

MEDICAL MAGNETIC RESONANCE IMAGING (MRI): TECHNOLOGIES AND GLOBAL MARKETS



HLC078B
September 2013

Peggy Lehr
Project Analyst

ISBN: 1-56965-548-0

bcc | Research
Market Forecasting

BCC Research
49 Walnut Park, Building 2
Wellesley, MA 02481
866-285-7215, 781-489-7301
www.bccresearch.com
Custom Reports:
carol.laverty@bccresearch.com

TABLE OF CONTENTS

TOPIC	PAGE NO.
CHAPTER 1 INTRODUCTION	2
STUDY GOALS AND OBJECTIVES	2
REASONS FOR DOING THE STUDY	2
INTENDED AUDIENCE	3
SCOPE OF REPORT	3
INFORMATION SOURCES	3
ANALYST CREDENTIALS	4
RELATED BCC REPORTS	4
BCC ON-LINE SERVICES	4
DISCLAIMER	4
CHAPTER 2 SUMMARY	6
GLOBAL MACRO TRENDS	6
REIMBURSEMENT AND REGULATION ISSUES	6
MARKET ANALYSIS	7
<i>SUMMARY TABLE PROJECTED GLOBAL MARKET FOR MRI SYSTEMS, BY TYPE, THROUGH 2018 (\$ MILLIONS)</i>	7
GEOGRAPHICAL ANALYSIS	7
<i>SUMMARY FIGURE MRI MARKET, BY GEOGRAPHIC REGION, IN 2013 AND 2018 (%)</i>	8
CHAPTER 3 MRI GLOBAL MARKET OVERVIEW	10
HISTORY	10
HOW MRI WORKS	10
COMPONENTS OF MRI	11
MAGNETS	12
Resistive Magnets	12
Permanent Magnets	12
Superconducting Magnets	12
Gradient Magnets	12
COILS	13
Coils for Specific Applications	13
Total Imaging Matrix	13
Refurbished Coils	13
GLOBAL MARKET FOR MRI COILS	14
<i>TABLE 1 GLOBAL MARKET FOR MRI COILS, THROUGH 2018 (\$ MILLIONS)</i>	14
RF TRANSMITTER OR SOLENOID	14
SHIELDS	14
MAGNETIC SHIELDING	15
CRYOGENIC LIQUIDS	15
POTENTIAL HELIUM REPLACEMENT	15
CONTRAST AGENTS	15
TYPES OF CONTRAST AGENTS	16
Hyperpolarized MRI Agents	16
Administration of contrast agents	17
Approval of contrast agents	17
Chelates of gadolinium	17

TOPIC	PAGE NO.
Iron Oxide	17
Manganese Chelates	17
GLOBAL MARKET FOR CONTRAST AGENTS	18
<i>TABLE 2 PROJECTED GLOBAL MARKET FOR SALES OF MRI CONTRAST MEDIA, THROUGH 2018 (\$ MILLIONS)</i>	18
NONINVASIVE CONTRAST METHODS	18
COMPUTER SYSTEMS	18
MRI PROCESS	19
USES FOR MRI	19
MRI IN RESEARCH SETTINGS	19
MRI IN VETERINARY SETTINGS	20
TYPES OF MRI SCANS	20
BASIC MRI SCANS	20
<i>TABLE 3 BASIC MRI SCAN, BY TYPE, WITH APPLICATION</i>	21
T1-weighted MRI	21
T2-weighted MRI	21
T*2-weighted MRI	21
Spin-density-weighted MRI	21
SPECIALIZED MRI SCANS	22
<i>TABLE 4 SPECIALIZED MRI SCAN, BY TYPE, WITH APPLICATION</i>	22
Diffusion MRI	22
MT MRI	23
FLAIR	23
MRA	23
MR-GILD	24
MRS	24
FUNCTIONAL MRI (FMRI)	24
INTERVENTIONAL MRI	24
Intraoperative MRI	24
Radiation Therapy Simulation	25
Magnetic Resonance Guided Focused Ultrasound (MRGFUS)	25
Multinuclear Imaging	25
Susceptibility-weighted Imaging (SWI)	25
MRI AND CT ATTRIBUTES	25
STRENGTHS/LIMITATIONS OF CT	25
STRENGTHS/LIMITATIONS OF MRI	26
<i>TABLE 5 STRENGTHS/LIMITATIONS OF MRI</i>	26
Superior Imaging for Some Situations	27
Continuing Evolution of More Powerful Equipment	27
New Applications for Equipment	27
MARKET CHALLENGES	27
MATURE MARKET IN DEVELOPED NATIONS	28
<i>TABLE 6 TOP 10 COUNTRIES WITH THE LARGEST NUMBER OF MRI UNITS (PER 1,000,000 POPULATION), 2010</i>	28
DIFFERENTIATING PRODUCT CAPABILITIES	28
Unit Capabilities	28
COMPLEX TECHNOLOGY AND LACK OF PERSONNEL	29
LONG SALES AND INSTALLATION CYCLES	29

TOPIC	PAGE NO.
HIGHER COST THAN OTHER TECHNOLOGIES	29
COMPETITIVE TECHNOLOGIES	29
<i>TABLE 7 ADVANTAGES AND DISADVANTAGES OF COMPETITIVE IMAGING TECHNOLOGIES</i>	30
<i>FIGURE 1 GLOBAL MARKET SHARE, BY TYPE OF IMAGING, 2012 (%)</i>	31
ACQUISITIONS AND MERGERS IN THE INDUSTRY	31
<i>TABLE 8 SELECTED ACQUISITIONS AND MERGERS IN MRI MARKET, 2008-2013 (\$ MILLIONS)</i>	32
MARKET SHARE FOR MAJOR MRI COMPANIES	32
<i>FIGURE 2 GLOBAL MARKET SHARE FOR NEW MRI EQUIPMENT, BY COMPANY, 2012 (%)</i>	33
CHAPTER 4 TECHNOLOGY OVERVIEW	35
TYPES OF SYSTEMS	35
<i>TABLE 9 PROJECTED GLOBAL MARKET FOR MRI SYSTEMS, BY SYSTEM TYPE, THROUGH 2018 (\$ MILLIONS)</i>	35
<i>FIGURE 3 MARKET SHARE, BY TYPE, FOR MRI SYSTEMS, 2013 AND 2018 (%)</i>	35
MRI CONFIGURATIONS	37
CLOSED MRI SYSTEMS	37
OPEN MRI SCANNERS	37
WHOLE-BODY MRI SCANNER	37
<i>TABLE 10 PROJECTED GLOBAL MARKET FOR MRI SYSTEMS, BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)</i>	38
<i>FIGURE 4 PROJECTED GLOBAL MARKET SHARE FOR MRI SYSTEMS BY CONFIGURATION, 2013 AND 2018 (%)</i>	38
MRI SYSTEMS AND CONFIGURATIONS	40
LOW- AND MID-FIELD SYSTEMS	40
<i>TABLE 11 PROJECTED GLOBAL REVENUE FOR LOW- AND MID-FIELD SYSTEMS, BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)</i>	40
HIGH-FIELD SYSTEMS	40
<i>TABLE 12 PROJECTED GLOBAL REVENUE FOR HIGH-FIELD SYSTEMS, BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)</i>	41
VERY-HIGH-FIELD SYSTEMS	41
Benefits of Very-high-field Systems	41
Limitations of 3T scanners	42
<i>TABLE 13 PROJECTED GLOBAL REVENUE FOR VERY-HIGH-FIELD SYSTEMS, BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)</i>	42
ULTRA-HIGH-FIELD SYSTEMS	42
<i>TABLE 14 PROJECTED GLOBAL REVENUE FOR ULTRAHIGH-FIELD SYSTEMS BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)</i>	44
SPECIALIZED MAGNET SYSTEMS	44
<i>TABLE 15 PROJECTED GLOBAL REVENUE FOR SPECIALIZED MAGNET SYSTEMS, BY AREA OF VISUALIZATION, THROUGH 2018 (\$ MILLIONS)</i>	44
Visualization	45
Heart visualization	45
Brain Visualization	46
Extremity Visualization	46
Spine Visualization	46
Driven Equilibrium	47
SPACE Readout	47

TOPIC	PAGE NO.
Parallel Imaging	47
INTRAOPERATIVE MRI	47
REFURBISHED VERSUS NEW COMPONENTS	48
FUTURE FOR USED MRI UNITS	48
GLOBAL MARKET FOR MRI EQUIPMENT, BY GEOGRAPHIC REGION	49
<i>TABLE 16 PROJECTED GLOBAL MARKET FOR MRI EQUIPMENT, BY GEOGRAPHIC REGION, THROUGH 2018 (\$ MILLIONS)</i>	49
<i>FIGURE 5 MRI MARKET SHARE, BY GEOGRAPHIC REGION, IN 2013 AND 2018 (%)</i>	49
CHAPTER 5 THE AMERICAS MARKET FOR MRI EQUIPMENT	52
<i>TABLE 17 PROJECTED AMERICAS MARKET FOR MRI EQUIPMENT BY TYPE, THROUGH 2018 (\$ MILLIONS)</i>	52
<i>FIGURE 6 MARKET SHARE FOR MRI EQUIPMENT IN THE AMERICAS, 2013 AND 2018 (%)</i>	52
REIMBURSEMENT	54
REIMBURSEMENT ISSUES IN THE U.S.	54
CANADA	54
MEXICO	55
BRAZIL	55
USAGE PATTERNS	55
U.S.	55
Diagnostic Uses	56
Interventional Uses	56
CANADA	56
MEXICO	56
BRAZIL	56
MARKET FOR MRI IN THE AMERICAS, BY REGION	57
<i>TABLE 18 PROJECTED AMERICAS MARKET FOR MRI EQUIPMENT, BY REGION, THROUGH 2018 (\$ MILLIONS)</i>	57
<i>FIGURE 7 AMERICAS MARKET FOR MRI BY REGION, 2013 AND 2018 (%)</i>	58
MRI MARKET IN THE AMERICAS, BY TYPE AND REGION	58
<i>TABLE 19 PROJECTED AMERICAS MARKET FOR MRI EQUIPMENT, BY TYPE AND REGION, THROUGH 2018 (\$ MILLIONS)</i>	59
CHAPTER 6 THE EMRA MARKET FOR MRI EQUIPMENT	61
<i>TABLE 20 PROJECTED EMRA MARKET FOR MRI EQUIPMENT BY TYPE, THROUGH 2018 (\$ MILLIONS)</i>	61
<i>FIGURE 8 MARKET SHARE FOR MRI SYSTEMS IN EMRA, 2013 AND 2018 (%)</i>	61
REIMBURSEMENT	63
REIMBURSEMENT ISSUES IN EUROPE	63
Universal Multipayer Health-care System	63
Tax-based Universal Health-care System	63
Social Health Insurance	63
Private Insurance	63
REIMBURSEMENT ISSUES IN MIDDLE EAST	64
Jordan	64
Qatar	64
REIMBURSEMENT ISSUES IN RUSSIAN FEDERATION	64
USAGE PATTERNS	65

TOPIC	PAGE NO.
USAGE PATTERNS IN EUROPE	65
USAGE PATTERNS IN MIDDLE EAST	65
USAGE PATTERNS IN RUSSIA	66
USAGE PATTERNS IN AFRICA	66
MARKET FOR MRI IN EMRA, BY REGION	66
<i>TABLE 21 PROJECTED EMRA MARKET FOR MRI EQUIPMENT, BY REGION, THROUGH 2018 (\$ MILLIONS)</i>	67
<i>FIGURE 9 EMRA MARKET FOR MRI BY REGION, 2013 AND 2018, (%)</i>	68
<i>TABLE 22 PROJECTED EMRA MARKET FOR MRI EQUIPMENT, BY TYPE AND REGION, THROUGH 2018 (\$ MILLIONS)</i>	69
CHAPTER 7 THE ASIAN MARKET FOR MRI EQUIPMENT	71
<i>TABLE 23 PROJECTED ASIAN MARKET FOR MRI EQUIPMENT BY TYPE, THROUGH 2018 (\$ MILLIONS)</i>	71
<i>FIGURE 10 MARKET SHARE FOR MRI EQUIPMENT IN ASIA, 2013 AND 2018 (%)</i>	71
REIMBURSEMENT	73
REIMBURSEMENT ISSUES IN JAPAN	73
REIMBURSEMENT ISSUES IN CHINA	73
REIMBURSEMENT ISSUES IN INDIA	73
REIMBURSEMENT ISSUES IN AUSTRALIA	73
USAGE PATTERNS	74
USAGE PATTERNS IN JAPAN	74
USAGE PATTERNS IN CHINA	74
USAGE PATTERNS IN INDIA	74
USAGE PATTERNS IN AUSTRALIA/NEW ZEALAND	74
MARKET FOR MRI IN ASIA, BY REGION	75
<i>TABLE 24 PROJECTED ASIAN MARKET FOR MRI EQUIPMENT, BY REGION, THROUGH 2018 (\$ MILLIONS)</i>	75
<i>FIGURE 11 ASIAN MARKET FOR MRI BY REGION, 2013 AND 2018 (%)</i>	75
MARKET FOR MRI SYSTEMS IN ASIA, BY TYPE AND REGION	76
<i>TABLE 25 PROJECTED ASIAN MARKET FOR MRI EQUIPMENT, BY TYPE AND REGION, THROUGH 2018 (\$ MILLIONS)</i>	77
CHAPTER 8 REGULATIONS AND REIMBURSEMENT	79
GLOBAL HARMONIZATION TASK FORCE (GHTF)	79
REGULATORY AGENCIES FOR MRI	79
<i>TABLE 26 SELECTED MRI REGULATORY AGENCIES, BY COUNTRY</i>	79
FDA REGULATIONS	80
E.U. REGULATIONS	80
CANADIAN REGULATIONS	81
MEXICAN REGULATIONS	81
JAPANESE REGULATIONS	81
CHINESE REGULATIONS	81
BRAZILIAN REGULATIONS	82
SAFETY ORGANIZATIONS	82
<i>TABLE 27 SELECTED GLOBAL SAFETY ORGANIZATIONS</i>	82
REIMBURSEMENT ISSUES	83
<i>TABLE 28 REIMBURSEMENT PRACTICES, BY COUNTRY</i>	83

TOPIC	PAGE NO.
UNITED STATES	83
Deficit Reduction Act (DRA) of 2005	83
Effects of DRA on MRI industry	84
Affordable Care Act of 2010 (ACA)	84
Implications of Reform on the MRI Market	84
Provisions of ACA that Affect the MRI Industry	85
CANADA	86
EUROPEAN UNION	86
INDIA	87
CHAPTER 9 PATENTS AND EMERGING TECHNOLOGY	89
PATENTS	89
<i>TABLE 29 SELECTED LISTING OF RECENTLY GRANTED PATENTS FOR MRI EQUIPMENT, 2008-2013 (\$ MILLIONS)</i>	89
PATENTS BY COMPANY	100
<i>TABLE 30 PATENTS ISSUED BETWEEN JANUARY 2008 AND MAY 2013 BY COMPANY</i>	100
PATENTS BY INSTITUTION, UNIVERSITIES AND FOUNDATIONS	101
<i>TABLE 31 PATENTS ISSUED TO RESEARCH INSTITUTIONS, UNIVERSITIES, AND FOUNDATIONS FROM JANUARY 2008 TO MAY 2013</i>	101
MRI PATENTS BY TYPE	102
<i>TABLE 32 PATENTS ISSUED BETWEEN JANUARY 2008 AND MAY 2013 BY PRODUCT TYPE</i>	102
<i>FIGURE 12 PATENT ACTIVITY BETWEEN JANUARY 2008 AND MAY 2013 BY TYPE OF PRODUCT (%)</i>	103
PATENTS BY ISSUE YEAR	104
<i>TABLE 33 NUMBER OF PATENTS ISSUED, BY YEAR, FOR MRI EQUIPMENT AND ACCESSORIES, JANUARY 2008-MAY 2013</i>	104
<i>FIGURE 13 MRI EQUIPMENT AND ACCESSORY PATENTS ISSUED BETWEEN 2008 AND 2013 (%)</i>	104
EMERGING TECHNOLOGY	105
INTEGRATED MRI-GUIDED RADIATION THERAPY SYSTEMS	105
PREPOLARIZED MR	105
SCANNER HARDWARE	105
IMAGE CONTRASTING	106
New Contrast Agents	106
Microfabricated Contrast Agents	106
Vascular Remodeling Imaging Agent	107
COMBINING CT AND MRI	107
CHAPTER 10 COMPANY DIRECTORY	110
MRI SYSTEMS	110
AGILENT TECHNOLOGIES, INC.	110
Products	110
ANALOGIC CORPORATION	110
Products	111
AURORA IMAGING TECHNOLOGY, INC.	111
Products	111
BRUKER BIOSPIN CORP.	111
Products	112

TOPIC	PAGE NO.
ESAOTE S.P.A.	113
Products/Services	113
FONAR CORPORATION	114
Products/Services	114
GE HEALTHCARE	114
U.S. Location	115
Products/Services	115
HITACHI MEDICAL SYSTEMS AMERICA, INC	116
Products/Services	116
HOLOGIC	116
Products	116
IMRIS INC.	117
Products/Services	117
INNERVISION MRI	118
Products	118
MEDINUS COMPANY	118
Products/Services	119
MEDTRONIC	119
Products/Services	119
MILLENNIUM TECHNOLOGY, INC.	120
Products	120
PARAMED MEDICAL SYSTEMS	120
Products	121
PHILIPS HEALTHCARE	121
Products/Services	121
SIEMENS MEDICAL SOLUTIONS USA, INC.	122
Products/Services	122
TIME MEDICAL	123
Products	123
TOSHIBA AMERICA MEDICAL SYSTEMS, INC.	124
Products/Services	124
USED MRI: REFURBISHED MRI SCANNERS AND SCANNER UPGRADES	124
ATLANTIS WORLDWIDE	124
BARRINGTON MEDICAL IMAGING, LLC	125
BLOCK IMAGING INTERNATIONAL	125
GENESIS MEDICAL IMAGING	125
ICS MEDICAL SERVICES	125
INTEGRITY MEDICAL SYSTEMS, INC.	125
JDI SOLUTIONS	126
MAGNASERV	126
MEDICAL IMAGING GROUP	126
MONARCH MEDICAL	126
SANRAD MEDICAL SYSTEMS	126
SMIT MOBILE EQUIPMENT B.V.	127
SOUND IMAGING	127
TOTAL IMAGING CONCEPTS, INC. (TICI)	127
ZETTA MEDICAL TECHNOLOGIES, LLC	127

TOPIC	PAGE NO.
RF TRANSMITTERS	128
COIL MANUFACTURERS	128
CAROLINA MEDICAL PARTS	128
DOTY SCIENTIFIC, INC.	128
INVIVO CORP.	128
LMT MEDICAL SYSTEMS GMBH	129
M2M IMAGING CORP.	129
MACHNET BV	129
MAGMEDIX, INC.	129
MEDRAD, INC.	129
MR INSTRUMENTS, INC.	130
NORAS MRI PRODUCTS GMBH	130
PULSETEQ LTD.	130
RAPID BIOMEDICAL GMBH	130
RESONATE RESEARCH, INC.	131
SCANMED	131
TESLA ENGINEERING, LTD	131
XLR IMAGING	131
MRI CONSUMABLES (CONTRAST AGENTS, IMAGING FILM)	132
BAYER PHARMA	132
BRACCO IMAGING S.P.A.	132
FERRANIA S.P.A	132
GUERBET LLC	132
LANTHEUS MEDICAL IMAGING	133
MALLINCKRODT, INC.	133
METPLAS	133
T2 BIOSYSTEMS, INC	133
LIQUID HELIUM AND NITROGEN	134
AIR LIQUIDE U.S.A	134
MATHESON, INC.	134
LINDE AG	134
PRAXAIR	134
MAGNETS	135
AMERICAN MAGNETICS, INC.	135
ASTER ENTERPRISES	135
OXFORD INSTRUMENTS, INC.	135
SOFTWARE SOLUTIONS FOR MRI	135
TOMTEC IMAGING SYSTEMS GMBH	135
CHAPTER 11 GLOSSARY	137

LIST OF TABLES

TABLE HEADING	PAGE NO.
SUMMARY TABLE PROJECTED GLOBAL MARKET FOR MRI SYSTEMS, BY TYPE, THROUGH 2018 (\$ MILLIONS)	7
TABLE 1 GLOBAL MARKET FOR MRI COILS, THROUGH 2018 (\$ MILLIONS)	14
TABLE 2 PROJECTED GLOBAL MARKET FOR SALES OF MRI CONTRAST MEDIA, THROUGH 2018 (\$ MILLIONS)	18
TABLE 3 BASIC MRI SCAN, BY TYPE, WITH APPLICATION	21
TABLE 4 SPECIALIZED MRI SCAN, BY TYPE, WITH APPLICATION	22
TABLE 5 STRENGTHS/LIMITATIONS OF MRI	26
TABLE 6 TOP 10 COUNTRIES WITH THE LARGEST NUMBER OF MRI UNITS (PER 1,000,000 POPULATION), 2010	28
TABLE 7 ADVANTAGES AND DISADVANTAGES OF COMPETITIVE IMAGING TECHNOLOGIES	30
TABLE 8 SELECTED ACQUISITIONS AND MERGERS IN MRI MARKET, 2008-2013 (\$ MILLIONS)	32
TABLE 9 PROJECTED GLOBAL MARKET FOR MRI SYSTEMS, BY SYSTEM TYPE, THROUGH 2018 (\$ MILLIONS)	35
TABLE 10 PROJECTED GLOBAL MARKET FOR MRI SYSTEMS, BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)	38
TABLE 11 PROJECTED GLOBAL REVENUE FOR LOW- AND MID-FIELD SYSTEMS, BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)	40
TABLE 12 PROJECTED GLOBAL REVENUE FOR HIGH-FIELD SYSTEMS, BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)	41
TABLE 13 PROJECTED GLOBAL REVENUE FOR VERY-HIGH-FIELD SYSTEMS, BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)	42
TABLE 14 PROJECTED GLOBAL REVENUE FOR ULTRAHIGH-FIELD SYSTEMS BY CONFIGURATION, THROUGH 2018 (\$ MILLIONS)	44
TABLE 15 PROJECTED GLOBAL REVENUE FOR SPECIALIZED MAGNET SYSTEMS, BY AREA OF VISUALIZATION, THROUGH 2018 (\$ MILLIONS)	44
TABLE 16 PROJECTED GLOBAL MARKET FOR MRI EQUIPMENT, BY GEOGRAPHIC REGION, THROUGH 2018 (\$ MILLIONS)	49
TABLE 17 PROJECTED AMERICAS MARKET FOR MRI EQUIPMENT BY TYPE, THROUGH 2018 (\$ MILLIONS)	52
TABLE 18 PROJECTED AMERICAS MARKET FOR MRI EQUIPMENT, BY REGION, THROUGH 2018 (\$ MILLIONS)	57
TABLE 19 PROJECTED AMERICAS MARKET FOR MRI EQUIPMENT, BY TYPE AND REGION, THROUGH 2018 (\$ MILLIONS)	59
TABLE 20 PROJECTED EMRA MARKET FOR MRI EQUIPMENT BY TYPE, THROUGH 2018 (\$ MILLIONS)	61
TABLE 21 PROJECTED EMRA MARKET FOR MRI EQUIPMENT, BY REGION, THROUGH 2018 (\$ MILLIONS)	67
TABLE 22 PROJECTED EMRA MARKET FOR MRI EQUIPMENT, BY TYPE AND REGION, THROUGH 2018 (\$ MILLIONS)	69
TABLE 23 PROJECTED ASIAN MARKET FOR MRI EQUIPMENT BY TYPE, THROUGH 2018 (\$ MILLIONS)	71
TABLE 24 PROJECTED ASIAN MARKET FOR MRI EQUIPMENT, BY REGION, THROUGH 2018 (\$ MILLIONS)	75
TABLE 25 PROJECTED ASIAN MARKET FOR MRI EQUIPMENT, BY TYPE AND REGION, THROUGH 2018 (\$ MILLIONS)	77
TABLE 26 SELECTED MRI REGULATORY AGENCIES, BY COUNTRY	79
TABLE 27 SELECTED GLOBAL SAFETY ORGANIZATIONS	82
TABLE 28 REIMBURSEMENT PRACTICES, BY COUNTRY	83

TABLE HEADING	PAGE NO.
TABLE 29 SELECTED LISTING OF RECENTLY GRANTED PATENTS FOR MRI EQUIPMENT, 2008-2013 (\$ MILLIONS)	89
TABLE 30 PATENTS ISSUED BETWEEN JANUARY 2008 AND MAY 2013 BY COMPANY	100
TABLE 31 PATENTS ISSUED TO RESEARCH INSTITUTIONS, UNIVERSITIES, AND FOUNDATIONS FROM JANUARY 2008 TO MAY 2013	101
TABLE 32 PATENTS ISSUED BETWEEN JANUARY 2008 AND MAY 2013 BY PRODUCT TYPE	102
TABLE 33 NUMBER OF PATENTS ISSUED, BY YEAR, FOR MRI EQUIPMENT AND ACCESSORIES, JANUARY 2008-MAY 2013	104

LIST OF FIGURES

FIGURE TITLE	PAGE NO.
SUMMARY FIGURE MRI MARKET, BY GEOGRAPHIC REGION, IN 2013 AND 2018 (%)	8
FIGURE 1 GLOBAL MARKET SHARE, BY TYPE OF IMAGING, 2012 (%)	31
FIGURE 2 GLOBAL MARKET SHARE FOR NEW MRI EQUIPMENT, BY COMPANY, 2012 (%)	33
FIGURE 3 MARKET SHARE, BY TYPE, FOR MRI SYSTEMS, 2013 AND 2018 (%)	35
FIGURE 4 PROJECTED GLOBAL MARKET SHARE FOR MRI SYSTEMS BY CONFIGURATION, 2013 AND 2018 (%)	38
FIGURE 5 MRI MARKET SHARE, BY GEOGRAPHIC REGION, IN 2013 AND 2018 (%)	49
FIGURE 6 MARKET SHARE FOR MRI EQUIPMENT IN THE AMERICAS, 2013 AND 2018 (%)	52
FIGURE 7 AMERICAS MARKET FOR MRI BY REGION, 2013 AND 2018 (%)	58
FIGURE 8 MARKET SHARE FOR MRI SYSTEMS IN EMRA, 2013 AND 2018 (%)	61
FIGURE 9 EMRA MARKET FOR MRI BY REGION, 2013 AND 2018, (%)	68
FIGURE 10 MARKET SHARE FOR MRI EQUIPMENT IN ASIA, 2013 AND 2018 (%)	71
FIGURE 11 ASIAN MARKET FOR MRI BY REGION, 2013 AND 2018 (%)	75
FIGURE 12 PATENT ACTIVITY BETWEEN JANUARY 2008 AND MAY 2013 BY TYPE OF PRODUCT (%)	103
FIGURE 13 MRI EQUIPMENT AND ACCESSORY PATENTS ISSUED BETWEEN 2008 AND 2013 (%)	104