapy until the data show a distinct clinical benefit for patients of one proton therapy over photon therapy. If that happens, then hospitals will be absorbing the high costs without additional reimbursement.

Multi-vault proton centers (i.e., that can accommodate several patients at once) and the facilities that need to be built to accommodate them now cost more than $150 million. However, even with several vaults, only one patient can be treated at a time and the sessions take longer than for photon radiation therapy with some downtime between patients. Single-vault, “low-cost” systems may run as high as $30 million. ECRI recommends that hospitals with large radiation oncology programs monitor this technology and the clinical evidence to support its claims of superiority, as well as the uncertain reimbursement climate. As several new systems are scheduled to open around the United States within the next 18 months, proton beam utilization and demand must be studied closely because the current proton wait lists are likely to rapidly evaporate, and payers will be seeking outcomes data that show improved patient outcomes before covering this much higher-cost technology for all cancer indications.

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6. RADIO-FREQUENCY IDENTIFICATION TECHNOLOGY: What Problems Can It Really Solve?

Radio-frequency identification (RFID) technology has garnered a lot of attention in healthcare recently as a technology that can improve patient safety, efficiency of processes, and save money. For example, RFID tags on surgical sponges can prevent their being left in a patient. The promise of RFID is also appealing as a way to monitor real-time whereabouts of critical staff, to mobilize rapid response teams, or to improve staff efficiency by monitoring patient locations to avoid wasting clinician time when patient transport from one clinical area of the hospital to another is delayed. RFID also promises to improve inventory management of medical devices and equipment within facilities. For example, fleets of rental infusion pumps can get scattered around facilities and be difficult to locate or worse, forgotten about. RFID can enable faster location and efficient return to service as the need requires, cutting expenditures on unnecessary rentals or acquisitions.

However, the benefits of RFID sometimes come at very significant costs, and hospitals wishing to purchase RFID technologies in uncertain economic times should carefully examine their potential for a return on investment (ROI). While RFID vendors will promise rapid ROIs, the returns often are difficult to track concretely, or they may be intangible, making it hard to ascribe a value. With most hospitals having to seriously limit capital budgets, demonstrating a positive ROI will become an even greater consideration in deciding whether an RFID solution offers both short- and long-term viability.

In the next few years, RFID solutions will make the most sense for those hospitals and healthcare facilities that have carefully thought-out strategies with evidence of a demonstrable benefit and positive ROI. RFID will be best applied in situations that address a well-defined problem with an associated and measurable cost (e.g., lost telemetry packs).

Some of the most promising applications that should be on the c-suite’s radar include tracking medical devices that are critically needed but often in short supply because of hoarding or bottlenecks in handling between uses. In these cases, promptly locating equipment and using RFID’s tracking capabilities to open up the bottlenecks can significantly reduce the need to expand inventory (whether renting or purchasing) when demand is high. Beware, however, that the locating accuracy of many out-of-the-box systems is insufficient to achieve the goals of some proposed applications. In such cases, considering the cost of customization for accuracy will be key because it can be significant.

7. ALARM INTEGRATION TECHNOLOGIES: How Best to Monitor All Those Alarms?

Patient safety remains a high priority for all hospitals this year, but hospitals continue to struggle with providing effective and efficient ways to respond to patients’ equipment alarms. ECRI Institute identified alarm hazards as #1 on its Top 10 Technology Hazards list because 12% of the 2,200 reports ECRI Institute received through its Problem Reporting Network from 2000 to 2006 were related to alarms; 64% involved physiologic monitor, ventilator, or infusion pump alarms.

Alarm integration systems are intended to provide a technology solution to enhance alarm notification and coverage. Such a system can be as simple as interfacing a ventilator to a physiologic monitoring system to provide alarm notification at a central station display. More recently, focus has shifted to complex alarm integration systems that incorporate many alarms (e.g., physiologic monitors, ventilators, infusion devices, medical telemetry) to notify a
clinician’s wireless device (e.g., cell phone, pager). Examples of these interconnectivity systems include Capsule Technologie’s DataCaptor solution or Philips’ Emergin Solution. Data from bedside devices or monitoring systems are transmitted to an integration system, which consists of hardware and software components that communicate alarm data to the desired device. Such data transmission often requires use of the hospital’s IT network (not a vendor’s dedicated, proprietary network), and issues such as data security and service quality must be addressed.

A big incentive driving hospitals to consider these systems is the ability to alert the clinician to alarms while the clinician is remote from the patient. Hospitals considering alarm integration systems should address the following issues before implementation:

▶ How will these logistics be addressed in the alarm integration system?
  - Which patients are assigned to which nurses at any given time
  - Which devices are assigned to which patients at any given time
  - What data will be transmitted (from which alarms, values, and labels for which parameters)
  - Which patients’ alarms should be sent to which nurses (e.g., all priority level alarms or just crisis and system alarms from the physiologic monitoring system to the primary care nurse and to an additional nurse that is providing back-up coverage)
  - Which alarm escalation model will be employed

▶ How will the alarm integration system affect alarm notification, verification, and response processes?

▶ Will the alarm integration improve the effectiveness and efficiency of alarm response?

▶ With respect to utilizing the hospital’s IT network for data exchange, consider the implications and capabilities of the network relative to:
  - Patient safety (e.g., could alarms get lost in the exchange?)
  - Effectiveness (e.g., how quickly can the alarms be communicated over the network? does the integration system facilitate efficient clinician workflow?)
  - Data and system security (e.g., HIPAA)
8. HYBRID OPERATING ROOMS:
How Many of Your ORs Should Have Imaging Capability?

A hybrid (OR)/catheterization laboratory is an interventional suite where a patient can undergo both a surgical procedure, such as open-heart surgery, and an endovascular procedure, such as angioplasty that requires fluoroscopic imaging. Thus, a hybrid interventional OR suite permits percutaneous coronary interventions (PCIs) to be performed immediately before, during, or after coronary artery bypass grafting (CABG) surgery without requiring the patient to be moved between two sterile rooms. This type of one-stage or simultaneous hybrid PCI/CABG procedure is being tested to treat high-risk patients with multivessel coronary artery disease (CAD) who need both stents and CABG. In these patients, the hybrid procedures potentially carry a lower mortality risk than conventional CABG surgery alone for multivessel disease. By contrast, the hybrid procedures typically involve placing one bypass graft to a major artery and stent implantation for the rest of the affected arteries. Another potential benefit of the use of hybrid interventional suites is the ability to perform a coronary angiogram at the end of routine CABG surgery. This angiogram helps to ensure that arterial bypass grafts are in place and that proper circulation has been restored.

As endovascular procedures become more time-consuming, fixed imaging systems rather than mobile C-arms are generally preferred by surgeons due to greater flexibility in anatomic coverage. Now, with next-generation fixed C-arm systems, many hospital administrators have to choose how to best utilize scarce OR resources. Hybrid ORs require larger space and typically have to be dedicated to only those procedures requiring that equipment. The costs are very high as well, given the 500,000 cost of a C-arm system. Besides having greater C-arm positioning flexibility, the new C-arm systems enhance diagnostic and therapeutic capabilities by enabling the acquisition of cross-sectional images showing soft tissue information as well as hard object information, which may aid in angiography-assisted tumor treatments and surgical planning. However, whether a hospital has sufficient cardiovascular and neurosurgical procedures to justify these new C-arms in an OR is a key question for consideration. While the concept is straightforward, there are technical hurdles that should be addressed and implemented before a hybrid OR is truly capable of supporting both endovascular and open surgical procedures. Although definitely an aid in recruiting surgeons, any hospital should also assess the potential for cannibalization of procedures from their interventional radiology services. Hybrid ORs could introduce unwanted competition between clinical service lines within the hospital.

9. THERAPEUTIC HYPOTHERMIA AFTER HEART ATTACK, STROKE, SPINAL CORD INJURY:
Dawn of a New Era in Emergency Medicine?

A new era of resuscitation medicine is dawning. The term applies to new protocols and technologies for rapidly cooling patients’ core temperatures after acute life-threatening cardiovascular and neurologic events to save lives and neurologic function. Known as therapeutic hypothermia (TH), rapid cooling using a special intravenously administered slurry has been shown in early clinical studies to contain and prevent damage to the heart and brain. Interest is also keen regarding rapid patient cooling for spinal cord injury.

The implications are large. For example, only 40% of the 166,000 patients having out-of-hospital cardiac arrests annually in the United States survive to be admitted to the hospital.
The published evidence on TH thus far comes from several randomized controlled trials comparing various TH methods plus supportive care to supportive care alone in patients successfully resuscitated after cardiac arrest. Data from these trials (longest follow-up 6 months) suggest that TH plus supportive care after cardiac arrest improves survival to discharge, neurologic/functional status at hospital discharge, and six-month survival compared to supportive care alone. Several dozen U.S. hospitals have a TH protocol in place for patients who have suffered cardiac arrest, but most do not despite the publication of several clinical guidelines recommending TH (32°C to 34°C for 12 to 24 hours) as a standard of care for out-of-hospital cardiac arrest in patients who have an initial rhythm of ventricular fibrillation. Several large cities have introduced policies requiring any ambulance in the city responding to a call for someone suffering an apparent myocardial infarction (MI) must take the patient to a hospital that offers therapeutic hypothermia services. On January 1, 2009, New York City became the latest major city to join these cities with policies already in place — Miami, Boston, Seattle, and Houston.

▷ If your hospital treats cardiac arrest and does not have a TH protocol in place, consider:

— Establishing and implementing a formal TH protocols*

— Training physicians appropriately for proper catheter placement into major veins if catheter-based cooling methods are to be used

— Ensuring that adequate nursing and intensive-care resources are available to monitor patients receiving 24-hour cooling

▷ Barriers that have been cited to adopting TH protocols include:

— Most ambulances are not outfitted with surface cooling products, and catheter-based cooling products are not portable.

— Emergency personnel may be unfamiliar with the pathophysiology of hypothermia.

— Uncertainty exists about which patients will clearly benefit.

— The technique is perceived as difficult.

*Several TH protocols in use by different hospitals are available at: http://www.med.upenn.edu/resuscitation/hypothermia/protocols.shtml.
10. RAPID TESTS FOR DEADLY INFECTIONS: Where Do They Fit in Infection Control Protocols?

With Medicare and third-party payers refusing to pay for healthcare-acquired infections (HAIs), hospitals and other healthcare facilities need to look at their infection control protocols and figure out where rapid tests (i.e., tests that give results in 2 hours rather than the 48 hours required for cultures) fit in their infection-control picture. C. difficile has become an even more pressing concern, if that’s possible, than super MRSA infections. The prevention protocols for these infections are necessarily different because of the different ways these bugs are transmitted.

With regard to use of rapid tests, many key operational issues must be considered: test costs, laboratory equipment costs, and Clinical Laboratory Improvement Amendment (CLIA) requirements to perform high-complexity tests if using the BD GeneOhm test and moderate-complexity tests if using the Xpert test. The Xpert MRSA test is processed on the company’s (Cepheid, Sunnyvale, CA) nucleic acid processors, GeneXpert, which come in several models. The national average price paid for a GeneXpert processor according to ECRI Institute’s SELECTplus PricePaid™ database, as of May 2009, is $148,000 (range $71,000 to $596,000). Prices range according to the model. Costs for the test reagents range according to quantity purchased and come in 10- and 120-test-kit packs. The SELECTplus PricePaid database shows per-test costs range from about $33 to $44. Annual service contracts range from about $10,000 to $14,000 per processor.

The polymerase chain reaction thermal cycling system required to perform the BD GeneOhm MRSA Assay (BD Diagnostic Systems, Sparks, MD) ranges from $31,500 to $63,000 depending on the instrument’s concurrent test capability and the per-test cost ranges from $25 to $30. Laboratories performing this test must meet CLIA regulations, including regular equipment calibration, personnel training, quality control, proficiency testing, record and specimen retention, and quality assessment. And while the tests have shown fairly good accuracy (sensitivities between 81% and 100%, specificities between 90.2% and 98.6%), their clinical utility with regard to reducing actual infection rates and adjusting infection control measures is still unclear.

Hospitals should refer to published evidence reports on these topics and consider how to integrate rapid tests in their infection control protocols and measure outcomes regarding impact on HAI rates with the understanding that protocols may need to be adjusted in light of the evidence they collect. They should also refer to evidence reports such as those published by ECRI Institute’s Evidence-based Practice Center, which provide information about protocols other hospitals are trying. It will be important to continue to closely monitor the clinical literature for new publications on outcomes from facilities that are implementing these rapid tests in their infection control protocols.

“...while the tests have shown fairly good accuracy (sensitivities between 81% and 100%, specificities between 90.2% and 98.6%), their clinical utility with regard to reducing actual infection rates and adjusting infection control measures is still unclear.”
ECRI Institute’s research, information, and advice enable you to lead your organization in:

GUIDANCE YOU CAN TRUST

▷ Assessing and addressing your patient safety, quality, and risk management challenges
▷ Selecting the safest, most effective medical devices, procedures, and drugs
▷ Procuring healthcare technology in the most cost-effective manner
▷ Developing evidence-based health coverage policies
▷ Aligning capital investments with strategic technology needs

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ABOUT ECRI INSTITUTE

ECRI Institute, a nonprofit organization, dedicates itself to bringing the discipline of applied scientific research to healthcare to uncover the best approaches to improving patient care. As pioneers in this science for 40 years, ECRI Institute marries experience and independence with the objectivity of evidence-based research. ECRI Institute is designated a Collaborating Center of the World Health Organization and an Evidence-based Practice Center by the U.S. Agency for Healthcare Research and Quality. ECRI Institute PSO is a federally certified Patient Safety Organization by the U.S. Department of Health and Human Services. For more information, visit www.ecri.org.
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ULTRA-HIGH-FIELD STRENGTH (3T AND HIGHER) MAGNETIC RESONANCE IMAGING

▷ Ultra-high-field Strength (3T and higher) Magnetic Resonance Imaging

▷ 1.5 Tesla versus 3.0 Tesla magnetic resonance imaging for cancer diagnosis and treatment planning [hotline response]. 2008 Jan database online.

▷ Ultrahigh-field-strength magnetic resonance imaging (MRI) with field strengths greater than 3.0T [technology profile]. Health Technology Forecast 2009 Jan database online.

▷ 1.5 Tesla versus 3.0 Tesla magnetic resonance imaging for cancer diagnosis and treatment planning [hotline response]. 2008 Jan database online.

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