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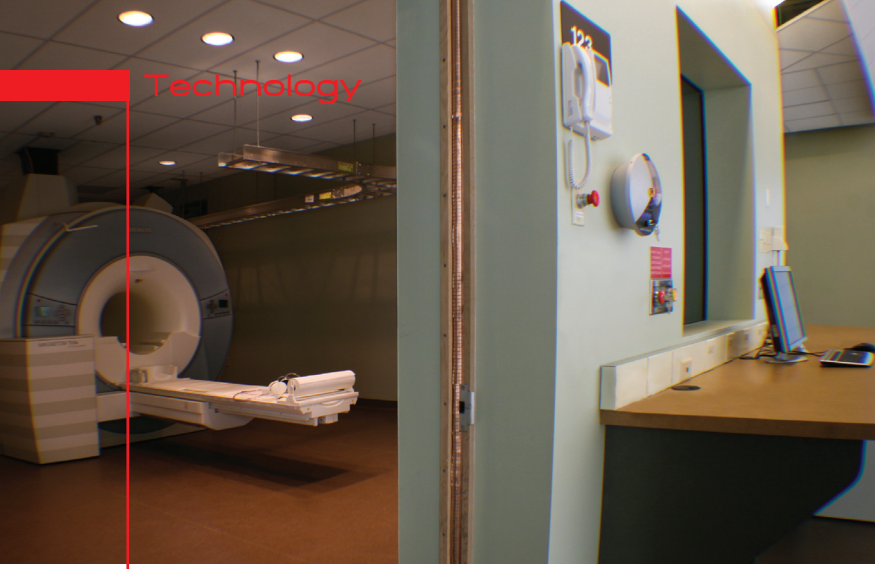
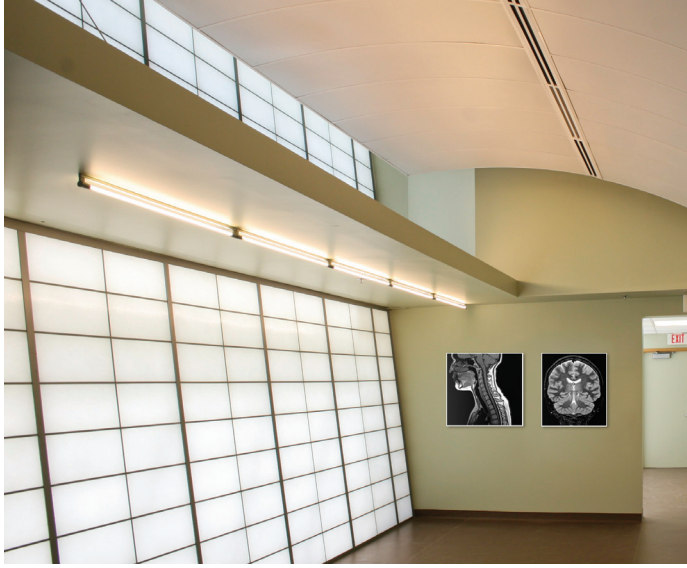




The high quality of American radiology equipment often doesn't match the design of the facilities themselves – and the international market should strive not repeat US mistakes, writes ***Tobias Gilk***

Improving our image

When American architects visit Europe, among its greatest attractions are the breathtaking gothic cathedrals. We have a special appreciation for these buildings – they were not only costly to erect, but dangerous too, which we know from the frequency with which they collapsed during construction. After the fall of the Roman Empire, architects had to rediscover, by trial and error, how to build arches, vaults, buttresses, and all of the other components of complex buildings. Simultaneously, cities vied with one another to have the tallest and widest cathedrals, with the most stained glass, creating something of an "arms race" of cathedral building. Builders literally pushed their designs to breaking point – and if their building collapsed and killed half a dozen stonemasons, that failure became part of the body of professional knowledge among other builders. But what do 700-year-old stone buildings have to do with today's cutting-edge radiology? Not much. And that's the problem.

Stagnant design

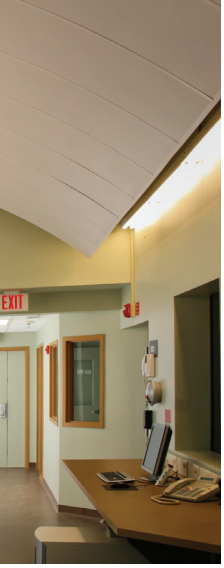
As modern radiology technology spreads around the world, it is the medieval builder's ability to learn from past mistakes that is missing. The US (arguably) has the most developed imaging, nuclear medicine and radiation therapy infrastructure in the world, and many look to the American model as the basis for planning their own systems. But, despite technologically innovative imaging machines, the planning and design of imaging facilities serially repeat the mistakes of prior architects, to the point where radiology architecture has institutionalised anachronistic practices.

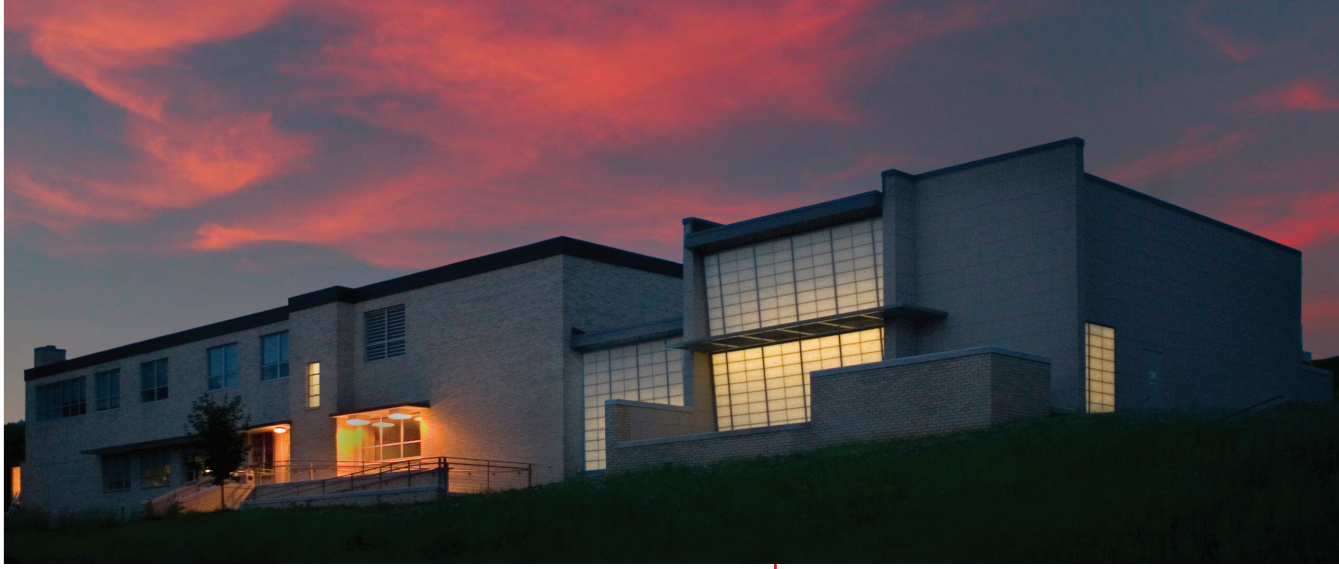
In the last 30 years, imaging technology, clinical applications, patient demographics and financial models have all shifted dramatically, and yet designs for a CT room design today look indistinguishable from designs for a CT room from a generation ago. With advanced medical imaging poised for substantial global growth, one of the worst things that could happen would be for others to model new facilities after the US example. Those nations advancing their medical care with technology ought to look first at how radiology design best fits their needs.

While fast equipment can increase throughput, facility planners must look at operational bottlenecks and lifecycle capacity to fully realise potential

Behind the curve

One attribute worth particular attention is throughput, which has become the ultimate aspiration of contemporary imaging for a number of reasons. The first is financial: in times of ever-growing financial pressure, capital costs aren't going down significantly any time soon, and until someone perfects a patient conveyor-belt, staffing requirements are near their functional floor. In answer to these accumulating





Above, left to right: The Marx Brain Imaging Center at the University of Missouri – Columbia, designed by RAD-Planning. Advanced imaging equipment can often make large demands on infrastructure and utilities, but that needn't be reflected in the buildings that house them: here, a fairly modest extension to an existing building has been designed to minimise energy requirements through the use of daylighting, superior insulation and thermal massing. The translucent facade offers an even light, with no glare

Photography: RAD-Planning

financial pressures, when capital costs can be cut no further, the only solution is to increase revenue. At fixed per-procedure reimbursements, this can only mean increasing throughput. For organisations that operate on fixed budgets for patient care services (such as most nationalised health services), maximising the clinical value of the investment, rather than maximising revenue, is the goal – and this means serving increasing numbers of beneficiaries. Throughput is again the solution.

Improved throughput by design

There are numerous parts of the world (Africa, the Middle East, Asia) where population growth and increasing demands for advanced healthcare are placing huge systemic demands to deploy advanced imaging and therapy technologies, such as MRI. Whether the society is comparatively wealthy, such as many Gulf states, or cash-strapped, as is much of Africa, or as populous as Asia, throughput and efficiency should be an equally important element in strategies for development and deployment of imaging technology.

Advanced imaging technology such as PET, CT and MRI seem to be following a radiology parallel to Moore's law (which states that computing power doubles every 18 months), as scanners are faster, stronger, and produce better images with each successive generation. But a Lamborghini engine in a Tata Nano doesn't make it a Formula One racecar. Fast scanners in poorly conceived supporting facilities will never realise their potential.

Beyond increasing revenue and patients served, perhaps the greatest benefit to developing systems is the strategic benefit of facilities that can respond to future need. What if the first MRI for a facility or region reveals a tremendous latent demand? If your service isn't flexible and scalable (and this includes bricks and mortar), how do you respond to this growth? Even slow-and-steady growth can be thwarted through a failure to imagine and anticipate changing needs. How can you expand capacity? How can you add clinical applications? How will you add equipment or space? It is short-sighted to pour resources into a particular scanner without looking at operational bottlenecks, and lifecycle capacity of your facility; an effective planner is at least as important to your capacity for efficiency as is any single piece of hardware.

A holistic view

So if throughput is precious, for financial, beneficiary or development concerns (or a combination of all three), we should not be fixated on the promises of a single piece of hardware, but we should look holistically at the patients, providers and the environment though which we provide care.

Fast scanners in poorly conceived supporting facilities will never realise their potential

Overall, regions that are expanding their use of technologically advanced medical imaging need to look closely at their own needs before adopting the facility designs templates that are proffered. A close analysis of the most prolific model, that of the US, will reveal that as glossy and gleaming as many of these facilities are, the designs actively undermine many of the basic needs of the healthcare systems they were built for: style over substance, and ready-made prototypes over appropriateness.

US cathedrals to medical imaging may not be falling down, but they largely aren't supporting the mission of their churches.

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