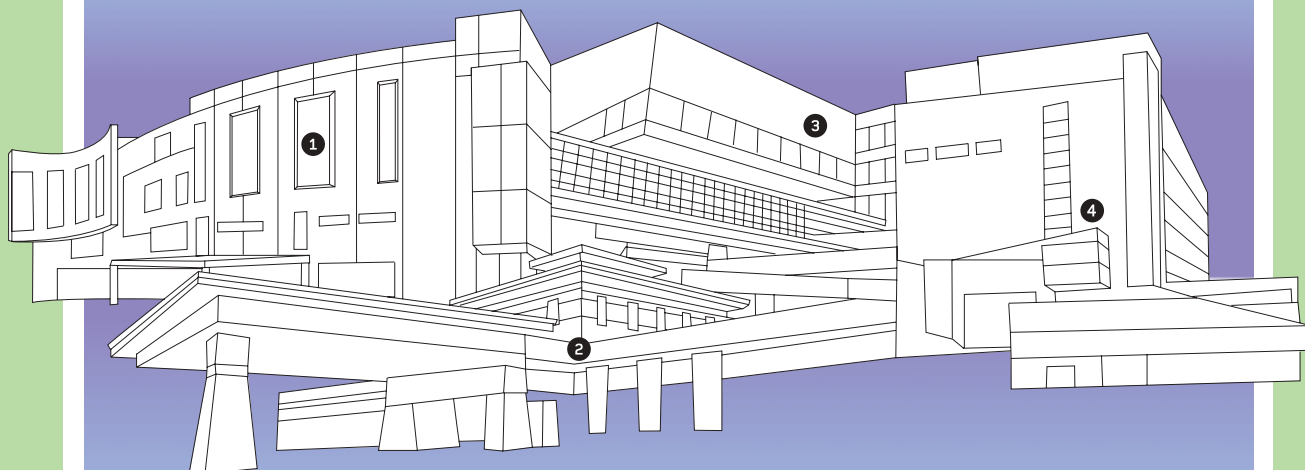


# The Incredible Thinking Hospital

*A look at how IT facilitates delivery and promotes safety in patient care*



**1** El Camino Hospital, Mountain View, Calif.

Mark Zielazinski, CIO  
No. beds: 426 licensed, operate at 340  
No. IT staff: 30, all outsourced to Eclipsys, Boca Raton, Fla.  
IT budget: 4.3% of operating expenditures

**2** Physicians Hospital, El Paso, Texas

Ed Mohrman, IT director  
No. beds: 40; plans include scaling hospital up to 160 beds and building two other 40-bed facilities  
No. IT staff: 4  
IT budget: Not revealed

**3** Sacred Heart Medical Center at Eugene, Ore.

John Haughom, M.D., senior vice president  
No. beds: 540  
No. IT staff: 230 for the six hospitals in the PeaceHealth system (70% technical, 30% clinical)  
IT budget: 3.5% to 4% of operating expenditures

**4** St. Vincent's Hospital, Birmingham, Ala.

Tim Stettheimer, vice president and CIO  
No. beds: 338  
IT staff: 64  
IT budget: Capital, \$2.5 million; operational, \$5 million

A digital hospital doesn't look different from a legacy hospital on the outside. It's the level and integration of the technology inside that sets it apart. Something like a contrast MRI elucidates the human body's network, this foldout feature highlights the electronic vessels of a digital hospital's "brain" to show the crucial systems and connections that keep information flowing.

Inspired by a report from Long Beach, Calif.-based First Consulting Group, "Digital Hospitals Move Off the Drawing Board," we selected four organizations from across the nation as a representative sample of the many "smart" hospitals in operation or in the planning stages. El Camino Hospital, Mountain View, Calif., is an example of a digital hospital built to replace a traditional one. Physicians Hospital, El Paso, Texas, is a small facility that is new from the ground up. Sacred Heart Hospital, Eugene, Ore., is being built to replace one hospital in a network of six. And St. Vincent's Hospital, Birmingham, Ala., is being rebuilt as a digital facility. We interviewed the CIO or IT director at each hospital to find out how they define a digital hospital,

how they chose their core technologies, and what they consider their most critical system.

A discussion of all the technology in these hospitals is far beyond the scope of this feature, so we focus on clinical applications and those used to manage the supply chain. Many of the systems pervade the hospital, but we highlight those locations where the technology directly impacts patient care: the emergency room, the operating room, nurse station, and patient room. Since data security and the clinical data repository undergird the entire hospital, we also look into those critical technologies.

On the following pages is a "scan" showing technologies already in use or in the plans, and the vendors providing them in each hospital. It illustrates how systems such as bar coding, electronic medical records and computerized physician order entry reinforce and refine the human checks and balances already in place to advance safe, prompt, high-quality patient care. Just another case of two—or more—heads being better than one.

—Mary Van Beusekom

# The Incredible Thinking Hospital

## Emergency Room ▶

### BAR CODING ▶

**1 Patient wristbands (for admitting):** El Camino (FormFast, Ballwin, Mo.), Physicians (Pyxis, San Diego) St. Vincent's (Adobe Corp., San Jose, Calif.)

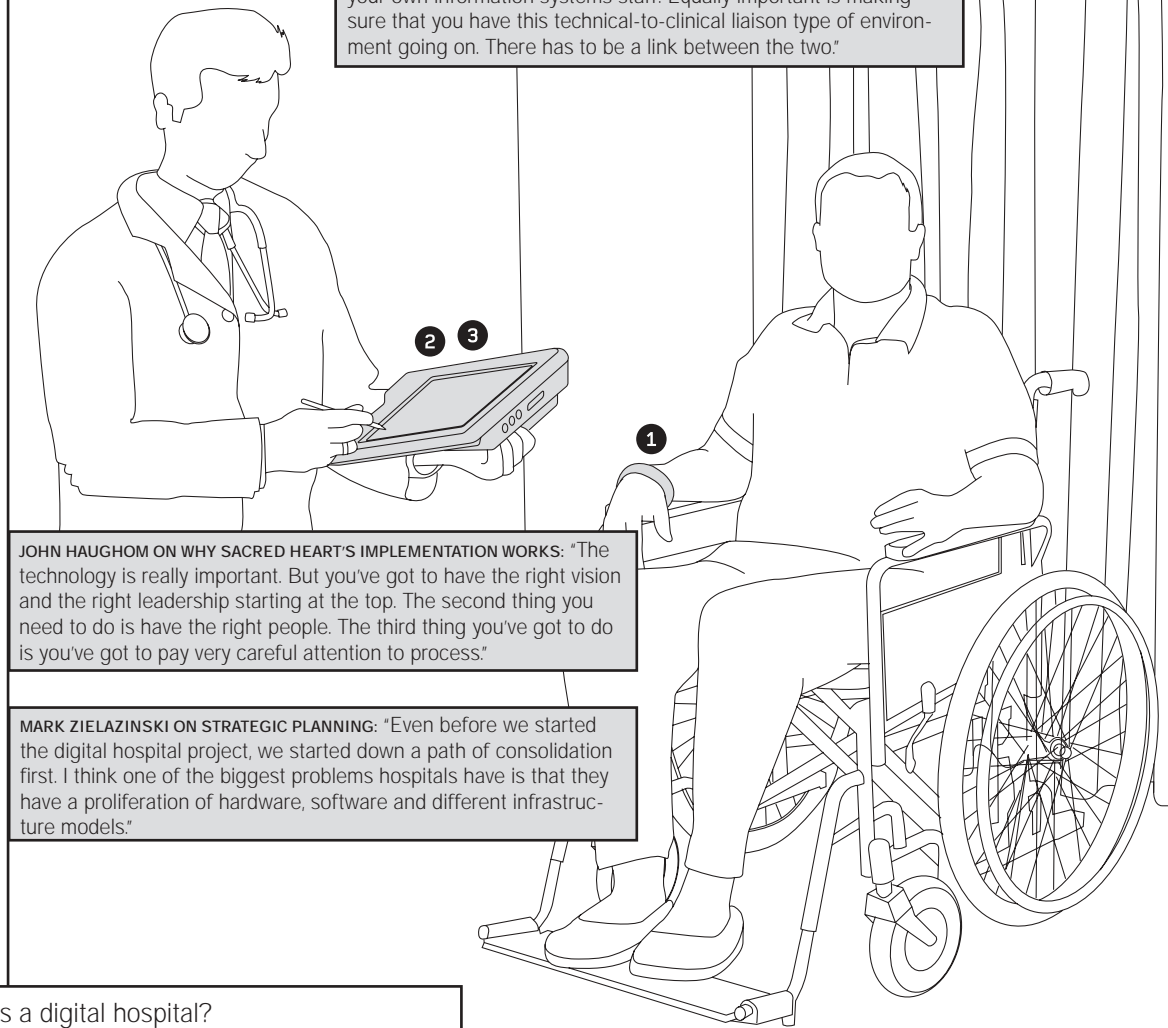
### WIRELESS ▶

**2 Portable wireless devices:** El Camino (Hewlett-Packard, Palo Alto, Calif.), Physicians (Hewlett-Packard; Dell, Round Rock, Texas), Sacred Heart (Dell), St. Vincent's (Hewlett-Packard; Toshiba, New York)

### CPOE ▶

**3 Computerized physician order entry:** El Camino (Eclipsys, Boca Raton, Fla.), Physicians (VisualMED Clinical Systems, Montreal), Sacred Heart (IDX, Burlington, Vt., in pilot), St. Vincent's (McKesson, San Francisco)

**ED MOHRMAN ON WHAT HE WISHES HE HAD KNOWN WHEN HE STARTED:** "One of the things would be making absolutely sure that you have a technical cohesion between the vendors that you work with and your own information systems staff. Equally important is making sure that you have this technical-to-clinical liaison type of environment going on. There has to be a link between the two."



**JOHN HAUGHOM ON WHY SACRED HEART'S IMPLEMENTATION WORKS:** "The technology is really important. But you've got to have the right vision and the right leadership starting at the top. The second thing you need to do is have the right people. The third thing you've got to do is you've got to pay very careful attention to process."

**MARK ZIELAZINSKI ON STRATEGIC PLANNING:** "Even before we started the digital hospital project, we started down a path of consolidation first. I think one of the biggest problems hospitals have is that they have a proliferation of hardware, software and different infrastructure models."

## Operating Room ▶

### BAR CODING ▶

**1 IV drips (for medication management):** Physicians (Pyxis), Sacred Heart (Picis, Wakefield, Mass.), St. Vincent's (DocuSys, Mobile, Ala.)

### PACS ▶

**2 Picture archiving and communications system:** El Camino (ScImage, Mountain View, Calif., supplies image storage and retrieval, not PACS), Physicians (Siemens, New York), Sacred Heart (IDX), St. Vincent's (Emageon, Birmingham, Ala.)

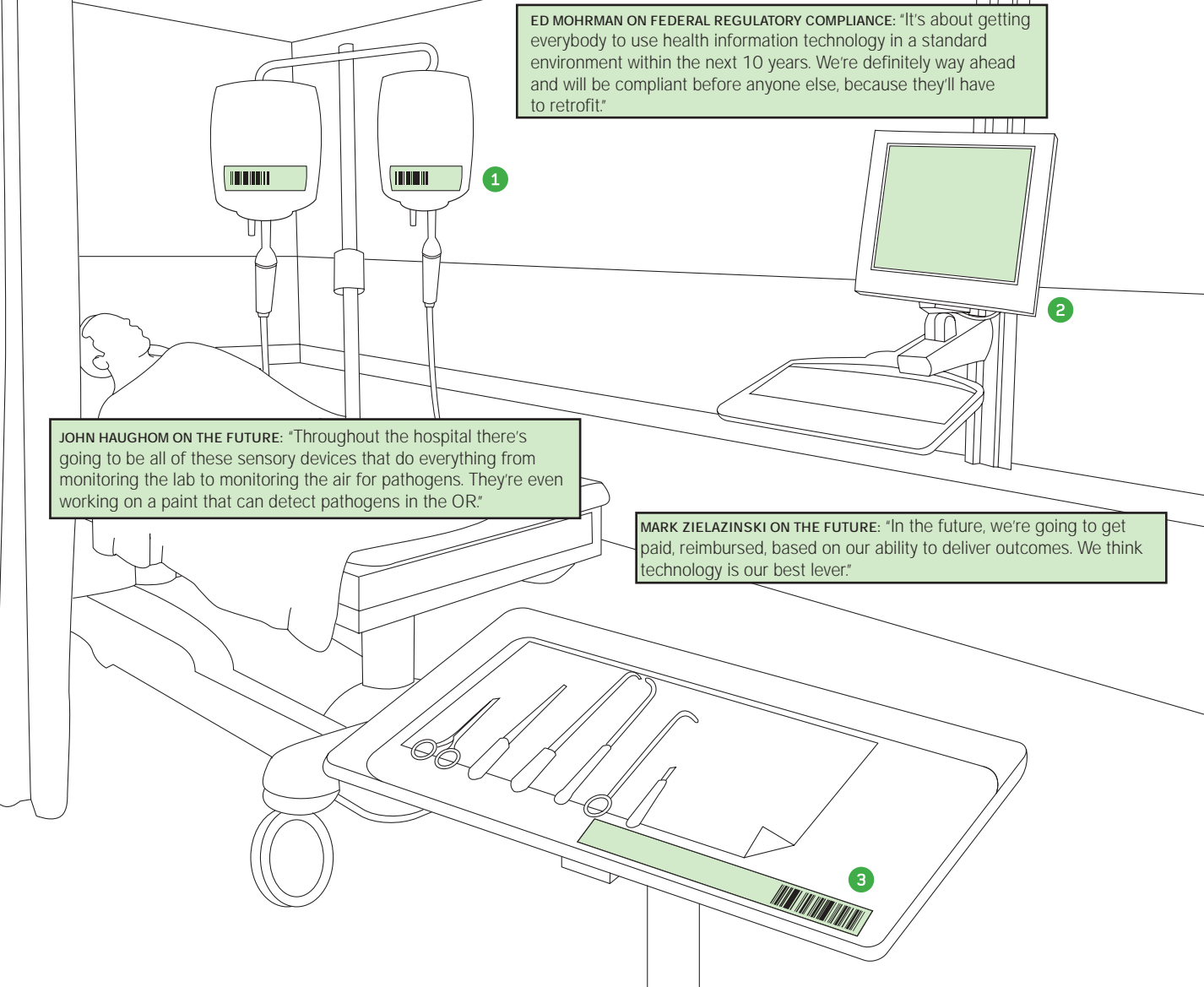
### SUPPLY CHAIN ▶

**3 Materials management:** El Camino (PeopleSoft, Pleasanton, Calif.; Pyxis), Physicians (Pyxis), Sacred Heart (developing one with Caduceus Systems, Austin, Texas), St. Vincent's (McKesson)

**ED MOHRMAN ON FEDERAL REGULATORY COMPLIANCE:** "It's about getting everybody to use health information technology in a standard environment within the next 10 years. We're definitely way ahead and will be compliant before anyone else, because they'll have to retrofit."

**JOHN HAUGHOM ON THE FUTURE:** "Throughout the hospital there's going to be all of these sensory devices that do everything from monitoring the lab to monitoring the air for pathogens. They're even working on a paint that can detect pathogens in the OR."

**MARK ZIELAZINSKI ON THE FUTURE:** "In the future, we're going to get paid, reimbursed, based on our ability to deliver outcomes. We think technology is our best lever."



## What is a digital hospital?

**ED MOHRMAN:** "I would say it's the widespread use of information technology to dramatically improve the processes and outcomes of care, making electronic information available at the point of care and at the point of the caregiver."

**MARK ZIELAZINSKI:** "I think there are going to be wearable, wireless mobile devices that we'll be able to leverage in our workforce, and they will help our workforce to deliver a better level of patient care. That's the kind of stuff that I'd like to think we'll be doing: wireless collection of vital signs and those types of things."

**JOHN HAUGHOM:** "Our hospital is considered digital because it's highly, highly automated. Absolutely everything is online except for physicians' daily progress notes and physician orders—and we have pilots going to address those. But wait a few years and the definition of a digital hospital will surely change. If we were going to view it from the perspective of where we need to be in five or seven years, we're not there yet."

**TIMOTHY STETTMEIER:** "A digital hospital provides for access to healthcare information anytime, anywhere, as appropriate for all people and organizations connected to that information. The intelligent hospital takes it a step further, providing pervasive context awareness and being the realization of concerted consumer focus."

**Nurse Station** ▶

**BAR CODING** ▶

**1 For medication management:** El Camino (Cardinal Health, Dublin, Ohio), Physicians (Pyxis), Sacred Heart (Pyxis), St. Vincent's (McKesson)

**EMR** ▶

**2 Electronic medical record:** El Camino (developing one with Eclipsys), Physicians (Meditech, Westwood, Mass.), Sacred Heart (IDX), St. Vincent's (CGI, Montreal)

**PAGING SYSTEMS** ▶

**3 Paging systems:** El Camino (Vocera, Cupertino, Calif.), St. Vincent's (Vocera)

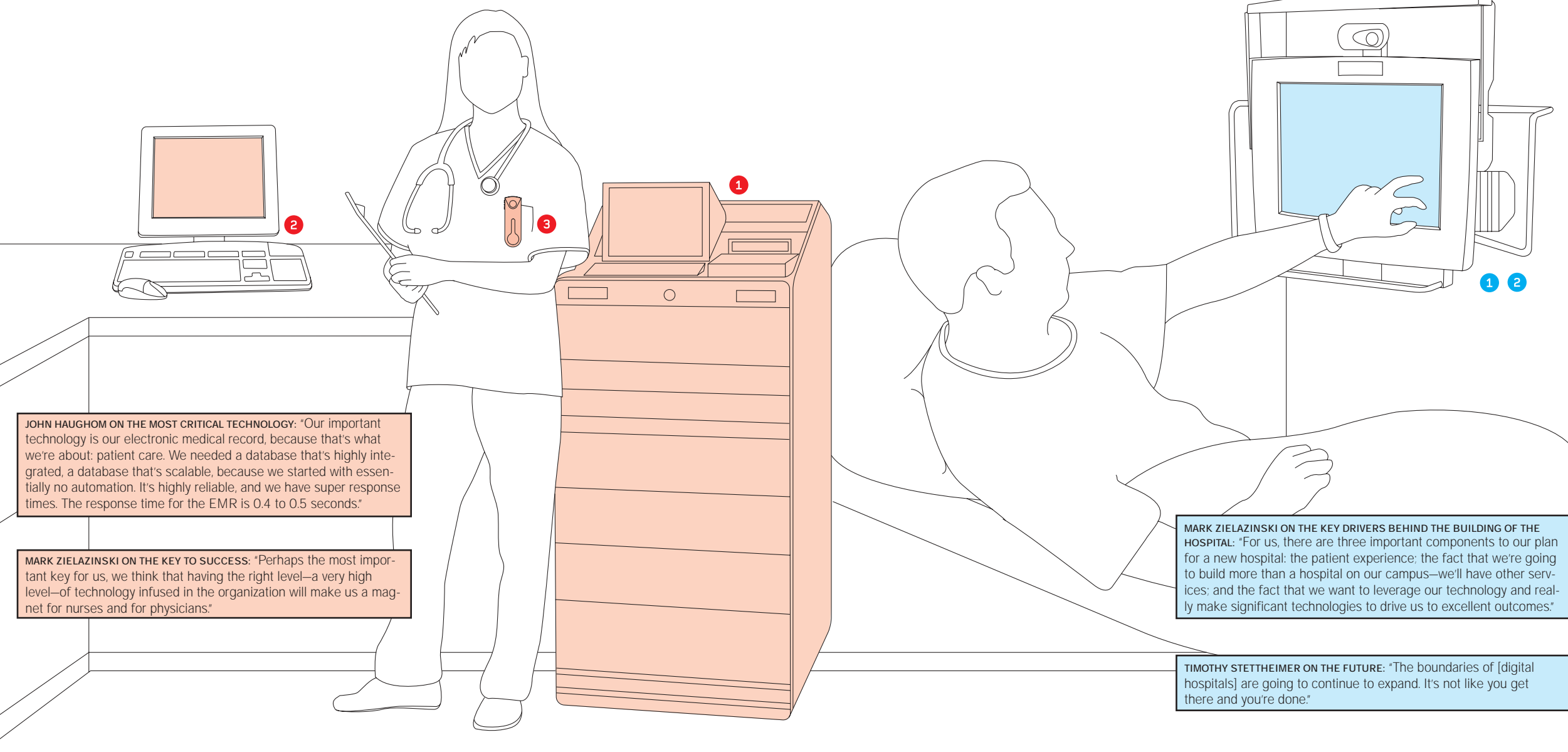
**Patient Room** ▶

**PATIENT STATIONS** ▶

**1 Patient education/entertainment center:** El Camino (Cardinal Health), Physicians (Pyxis), St. Vincent's (McKesson; LodgeNet, Sioux Falls, S.D.)

**WEB PORTAL** ▶

**2 Web-based patient portal (education materials, portable patient record):** Sacred Heart (IDX), St. Vincent's (McKesson)



**JOHN HAUGHOM ON THE MOST CRITICAL TECHNOLOGY:** "Our important technology is our electronic medical record, because that's what we're about: patient care. We needed a database that's highly integrated, a database that's scalable, because we started with essentially no automation. It's highly reliable, and we have super response times. The response time for the EMR is 0.4 to 0.5 seconds."

**MARK ZIELAZINSKI ON THE KEY TO SUCCESS:** "Perhaps the most important key for us, we think that having the right level—a very high level—of technology infused in the organization will make us a magnet for nurses and for physicians."

**MARK ZIELAZINSKI ON THE KEY DRIVERS BEHIND THE BUILDING OF THE HOSPITAL:** "For us, there are three important components to our plan for a new hospital: the patient experience; the fact that we're going to build more than a hospital on our campus—we'll have other services; and the fact that we want to leverage our technology and really make significant technologies to drive us to excellent outcomes."

**TIMOTHY STETTHEIMER ON THE FUTURE:** "The boundaries of [digital hospitals] are going to continue to expand. It's not like you get there and you're done."

**Infrastructure** ▶

**Data security:** El Camino (Cisco, San Jose, Calif.; Veritas, Mountain View, Calif.; Microsoft, Redmond, Wash.; McAfee, Santa Clara, Calif.), Physicians (Cisco; Veritas; Legato, Mountain View, Calif.), Sacred Heart (Symantec, Cupertino, Calif.; Cisco; Trend Micro, Cupertino, Calif.), St. Vincent's (Cisco; Vernier Networks, Mountain View, Calif.; Internet Security Systems, Atlanta; BellSouth, Atlanta)

**Clinical data repository:** El Camino (Eclipsys), Physicians (Meditech), Sacred Heart (built own system using Microsoft SQL server), St. Vincent's (McKesson)

**TIMOTHY STETTHEIMER ON THE IMPLEMENTATION OF CORE TECHNOLOGIES:** "I'm convinced you have to start with a wired infrastructure that can deliver the mass volumes of information involved. Then I believe you can add a truly pervasive wireless infrastructure onto that foundation."

**MARK ZIELAZINSKI ON THE MARKET MOVE TOWARD SERVER CONSOLIDATION:** "We'll be at three big multiserver boxes versus 100 plus and some odd servers."