MAGNETIC RESONANCE IMAGING SYSTEMS – US ANALYSIS AND MARKET FORECASTS
Executive Summary

Magnetic Resonance Imaging Key Metrics: Key Events and Pipeline Assessment

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<th>Year</th>
<th>Market Sales ($m)</th>
<th>Level of Impact</th>
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<td>2013</td>
<td>US $1,323.6m</td>
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<td>Key Events (2012–2020)</td>
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<td>Patient Protection and Affordable Care Act of 2010</td>
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<td>Affordable Care Act of 2011</td>
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<td>Reform of CFDA Medical Device Regulation in 2014</td>
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<td>GE Healthcare PET/CT &amp; PET/MRI Comparison Trial 2014</td>
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Pipeline and Competitive Landscape Assessment

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2020 Market Sales ($m)

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<tr>
<td>2020</td>
<td>US $1,637.1m</td>
<td>GlobalData, primary research interviews with leading nuclear medicine specialist in US.</td>
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Magnetic Resonance Imaging Market Overview

Several attributes of X-ray imaging have limited its use over the years, specifically patient exposure to radiation and imaging-related issues such as poor resolution, depth, and contrast. However, the advent of next-generation imaging technologies has changed all that. The ability to achieve millimeter or even sub-millimeter spatial resolution with new X-ray computer tomography (CT) and magnetic resonance imaging (MRI) scanners has accelerated the use of non-invasive imaging and opened the door to a broad set of advanced applications. Nuclear imaging, particularly positron emission tomography (PET), has significantly progressed as well. While PET and CT are quickly becoming a critical component of clinical diagnoses, they are limited by image artifacts related to the scanning pattern: CT and PET images are acquired sequentially, rather than simultaneously, which means that artifacts can be caused by intra- and inter-scan patient and organ motion as well as differences between the breathing protocols used in PET and CT. These artifacts can severely impact the accuracy of the scanner and its attenuation correction, seriously compromising the imaging capability. MRI does not have these problems, and provides a large variety of protocols that selectively enhance contrast and thus provide enhanced visual discrimination among different tissues *in vivo*, and which can be utilized for dynamic contrast-enhanced imaging, diffusion imaging, functional MRI, and other purposes. Most importantly, MRI is also capable of spectroscopy for detection of organ-specific abnormalities. With significant advances in the MRI field, devices are more powerful and accurate than ever.

Increased utility and ever-rising desirability will drive the global MRI systems market to grow from $3.7 billion in 2012 to over $9.2 billion by 2020, increasing at a Compound Annual Growth Rate (CAGR) of 11.8% during the forecast period.

There are a number of key drivers for the adoption of MRI systems globally, including:

- Rising prevalence of diseases
- Increased demand for cost-effective and quality healthcare
Executive Summary

- Novel technologies driving innovation
- Increased awareness of radiation dosage
- Open and partial MRI systems to drive further adoption, especially for claustrophobic patients
- Expanding use of MRI techniques by non-radiologists
- Steady reimbursement and other government funding
- Ever-growing global population

Despite increasing adoption, MRI system sales still face many market barriers, such as:

- US medical device excise tax
- Limited availability of venture capital
- Reduced hospital budgets
- Increasing prevalence of lifestyle-related diseases
- Ever-present competition from CT systems
- Shortage of dedicated MRI technologists
- High initial cost of capital equipment
- Lack of long-term data on use of MRI in patients

Regardless of market obstacles, GlobalData expects steady growth in the MRI systems market, which is still in its infancy in many countries. Continued growth in this sector will be fueled by continual design developments, cost reductions, reimbursement improvements, and technology adoption in emerging markets.

Future Market Growth

The recent economic downturn has had a continued effect on MRI system sales, especially because competing technologies are cheaper and in many cases offer equal imaging quality and resolution. However, despite competition from other diagnostic devices, MRI systems have experienced continued adoption as cost-effectiveness improves and innovation drives technology improvements. The market growth for MRI systems in the US is heavily dependent on the replacement of existing systems that are nearing the end of their lifetime. As such, the capacity for new installations in developed countries is limited, and as world economies recover, it can be expected that equipment replacement rates will increase in the future.

Despite the need for replacements, hospitals do not always decommission MRI systems at the end of the product’s manufacturer-recommended lifecycle, which negatively affects the sales of systems in these developed markets as companies forgo new system purchases. Additionally, a “trickling down” of MRI system features negatively impacts sales in developed countries: older high-end systems are sometimes replaced with low-end or mid-range systems, sacrificing features for cost savings. Finally, newer systems are expected to cost less, reducing the profit margins of
Manufacturers in this space. As a result, the MRI market is expected to be highly competitive.

Changes to reimbursement, the increasing aging population, rising prevalence of disease, and the escalating need for advanced imaging systems will act as major drivers for continued growth in the MRI market. Despite cost-containment measures implemented by healthcare authorities, the safety and efficacy of MRI techniques will continue to drive new sales in developed and emerging markets.

**What Do Physicians Think?**

The KOLs interviewed for this report agreed that in terms of popularity, 1.5T (tesla) systems are currently the most popular, although the high-field market segment is growing quickly.

“1.5T is the most popular field strength, and [we] can do a number of procedures with it.”

Key Opinion Leader

MRI has experienced significant adoption worldwide as a result of its ability to produce high-quality images, especially for soft tissue.

“MR and CT complement each other, and both technologies are moving fairly rapidly. MR is good for diagnostic analysis of soft tissue.”

Key Opinion Leader

The imaging technique has been adopted by an expanding number of departments. As technology improves and guidelines are put in place, MRI is increasingly used for additional indications, including oncology, neurology, and cardiology. During the forecast period, these areas are expected to increasingly rely on MRI technology for diagnostics, further driving new device sales.

“MRI of the heart, for infarction especially, is increasing in general.”

Key Opinion Leader

“Other rising indications for MRI use include breast and prostate cancer.”

Key Opinion Leader

While manufacturers continue to include additional features in MRI systems, and have greatly changed system software, the most important part of MRI remains the image quality, physicians note. While manufacturers may tout add-ons or next-generation features, image quality is still the most important factor.

“The most important criteria for selecting a new device are the quality of the images.”

Key Opinion Leader

While third-party vendors are increasingly present in the industry, providing competitive maintenance or repair, and refurbished system sales are on the rise, physicians still are not completely happy with refurbished systems' image quality, which in turn continues to drive new device sales.

“It's very difficult to achieve a homogenous signal [with an older system].”

Key Opinion Leader
Executive Summary

Other areas of development include diffusion MRI, pre-polarizing systems, and parallel imaging. Physicians are interested in these technologies because they offer significant benefits for patient diagnosis and allow radiologists to examine degenerative disease or trauma using wholly new methods.

“Multiparametric MRI is really appealing, and is growing. It promises to greatly improve diagnostics, especially for things like prostate cancer.”

Researchers are also increasingly utilizing MRI with other scanning technologies, like PET, to produce hybrid images that combine the advantages of both systems. This hybrid imaging is fairly new to the industry but has been gaining interest rapidly, especially in complex areas of degenerative disease. Increasing utilization of hybrid PET/MRI imaging will drive MRI sales as well.

“There is a new possibility of PET/MRI hybrid imaging that might, again, increase the MRI demand.”
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MAGNETIC RESONANCE IMAGING SYSTEMS
US ANALYSIS AND MARKET FORECASTS

Introduction

2 Introduction

Magnetic resonance imaging (MRI) systems utilize strong magnetic fields and radio waves to generate clear and detailed images of internal organs and tissues. MRI is widely used in hospitals, and is generally the preferred imaging method for the diagnosis of brain and other neurological disorders. MRI systems vary in the strength of the magnetic field they can produce (measured in teslas, or “T”); devices are classified as high-field (3T), mid-field (1.5T), or low-field (less than 1.5T). These systems work in tandem with many other medical devices, including surgical tools, radiology equipment, and MRI system accessories. MRI systems have many applications, but are most commonly used for the imaging of nervous, cardiovascular, musculoskeletal, liver, gastrointestinal, and cancerous structures due to their strong imaging capabilities with soft tissue. Advancements in real-time imaging technology have enabled functional neuroimaging, a procedure that measures brain activity by detecting associated changes in blood flow. This is known as functional MRI (fMRI).

The US, EU, and Japanese markets make up the majority of MRI system sales, with purchasers upgrading their outmoded systems and acquiring additional MRI systems to meet demand, within stringent cost-effective criteria. Mid- and high-field systems dominate the market these days, largely because they allow previously unavailable applications and greatly improve image resolution and quality, particularly for cartilage tissue. However, these mid- and high-field MRI systems are extremely large and complicated, making them expensive to purchase, install on-site, and maintain. These characteristics have resulted in many hospitals deferring purchasing decisions or seeking alternatives. Despite this, several indications require the use of high-field imaging for diagnosis and treatment, prompting patients to travel great distances to where a high-field system is available instead of opting for a local mid-field scan. As a result, smaller hospitals must invest in more expensive, higher-field systems to remain competitive in the future. This has introduced a new market of “magnet upgrades”, where major system integrators introduce new, higher-field magnets to existing MRI systems rather than replacing the whole system, to keep the system from become obsolete. In other areas, these high-field devices have gained little traction, especially in the Asia-Pacific (APAC) region, showing the significant diversity of purchasers looking to acquire new systems. Overall, the MRI market will see continued growth throughout the forecast period, with the fastest device adoption in the high-field market segment.
Introduction

2.1 Catalyst

Given their impressive safety, efficacy, and non-invasive nature, MRI systems have seen continued adoption since they were first introduced to the healthcare market. Despite a high initial price tag as well as substantial maintenance costs, these systems are increasingly prevalent in hospitals around the world, and their use is now global. With a variety of options available in terms of magnetic field strength and additional features, purchasing hospitals have a wide selection of systems to choose from, and market offerings are only growing. As new players enter the industry with innovative new systems during the forecast period, competition is expected to escalate to new levels. Additionally, as the number of disease and trauma indications that can be diagnosed using MRI increases, the number of procedures performed per year will rise as well.

Moreover, the advent of hybrid imaging has enabled PET/MRI imaging adoption. New developments in hybrid imaging promise to further increase the demand and the utility of these systems, while significantly improving patient cost. Healthcare reforms, stimulated by economic pressures, have looked to reduce the burden of imaging on the healthcare system by restricting reimbursement for various imaging procedures. This report examines the adoption of new technologies and the challenges current competitors will face within the MRI market, with a focus on current and future industry trends. In addition, the report will highlight the current and future applications of MRI technology, and identify unmet needs and potential opportunities within the market.

2.2 Related Reports

- GlobalData (2013). MediFocus: Future of Molecular Imaging, August, 2013, GDME002MFR
Appendix

13.9 About GlobalData

GlobalData is a leading global provider of business intelligence in the Healthcare industry. GlobalData provides its clients with up-to-date information and analysis on the latest developments in drug research, disease analysis, and clinical research and development. Our integrated business intelligence solutions include a range of interactive online databases, analytical tools, reports and forecasts. Our analysis is supported by a 24/7 client support and analyst team.

GlobalData has offices in New York, San Francisco, Boston, London, India, Korea, Japan, Singapore, and Australia.

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