



Bringing MRI to Your Community Hospital

A Community Hospital White Paper

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INTRODUCTION

MRI is one of today's fastest growing imaging modalities, spurred in part by rapid advances in technology and important new applications in patient care. Recent statistics also suggest that expanding Medicare reimbursements and the growing demands of an informed and aging population for healthcare services are elevating MRI utilization to new levels.

Is your community hospital considering adding this expanding and often lucrative modality?

This paper will help you answer that question. It looks at the business and financial aspects of an MRI program, reviews MRI technologies and features, and discusses management of an MRI program. Overall, it shows how implementing an MRI program will enhance existing medical services and better meet community needs.

Bringing MRI to Your Community Hospital

MAKING THE BUSINESS CASE

The decision to implement an MRI program comes from understanding the business case – the reasons for bringing MRI to your hospital and the financial, managerial, and organizational factors underlying the program. The decision-makers, whether the hospital board or administrators, need to consider all aspects of the program, as set out in the business plan.

The Business Plan

The business plan is the formal written analysis of the feasibility of bringing MRI to your hospital. The plan should cover the following points:

- The reasons for bringing MRI to your hospital, including how the program supports or contributes to your hospital's overall mission
- The details of your proposed program, including equipment, procedures, and logistics
- An analysis of the local marketplace, including social and demographic characteristics, projected demand for MRI services, and sources of referrals
- A financial analysis, including financing plan, pro forma financial statements, and profitability analyses
- The management plan, including staffing, marketing, and administration

The plan should include detailed discussions, charts and figures, and all pertinent information needed by the decision-makers.

Reasons for Bringing MRI to your Hospital

Most hospitals that implement MRI programs do so to improve the quality of patient care. MRI's capabilities can lead to faster and more accurate diagnoses and earlier and more specific treatment of medical conditions, and can support and enhance the work of other departments in the hospital.

Hospitals may find that having MRI capabilities helps attract and retain doctors. Doctors want to know that they will be working with advanced technologies and that they will be able to get faster and more accurate imaging and diagnosis for their patients.

Having MRI capabilities can also attract patients who might go elsewhere for their imaging procedures. MRI broadens the range of services available to patients, draws patients to work with in-house specialists, and helps support the image of the hospital as a leading provider of healthcare services. Finally, having MRI capabilities may increase the downstream revenue (that is, the non-scan-related revenue captured as a result of the MRI scan), as patients get further medical treatment, see other in-house specialists, and use additional services provided by the hospital.

Financial Considerations

For many hospitals, the benefits of better patient care and enhanced services outweigh concerns about the costs of implementing an MRI program. The business plan, however, must set out the financial considerations and realities underlying the proposed program. These include how much revenue will be generated by the program, how profitable the program can be, and how the program will be financed.

Predicting Demand and Market Share

Estimating how many MRI procedures you will perform is an important first step in developing the financial picture of your proposed program. It is important to consider the following factors:

- **Local market needs.** Examine the overall need for MRI in your area by looking at demographics and economics. Population growth and affluence, for example, predict a strong market for healthcare services in general, while age, occupation, and lifestyle predict the need for specific imaging services, including MRI exams. Local and regional statistics on the average number of daily MRI referrals can also reflect the overall demand for the modality in your area.
- **Referrals.** Look at the number and type of MRI exams your hospital is currently referring to other facilities. You can count on bringing a high proportion of these exams in-house. Some local hospitals have also found that, when MRI capabilities are established, local doctors will make more referrals to their community hospitals than they had previously made. Care should be taken, however, to see legal counsel regarding your referral model.

- **Competition.** Who are the other providers of MRI services in your area? Will you have a competitive advantage? Competitors may include local imaging centers, other community hospitals, or regional hospitals. Gather detailed information on the competitors, including locations, office hours, equipment, services provided, and patient visits. This information will help determine whether the market can support an additional MRI provider and may suggest ways to fine-tune your business plan to rise above the competition. For example, you may find that there is under- or over-capacity in certain service lines, which can point to the procedures you will offer.
- **Ability to attract business.** Your ability to shift existing referrals, retain patients, and attract business to your hospital may depend on the specific MRI applications you offer, logistics such as hours and locations, and your marketing program.
- **Payer mix.** A payer mix analysis is a well-accepted way to predict income. Find the current reimbursement rates in your area for the full range of MRI exams by Medicare, Medicaid, and all your insurance payers. Next, find the percentage of patients in your market covered by all these payers, as well as the current number of referrals for every type of MRI exam. Multiplying the two sets of figures will give you an immediate snapshot of the potential MRI revenue stream you could expect. Remember that payer mix is dynamic, varying with shifts in demographics and ever-changing contractual agreements.
- **Utilization rate.** Another income predictor for your specific market is utilization rate – the percentage of time your MRI equipment will be in use. Gather statistics on utilization rate for various populations and analyze them in light of your market demographics. You may find, for example, that your local market contains a large population of the elderly, but that the utilization rate for people on Medicare is low. The statistics you gathered on referrals can also point to utilization rate. For example, you may note that doctors in your area do not make many referrals for MRI.

Medical societies, equipment vendors, commercial databases, competitive market analysis suppliers, and outside consultants may provide the information you need to conduct these analyses. Equipment vendors in particular offer detailed market research; comprehensive market assessment and planning services may also be available.

Profitability

Performing a number of standard financial analyses will help determine the potential profitability of your proposed MRI program. Generally, the financial analyses should cover the first five years of your program.

The standard financial analyses are:

- **Break-even analysis.** A break-even analysis will show how many examinations must be performed to cover MRI program costs. The specific break-even point is calculated by dividing the fixed costs (such as equipment, space, personnel, maintenance, and utilities) by the payment per exam minus the variable costs (such as supplies, fees, and billing costs) per exam. It may turn out that your break-even point is 1,000 exams, but your market analysis indicates demand for only 700 exams. In this case, you may want to analyze growth trends to determine when or whether your MRI program could break even in the future. You may also want to look at restructuring your proposed program to make it financially feasible.
- **Return on investment (ROI).** ROI is one of the most common measures of profitability and can indicate whether spending money on an MRI program is a good use of your hospital's resources. It is calculated by dividing net income by the cost of the investment. Net income can be approximated by looking at the demand, payer mix, and utilization rate for various MRI procedures in your market and estimating your revenues. The investment number includes not only the cost of the equipment under each financing option, but also the costs of running the program (including the costs of staffing, marketing, any needed construction, and administration). Given the number of variables contributing to the ROI calculation, changing the structure of your proposed MRI program can increase your return on your MRI investment.
- **Internal rate of return (IRR) and net present value (NPV).** IRR and NPV are commonly used to analyze whether a capital expenditure (such as the purchase of MRI equipment) will yield the revenue wanted in the future; they can also be used to choose among various investment proposals (such as different types of MRI equipment or different financing options). Net present value is calculated by a mathematical process involving the estimated revenues and expenses of an investment. The calculation can help determine whether the anticipated cash flows

will cover the cost of capital and recover the costs of the investment. IRR (defined as the rate of interest at which the incremental NPV of a proposal is zero) is another way to look at the value of a capital expenditure – by looking at the rate of return on the investment. If a calculation shows that the IRR is above the cost of capital, the proposed investment should be profitable. These two calculations help determine whether the investment is economically feasible for the hospital.

Again, the information needed for these analyses can be obtained from equipment vendors, commercial databases, and outside suppliers.

Financing Options

Hospitals can use a number of methods or creative hybrids from these methods to acquire both fixed and mobile MRI. Deciding how you will pay for your MRI system requires achieving the right balance between using available cash and accessing debt. Using available cash may make sense if there are few other capital projects on the horizon and cash flow from operations is strong. Using debt instruments, such as bonds, bank loans, or leases, however, may preserve available cash for other capital projects, provide a better financial return on the capital project, or simply make the project affordable by reducing the capital outlay to a monthly operating expense. Consider the following options:

- ***Cash Purchase.*** The main advantage of a cash purchase is that your hospital would own the equipment outright; the equipment becomes an asset on your balance sheet and no debt or liability is created. Making the purchase, however, would involve the use of a significant amount of available cash, which would then no longer be available to support other projects or for future financial needs.
- ***Leasing.*** Leasing moves much of the funding to your operational budget and minimizes credit requirements. In addition, it provides better matching of revenues and expenses on a monthly basis. Some types of leases allow you to build equity into the lease and purchase the MRI equipment for a small capital outlay at the end of your agreement.

- **Bonds.** Using bonds allows your hospital to raise significant capital to fund long-term and short-term projects through one debt issue. The bond offering can be made on a tax-exempt basis, so the interest due on the principal is typically calculated at a very attractive rate. A bond offering may take six to nine months to execute, however, and may involve significant costs. More importantly, including assets that have economic and useful lives shorter than the term of the bond in a bond issue produces debt without any continuing benefit to your hospital; there would be a mismatch between revenues and expenses.
- **Bank Loans.** If your hospital has an existing relationship with a bank, it may be quickest and easiest to fund your technology acquisitions through a bank line of credit. Given banks' size and access to capital, they typically offer attractive finance rates for full payout loans. Your hospital may be required to keep a compensating balance at your bank, however, and one technology purchase may consume available credit lines that your hospital may need for other capital projects or working capital needs. Another drawback to using a bank loan is that banks will only finance the technology acquisition itself; they will not pay for the installation or the costs of professional services associated with the equipment.

Your hospital may want to purchase MRI equipment independently to meet your own imaging needs. You could then lease access to the equipment part time to other facilities at fees that could help pay for the purchase.

Your hospital may also consider a shared purchase of MRI equipment. Partnering with other local hospitals or independent imaging centers offers the advantages of sharing financial burdens and risks, while acquiring the ability to provide MRI services. Frequently, the participating facilities form a partnership or limited liability corporation to serve as the umbrella for the purchase, and the financial arrangements and responsibilities would be specified in the formal agreement. This arrangement reduces the costs and financial risk for each partner, while allowing each partner to provide MRI services. Co-funded MRI acquisitions may be either direct purchases or leases.

SELECTING THE EQUIPMENT

Rapid developments in MRI technology mean that your hospital will be faced with an array of equipment and features. Your selection will depend on your business objectives and clinical requirements. Your goal is to select the equipment most appropriate and cost-effective for delivering the high-quality images you need today, while allowing for new applications and upgrades in the future. Equipment vendors can help you sort through your options to acquire the capabilities you need without paying for features you will not use.

The sections below discuss some of the basic technologies and features available to you.

Comparing Technologies

Magnet

Given the growth in the number of MRI applications and rapid advances in MRI technology, MRI may become your radiology department's workhorse. Therefore, your hospital should start with a solid, proven platform. While some applications still use a sub-1T magnet, a 1.5T magnet is now the standard, because it can both handle current applications and accommodate future applications and upgrades. A 3T magnet is available, but it represents truly innovative technology and might be more powerful than most hospitals need.

Mobile vs. Fixed MRI

As noted above, mobile MRI is housed in a specialized van and can readily be shared among hospitals and healthcare facilities. Mobile MRI is frequently acquired when a hospital expects a small volume of exams, when the hospital wants to test an MRI program before leasing or purchasing, or when the hospital does not have the financial resources to purchase fixed equipment.

Some hospitals use mobile MRI to supplement overburdened fixed MRI equipment, provide capacity while waiting to purchase additional fixed equipment, extend radiology services into other geographic areas, or maintain service during building projects.

A main drawback of mobile MRI is its accessibility – the equipment may not be available when it is needed. Patients and referring physicians may have to wait for several days or even weeks for procedures.

Fixed MRI may be located inside the hospital or in a nearby building. Because it is right at the hospital, it is very convenient to use. Patients may be able to get their exams within a day, emergency room doctors can get studies the same day, and diagnoses can be made or confirmed very quickly. Physicians can use in-house equipment to confirm results and to make sure that proper care is given and they can draw on the medical services provided by other departments in the hospital, if needed.

Fixed MRI facilitates patient care. It is easier to move seriously ill, elderly, or emergency room patients to an in-house MRI than to transport them to mobile or distant equipment. In-house and fixed facilities also tend to be more comfortable and attractive than mobile ones and patients can use other hospital services and facilities at the same time.

Open vs. Closed MRI

Approximately 28% of MRI installations are of open MRI (according to the *IMV 2002/03 MRI Census Market Summary Report*). Open MRI is considered more comfortable for patients, particularly children, the elderly, the obese, and the claustrophobic, and may thus reduce the need for patient sedation and the number of incomplete exams. Until now, the strength of the magnet in most open MRI systems has been comparatively weak (no more than 0.7T), which has limited the quality of the images and has not supported a full range of applications. A new class of MRI systems was introduced in the summer of 2004, called Open Bore MRI, with stronger 1.5T magnets and the ability to offer 60% of exams with the patient's head outside the magnet. These new systems have the same image quality as closed MRI systems and are able to support as many applications.

Closed MRI has traditionally used a stronger magnet, which has led to clearer images and has allowed closed MRI systems to support a broader range of applications and many new technological advances and upgrades. Some newer closed MRI equipment has been designed to be more comfortable for patients and to reduce the acoustic noise level by up to 97%.* The technological advances in open MRI may reduce the differences in technological capabilities between open and closed MRI systems.

*Results may vary. Data on file.

Equipment Features

Image Quality

Image quality is one of the primary MRI considerations. Factors affecting quality include strength of the magnet, high field computer performance, sequence selections, and 3D postprocessing. Differences in image quality can be seen by comparing sample images produced by all the equipment being considered.

Workflow and Productivity

MRI benefits from a broad range of new productivity-enhancing tools that may allow you to serve more patients and make the best use of your equipment and staff.

Advanced scanners have the ability to do seamless whole-body imaging with a single coil, eliminating the need to reconfigure coils and reposition patients. These can cut scanning time by as much as 50% to 75%. * Others allow simultaneous scanning of more limited anatomical areas with up to four integrated coils, delivering similar benefits. Both allow the user to select exams, not coils, and provide the highest acquisition speed without image artifacts, while promoting patient comfort. This enhanced workflow enables more patients to be seen during a day and often paves the way for handling of a greater patient volume and increased profits.

Additionally, recent advances in MRI technologies allow the processing of MRI images during, rather than following, the examination, which produces results faster. Others automatically position slices for reproducible, consistent results.

New developments also promote clinical efficiency by improving workflow and eliminating duplicate tasks. This includes reducing examination set-up time through single-mouse-click coil positioning. Another new technology eliminates the need to reenter patient exam parameters by allowing existing images to be dragged and dropped onto the patient list and even to be transferred from images on email or CDs. Some manufacturers provide a common interface across all modalities and applications, including MRI, to reduce learning curves and facilitate practice management.

*Results may vary. Data on file.

Patient Comfort

Some new technologies make MRI procedures more comfortable for patients, which in turn makes clinical time more productive. These technologies may reduce noise level, eliminating the need for ear protection; reduce scan time, which makes the procedure less stressful for patients; allow for more comfortable horizontal loading; or allow patients to keep their heads outside the bore, minimizing claustrophobia. Open MRI technology accommodates anxious, obese, or claustrophobic patients, particularly children.

Search Process

A multifunctional search team, including radiologists, technologists, administrators, and IT professionals, should be appointed to analyze the equipment options and make recommendations. The search should be driven by the goals of your program in terms of improved patient care and financial feasibility, the technological features specified by radiologists, and the procedure needs of referring physicians.

The search process should include detailed comparisons of the features and image quality of the equipment made by different vendors. Members of the team should visit sites where the equipment is used, interview radiologists and technologists working with the equipment, and request and review a range of images made by the equipment. Some equipment vendors may allow a short-term trial of the equipment or special features before purchase.

Many hospitals consider it important to purchase as much equipment as possible from the same vendor. For smaller hospitals, where technologists may perform many different types of procedures, having one vendor makes cross-training on different modalities easier. The relationship with a single vendor may also contribute to the efficient running of the radiology department and may expedite repairs and other needed services.

At the end of the search process, the team should make recommendations on which specific equipment and features to purchase. The team may also set out a schedule for making regular upgrades to the equipment or for purchasing additional features or applications.

MANAGING THE MRI PROGRAM

When bringing MRI to your community hospital, you will have to make decisions about overall management of the program. Planning should cover four areas – operations, staffing, siting, and marketing.

Operations

Patients and physicians both want the MRI program to run smoothly, efficiently, and in a timely manner. When implementing the program, the hospital will have to keep an eye on the scheduling of patients for efficient utilization of equipment, patient throughput, patient comfort and education, efficient handling of paperwork and archiving of images, and timely communication. A Picture Archiving and Communication System (PACS) has become a necessity in managing an MRI program.

The hospital should plan on monitoring the operations of the program and should expect to make changes to increase operating effectiveness. For example, the hospital may find that it wants to extend hours of service or hire additional personnel to handle paperwork and scheduling.

Staffing

For a community hospital, an MRI program requires one or more radiologists, technologists, administrators, and possibly also technologist aides. There is currently a shortfall in the number of available radiology professionals, so it may be necessary to develop a recruiting program that sets out how the hospital supports and meets the needs of its employees. Radiology professionals will look for a competitive salary and benefits, good working conditions, flexible and reasonable schedules and workloads, and opportunities for growth and development within the profession. They are particularly interested in keeping up with technological advances and in having opportunities to learn new modalities. During recruiting visits and interviews, most radiology professionals check whether a hospital has the latest technologies and equipment.

Many radiologists look for the use of a nighthawk service at night or over weekends to make their workloads manageable. Nighthawks, who can be located anywhere in the world, are sent images digitally over the Internet for remote reading. A PACS system facilitates the sharing of images between the hospital and the nighthawks.

The hospital may also need to consider whether it will be able to pursue a number of the standard options for making sure that it has sufficient staff:

- Using temporary or short-term workers, provided by a healthcare staffing company or recruited from locum tenens services
- Sharing radiology professionals among joint venture partners or local radiology practices
- Using creative scheduling, such as job-sharing or part-time arrangements
- Cross-training technologists on different modalities

Given the shortfall in available radiology professionals, a hospital will want to pay attention to retaining its staff. An effective retention program must be built into the staffing plan for the MRI program. Retention strategies may include giving staff opportunities for career growth through learning new technologies and modalities, creating a supportive work environment, and following through on all the commitments made during the recruiting process.

Siting

Given the physical requirements of fixed MRI equipment, administrators will have to decide where they want to site the program.

Existing vs. New Space

An MRI's powerful magnetic field limits the possible locations for the equipment. The magnet room must be built with specific construction materials and can contain only certain fixtures and additional equipment. An existing site within the hospital will need significant structural renovation to eliminate all ferrous metals to ensure patient safety and protect your equipment. It is necessary to compare the costs of renovating and of building new space to help contain expenses associated with the program. Equipment vendors are a good source of information on the requirements of a magnet room and the work needed to create a safe and comfortable site for your MRI program.

Inside-the-Hospital vs. Freestanding Outpatient Facility

MRI exams are frequently outpatient procedures. Locating your MRI program in an outpatient facility has the obvious advantages of reducing hospital crowding, enhancing throughput, and reducing the complications of hospital visits for ambulatory patients. Other outpatient facility siting benefits include flexibility in financing, through joint ventures and shared equipment, and larger physical space with the possibility of expansion.

However, if your primary goal is to meet in-patient imaging needs, an inside-the-hospital location is safer and easier, particularly for critically ill patients. Other advantages are the availability of the full range of on-site medical services and the proximity to in-house physicians and referring physicians with offices near the hospital.

Marketing the Program

A community hospital can best market its new MRI program by involving the community during the development of the program and by using specific marketing techniques.

Community Involvement

Many community hospitals have found that creating strong community involvement in the program leads to high patient volume. It may be effective to:

- Draw local businesses and business associations, such as a Chamber of Commerce, into the planning process and any necessary fundraising
- Create a hospital website that keeps the community informed about progress, educates potential future patients about your new services and the benefits of MRI, shows pictures of the new equipment, and links to the equipment vendor's website for additional information
- Speak about the program and MRI to local community groups and at school programs
- Hold an open house and give tours of your new facilities

Media Relations

Given the strong popular interest in healthcare issues, it may be possible to interest local newspapers, magazines, television, and radio stations into reporting on your new MRI program and its benefits. Distributing a press release describing your program, making hospital administrations and radiology professionals available for interviews, and hosting media events may be effective in publicizing your program.

Marketing Communications

Some hospitals have found it effective to develop written materials that explain and publicize their program and the new MRI technology. These materials can include brochures that educate patients and answer questions about MRI technology and benefits, brochures for referring physicians that describe the new imaging services, handouts with contact and procedural information, and print advertisements for local media. Equipment manufacturers are a good source of cost-effective assistance in developing marketing communications.

CONCLUSION

MRI technology can provide numerous benefits to your hospital by enhancing the speed and accuracy of diagnoses, facilitating earlier and more accurate treatment of medical conditions, and generating additional revenue. Making the decision to implement an MRI program involves analyzing the marketplace and the financial aspects of the program and planning for managing and marketing the program.

A critical decision is which MRI equipment and applications will meet the needs of the hospital and the community. Many of the newest technologies provide significant benefits in terms of quality, efficiency, and patient comfort. Given the cost of the equipment, the hospital should compare various financing options, including direct purchase, leasing, and joint ventures.

Equipment vendors are a good source of the useful information and support needed to design an MRI program, implement it effectively, and manage it to meet both the hospital's financial goals and the growing needs of the community.

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The information in this document contains general technical descriptions of specifications and options as well as standard and optional features which may not always be present in individual cases.

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