

## 2015 HEALTHCARE RESEARCH REVIEW



HLC068F  
January 2016

Various Analysts  
*Project Analyst*

ISBN: 1-62296-206-0



**BCC Research**  
49 Walnut Park, Building 2  
Wellesley, MA 02481 USA  
866-285-7215 (toll-free within the USA),  
or (+1) 781-489-7301  
[www.bccresearch.com](http://www.bccresearch.com)  
[information@bccresearch.com](mailto:information@bccresearch.com)

## TABLE OF CONTENTS

TOPIC	PAGE NO.
CHAPTER 1 FOREWORD	2
CHAPTER 2 LABORATORY-DEVELOPED TESTING: TECHNOLOGIES AND MARKETS (REPORT HLC179A)	4
INTRODUCTION	4
STUDY GOALS AND OBJECTIVES	4
REASONS FOR DOING THE STUDY	4
SCOPE OF REPORT	4
INTENDED AUDIENCE	5
INFORMATION SOURCES	5
ANALYST'S CREDENTIALS	5
RELATED BCC RESEARCH REPORTS	5
SUMMARY	6
<i>TABLE 1 MARKET FOR U.S. LABORATORY-DEVELOPED TESTS, THROUGH 2019 (\$ MILLIONS)</i>	6
<i>FIGURE 1 MARKET FOR U.S. LABORATORY-DEVELOPED TESTS, 2012-2019 (\$ MILLIONS)</i>	6
KEY TRENDS	7
THE RISE OF FDA REGULATION	7
GENOMIC RAMP-UP	7
DECLINE OF THE ACADEMIC MEDICAL CENTER	7
EVOLUTION OF THE LABORATORY-DEVELOPED TEST (LDT)	7
MOLECULAR DIAGNOSTICS EXPLOSION	7
SHIFTS TOWARD LICENSING AND STARTUP INVESTMENT	8
SLOW DECLINE OF SEROLOGY	8
OVERVIEW: DESCRIPTION OF LABORATORY-DEVELOPED TESTS	8
LIFE CYCLE OF CLINICAL DIAGNOSTIC TESTS	9
<i>TABLE 2 LIFE CYCLE OF CLINICAL DIAGNOSTIC TESTS</i>	10
WHY USE AN LDT	10
COMMON TECHNOLOGIES USED	11
POLYMERASE CHAIN REACTION (PCR)	11
How PCR Works in an LDT	12
NEXT-GENERATION SEQUENCING	14
How NGS Works in LDTs	14
Sequencing by Synthesis	14
Solid Sequencing	15
Semiconductor Sequencing	16
OTHER MOLECULAR TECHNOLOGIES	16
MASS SPECTROMETRY	17
How Mass Spectrophotometry Works in LDTs	17
HPLC-MS	18
MALDI-TOF	18
IMMUNOASSAYS	19
How an Immunoassay Works in an LDT	19
CLINICAL INDICATIONS	21
ONCOLOGY	21

<b>TOPIC</b>	<b>PAGE NO.</b>
INFECTIOUS DISEASE	21
RARE DISEASES	22
MATERNITY	22
CHRONIC DISEASE	23
DIFFERENCES BETWEEN LDTS AND FDA APPROVED TESTS	23
CHAPTER 3 RADIOTHERAPY: TECHNOLOGIES AND GLOBAL MARKETS (REPORT HLC176A)	26
INTRODUCTION	26
STUDY GOALS AND OBJECTIVES	26
REASONS FOR DOING THE STUDY	26
SCOPE OF REPORT	27
INTENDED AUDIENCE	27
RESEARCH METHODOLOGY	28
ANALYST'S CREDENTIALS	28
RELATED BCC RESEARCH REPORTS	28
EXECUTIVE SUMMARY	29
<i>TABLE 3 RADIATION THERAPY MARKET BY TYPE, THROUGH 2019 (\$ MILLIONS)</i>	30
<i>FIGURE 2 RADIATION THERAPY MARKET BY REGION, THROUGH 2019 (\$ MILLIONS)</i>	30
MARKET OVERVIEW	31
INTRODUCTION TO CANCER	32
BENIGN TUMORS	32
MALIGNANT TUMORS	32
Malignant Tumor Categories	32
Carcinomas	32
Sarcomas	32
OTHER TYPES OF CANCER	33
<i>TABLE 4 CHARACTERISTICS OF BENIGN AND MALIGNANT TUMORS</i>	33
CAUSES OF CANCER	33
Internal Factors	33
External Factors	33
CANCER PROTECTIVE FACTORS AND RISK FACTORS	34
<i>TABLE 5 IMPACT OF CANCER PROTECTIVE FACTORS AND CANCER RISK FACTORS ON VARIOUS TYPES OF CANCERS</i>	34
INTRODUCTION TO RADIATION	35
<i>FIGURE 3 TYPES OF RADIATION</i>	35
NON-IONIZING RADIATION	35
IONIZING RADIATION	36
PARTICLE RADIATION	36
Electron Beams	36
Proton Beams	36
Neutron Beams	36
Carbon Ions	37
Alpha and Beta Particles	37
Photon Radiations	37
Gamma Rays	37
X-rays	37
HISTORY OF RADIATION THERAPY	38

<b>TOPIC</b>	<b>PAGE NO.</b>
The Discovery Period	38
Megavoltage Era (1946-1996)	38
Computer-Assisted ERA (1996-2013)	39
<b>MECHANISM OF ACTION</b>	39
CELL GROWTH CYCLE	39
<i>FIGURE 4 CELL GROWTH CYCLE</i>	39
<i>TABLE 6 STEPS INVOLVED IN RADIATION THERAPY</i>	41
RISK MANAGEMENT AND QUALITY ASSURANCE IN RADIATION THERAPY	42
RADIATION THERAPY MARKET SEGMENTATION	42
<i>FIGURE 5 RADIATION THERAPY MARKET SEGMENTATION</i>	42
DRIVERS, RESTRAINTS, OPPORTUNITIES AND TRENDS	43
<i>FIGURE 6 DRIVERS, RESTRAINTS, OPPORTUNITIES AND TRENDS IN THE RADIATION THERAPY MARKET</i>	43
<b>DRIVERS</b>	44
Increasing Incidences of Cancer	44
High Incidence of Cancer in Aging Population	44
<i>FIGURE 7 GLOBAL AGING POPULATION (MILLIONS)</i>	44
<i>FIGURE 8 FACTORS RELATED TO AGING AND THE PROMOTION OF CANCER</i>	45
High Efficiency of Radiotherapy	46
Palliative Radiation Therapy	46
Government Funding	47
Advancement in Technology	47
Reimbursement Boosting Market Growth	47
<b>RESTRAINTS</b>	47
Capital Intensive	47
Lack of Trained Professionals	48
Limited Effectiveness against Metastatic Cancer	48
Side Effects Associated with Radiation Therapy	48
<b>OPPORTUNITY</b>	48
Developing Countries	48
Personalized Treatment	48
<b>TRENDS</b>	49
VMAT	49
Proton Therapy	49
Carbon Ions	50
<b>THREAT</b>	50
Recession Could Restrict the Growth of Radiation Therapy Market	50
<b>MARKET SHARE ANALYSIS</b>	50
<i>FIGURE 9 MARKET SHARE ANALYSIS OF THE RADIATION THERAPY MARKET, 2013 (%)</i>	50
<b>VARIOUS CANCER TREATMENTS</b>	51
<i>TABLE 7 ADVANTAGES AND DISADVANTAGES OF VARIOUS CANCER TREATMENTS</i>	52
STEREOTACTIC RADIOSURGERY (SRS) AND FRACTIONATED STEREOTACTIC RADIATION THERAPY	52
<b>CHAPTER 4 THE MARKET FOR MINIMALLY INVASIVE MEDICAL DEVICES (REPORT HLC051G)</b>	55
MINIMALLY INVASIVE SURGERY	55

<b>TOPIC</b>	<b>PAGE NO.</b>
MINIMALLY INVASIVE SURGERY VERSUS AMBULATORY SURGERY	55
MINIMALLY INVASIVE SURGERY VERSUS NONINVASIVE SURGERY	55
INTRODUCTION	56
STUDY BACKGROUND	56
STUDY GOALS AND OBJECTIVES	56
INTENDED AUDIENCE	57
SCOPE AND FORMAT OF REPORT	57
METHODOLOGY AND INFORMATION SOURCES	58
ANALYST'S CREDENTIALS	58
RELATED BCC RESEARCH REPORTS	59
EXECUTIVE SUMMARY	59
<i>TABLE 8 GLOBAL MARKET FOR MIS DEVICES AND EQUIPMENT, THROUGH 2019 (\$ MILLIONS)</i>	60
<i>FIGURE 10 GLOBAL MARKET FOR MIS DEVICES AND EQUIPMENT, 2013-2019 (\$ MILLIONS)</i>	60
GENERAL DESCRIPTION	61
HISTORY OF MINIMALLY INVASIVE SURGERY	61
ENDOSCOPY	62
INSUFFLATION	63
SPECIALIZED SURGICAL INSTRUMENTS	64
MINIMALLY INVASIVE SURGICAL PROCEDURES	64
SURGICAL ROBOTICS	65
MEDICAL LASERS	66
SURGICAL TRENDS AND THE GROWING IMPORTANCE OF MINIMALLY INVASIVE SURGERY	66
<i>FIGURE 11 MIS PROCEDURES AS A PERCENTAGE OF ALL SURGICAL PROCEDURES PERFORMED IN THE U.S., 2013 (%)</i>	66
<i>FIGURE 12 MIS PROCEDURES AS A PERCENTAGE OF SELECTED TYPES OF SURGICAL MEASURES IN THE U.S., 2013</i>	67
PRINCIPAL APPLICATIONS OF MINIMALLY INVASIVE SURGERY	69
<i>FIGURE 13 SURGICAL PROCEDURES PERFORMED IN THE U.S. USING ALL MIS APPROACHES, 2013 (% OF ALL MIS PROCEDURES)</i>	70
<i>TABLE 9 SURGICAL PROCEDURES COMMONLY PERFORMED IN THE U.S. USING A MINIMALLY INVASIVE APPROACH, 2013</i>	71
GASTROINTESTINAL SURGERY	72
Gallbladder Removal (Cholecystectomy)	72
Nissen Fundoplication	73
Adhesiolysis (Removal of Abdominal Scar Tissue)	73
Gastric Bypass	74
Appendectomy	74
Colon Resection	75
Hernia Repair	75
GYNECOLOGY	76
Hysterectomy	76
Myomectomy	77
Endometrial Ablation	77
Pelvic Floor Reconstruction	78
Adnexectomy (Removal of Adnexal Structures)	78
UROLOGY	79

<b>TOPIC</b>	<b>PAGE NO.</b>
Nephrectomy	79
Cystocele/Rectocele Repair	79
Pediatric Urology	80
Adrenalectomy	81
Radical Prostatectomy	82
<b>COSMETIC SURGERY</b>	82
Breast Augmentation	82
Face and Forehead Lifts	83
<b>THORACIC SURGERY</b>	83
Lung Biopsy	83
Lung Resection	84
Endoscopic Thoracic Sympathectomy	84
<b>CARDIOTHORACIC SURGERY</b>	84
Angioplasty and Other Catheterization Types	85
Coronary Artery Bypass	86
Heart Valve Repair and Replacement	86
Congenital Heart Defect Surgery	87
<b>NONCARDIAC VASCULAR INTERVENTIONAL SURGERY</b>	87
Saphenous Vein Harvest	87
Peripheral Vascular Bypass	87
Aortoiliofemoral Bypass	88
Abdominal Aortic Aneurism Repair	88
Lower Extremity Angioplasty	88
<b>ORTHOPEDIC SURGERY</b>	89
Joint Surgery	89
Arthroscopic Surgery	89
Arthroplasty	90
Damaged or Diseased Spinal Disk Surgery	90
Microendoscopic Discectomy	90
Intradiskal Electrothermal Annuloplasty	90
Vertebroplasty and Kyphoplasty	91
<b>PRODUCT TYPES</b>	91
<b>MONITORING/VISUALIZATION EQUIPMENT</b>	92
<i>TABLE 10 PRINCIPAL TYPES OF MONITORING/VISUALIZATION EQUIPMENT</i>	92
<b>ROBOTICALLY ASSISTED SURGICAL SYSTEMS</b>	94
<i>TABLE 11 PRINCIPAL TYPES OF SURGICAL ROBOTIC SYSTEMS</i>	94
<b>ELECTROSURGICAL EQUIPMENT</b>	95
<i>TABLE 12 ELECTROSURGICAL EQUIPMENT</i>	96
<b>MECHANICAL INSTRUMENTS</b>	97
<i>TABLE 13 PRINCIPAL TYPES OF MECHANICAL INSTRUMENTS</i>	97
<b>AUXILIARY EQUIPMENT</b>	98
<i>TABLE 14 PRINCIPAL TYPES OF AUXILIARY EQUIPMENT USED FOR MINIMALLY INVASIVE SURGERY</i>	98
<b>SURGICAL DEVICES</b>	98
<i>TABLE 15 MINIMALLY INVASIVE SURGICAL DEVICES</i>	99
<b>REGULATORY STATUS OF MIS EQUIPMENT</b>	99
UNITED STATES	99
EUROPEAN UNION (EU)	102

<b>TOPIC</b>	<b>PAGE NO.</b>
JAPAN	104
OTHER COUNTRIES	104
Canada	104
China	105
India	106
Latin American Nations	106
Saudi Arabia	106
END-USER SEGMENTS	107
HOSPITAL SURGICAL DEPARTMENTS	107
<i>FIGURE 14 U.S. HOSPITALS WITH SURGERY DEPARTMENTS, 2013 (NUMBER OF HOSPITALS)</i>	107
OUTPATIENT SURGERY CENTERS	108
GROUP PRACTICES	108
INDIVIDUAL SURGEONS	108
<i>FIGURE 15 U.S. SURGICAL SPECIALTIES, 2013 (% OF ALL U.S. SURGEONS)</i>	108
MEDICAL SCHOOLS	109
CHAPTER 5 DISPOSABLE MEDICAL SENSORS: TECHNOLOGIES AND GLOBAL MARKETS (REPORT HLC182A)	111
INTRODUCTION	111
STUDY OBJECTIVES	111
SCOPE OF THE REPORT	111
MARKET STRUCTURE	112
INTENDED AUDIENCE	112
RESEARCH METHODOLOGY	112
ANALYST'S CREDENTIALS	112
RELATED BCC RESEARCH REPORTS	113
EXECUTIVE SUMMARY	113
<i>TABLE 16 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY REGION, THROUGH 2019 (\$ MILLIONS)</i>	113
<i>FIGURE 16 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY REGION, 2013-2019 (\$ MILLIONS)</i>	114
MARKET OVERVIEW	114
<i>TABLE 17 EVOLUTION OF MEMS IN THE HEALTHCARE SECTOR</i>	115
TYPES OF SENSORS	115
<i>FIGURE 17 TYPES OF SENSORS</i>	115
MARKET SEGMENTATION	116
KEY MARKET TRENDS	116
<i>FIGURE 18 SEGMENTATION OF BIOSENSORS</i>	116
<i>FIGURE 19 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY PRODUCT, 2013 (\$ MILLIONS)</i>	117
<i>FIGURE 20 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY TYPE, 2013 (\$ MILLIONS)</i>	117
<i>FIGURE 21 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY APPLICATION, 2013 (\$ MILLIONS)</i>	118
<i>FIGURE 22 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY REGION, 2013-2019 (\$ MILLIONS)</i>	118
MARKET DYNAMICS	119
DRIVERS	119

<b>TOPIC</b>	<b>PAGE NO.</b>
Growing Number of People Affected by Target Diseases	119
Cardiovascular Diseases	119
Cancer	120
<i>TABLE 18 CANCER INCIDENCES, 2008 AND 2015 (MILLIONS)</i>	120
Diabetes	120
<i>FIGURE 23 DIABETES PREVALENCE IN TOP 10 COUNTRIES FOR AGES 20 TO 79 YEARS, 2013 (MILLIONS)</i>	121
<i>FIGURE 24 GLOBAL DIABETES PREVALENCE BY REGION, 2013 AND 2035 (MILLIONS)</i>	121
<i>TABLE 19 NORTH AMERICA DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)</i>	123
<i>TABLE 20 EUROPEAN DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)</i>	123
<i>TABLE 21 ASIA-PACIFIC DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)</i>	123
<i>TABLE 22 LATIN AMERICAN DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)</i>	124
<i>TABLE 23 MENA DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)</i>	124
<i>TABLE 24 CIS DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)</i>	125
Deafness and Hearing Loss Disorders	125
<i>FIGURE 25 ESTIMATED PERCENTAGE INCREASE IN NUMBER OF PERSONS (65 YEARS AND OLDER) WITH HEARING LOSS BY REGION, 2010-2020 (%)</i>	125
Kidney Diseases	126
Chronic Pulmonary Diseases	127
Increasing Life Expectancy Triggering Incidence Rates of Target Diseases	127
<i>FIGURE 26 GLOBAL PERCENTAGE A PERSON'S SUSCEPTIBILITY TO CHRONIC DISEASES BY AGE GROUP, 2000 AND 2015 (%)</i>	127
RESTRAINTS	129
Lack of Standardization for Testing, Stringent Regulations and Reimbursement Policies for MEMS-based Sensors	129
OPPORTUNITIES	129
Technological Advances in MEMS Technology	129
Implantable MEMS-Based Sensors	130
<i>TABLE 25 IMPLANTABLE SENSORS</i>	130
MARKET STRATEGIES	130
INCREASE INVESTMENTS IN R&D	130
Opportunities in Emerging Economies	131
High Investment Costs Associated with MEMS-Based Devices	131
COMPETITIVE LANDSCAPE	131
<i>FIGURE 27 GLOBAL MARKET SHARE FOR DISPOSABLE MEDICAL SENSORS BY COMPANY, 2013* (%)</i>	131
REGULATIONS	133
UNITED STATES	133
EUROPEAN UNION	134
CHINA	135
<i>FIGURE 28 APPROVAL PROCESS OF CHINA SFDA REGULATORY BODY INVOLVED IN DISPOSABLE MEDICAL SENSORS</i>	135
INNOVATIONS IN TECHNOLOGY	136
TATTOO SENSORS	136
PATCH SENSORS	136
SLEEP STRIPS	137



<b>TOPIC</b>	<b>PAGE NO.</b>
<i>CANCER-TRACKING IMPLANTABLE SENSORS</i>	137
DISPOSABLE HBA1C SENSORS	137
MEMS PRESSURE SENSORS	137
NANOELECTROMECHANICAL SYSTEMS (NEMS): A FUTURE TECHNOLOGY	138
INNOVATIVE DISPOSABLE SENSORS	138
CURRENT TRENDS	139
ADVANTAGE TO MANUFACTURERS OF DISPOSABLE WIRELESS SENSORS	140
DISPOSABLE MEDICAL SENSORS MARKET SET TO GROW	140
<b>CHAPTER 6 HEALTH SELF-MONITORING: TECHNOLOGIES AND GLOBAL MARKET (REPORT HLC185A)</b>	<b>144</b>
INTRODUCTION	144
STUDY BACKGROUND	144
GOALS AND OBJECTIVES	144
INTENDED AUDIENCE	145
SCOPE AND FORMAT	145
METHODOLOGY	146
ANALYSTS' CREDENTIALS	146
RELATED BCC RESEARCH REPORTS	147
EXECUTIVE SUMMARY	147
<i>TABLE 26 GLOBAL MARKET FOR SELECTED HEALTH SELF-MONITORING TECHNOLOGIES, THROUGH 2019 (\$ MILLIONS)</i>	148
<i>FIGURE 29 GLOBAL MARKET FOR SELECTED HEALTH SELF-MONITORING TECHNOLOGIES, 2013-2019 (\$ MILLIONS)</i>	148
DEFINITIONS	149
DIGITAL VS. ANALOG MONITORING TECHNOLOGIES	149
<i>MOBILE VS. PORTABLE MONITORING TECHNOLOGIES</i>	149
SELF-TESTING VS. SELF-MONITORING	149
HEALTH VS. SPORTS AND FITNESS MONITORING	149
ENABLING TECHNOLOGIES	150
SMARTPHONES	150
ENHANCED DATA PROCESSING CAPABILITIES	151
SENSORS	151
MEMS Sensors	151
PFOE Sensors	152
GEOSPATIAL TRACKING	152
SMART TEXTILES FOR WEARABLE SENSORS	152
NETWORKING TECHNOLOGIES	153
Bluetooth	153
ANT+	153
ZigBee	154
Near-Field Communications	154
Human Area Networks	154
Cellular Communications	155
Wi-Fi	155
CLOUD SERVICES	155
MARKET SEGMENTS	156
TECHNOLOGIES	156

<b>TOPIC</b>	<b>PAGE NO.</b>
Platforms	156
Hubs	156
<i>FIGURE 30 SELF-MONITORING HUB (SCHEMATIC)</i>	157
Peripherals	157
Software	158
APPLICATIONS	158
Fitness, Wellness and Prevention	158
Fertility and Reproductive Health	158
Chronic Disease Management	159
Post-Acute Care and Rehabilitation	160
Aging at Home	161
Mental Health	162
PURCHASERS/PAYERS	163
Consumers	163
Employers	163
Hospitals/Healthcare Providers	164
Insurers	165
Private Insurers	165
Medicare and Medicaid	166
MARKET SUMMARY	166
<i>FIGURE 31 GLOBAL MARKET FOR HEALTH SELF-MONITORING TECHNOLOGIES, 2013-2019 (\$ MILLIONS)</i>	167
<i>TABLE 27 GLOBAL MARKET FOR HEALTH SELF-MONITORING TECHNOLOGIES BY TYPE OF TECHNOLOGY, THROUGH 2019 (\$ MILLIONS)</i>	167
<i>FIGURE 32 GLOBAL MARKET FOR HEALTH SELF-MONITORING TECHNOLOGIES BY REGION, 2013-2019 (\$ MILLIONS)</i>	168
CHAPTER 7 OPHTHALMIC DEVICES: TECHNOLOGIES AND GLOBAL MARKETS (REPORT HLC173A)	171
INTRODUCTION	171
STUDY GOALS AND OBJECTIVES	171
REASONS FOR DOING THE REPORT	171
SCOPE OF REPORT	172
INTENDED AUDIENCE	172
METHODOLOGY AND INFORMATION SOURCES	172
ANALYSTS' CREDENTIALS	172
RELATED BCC RESEARCH REPORTS	173
SUMMARY	173
<i>TABLE 28 GLOBAL OPHTHALMIC DEVICE MARKET BY REGION, THROUGH 2019 (\$ MILLIONS)</i>	174
<i>FIGURE 33 GLOBAL OPHTHALMIC DEVICE MARKET BY REGION, 2013-2019 (\$ MILLIONS)</i>	174
INTRODUCTION TO THE HUMAN EYE	175
<i>FIGURE 34 STRUCTURE OF THE EYE</i>	175
EYE CONDITIONS AND THE ADDRESSABLE POPULATION	176
CATARACTS	176
Cataract Prevalence	176
<i>FIGURE 35 PREVALENCE OF CATARACTS IN THE UNITED STATES, 2000-2050 (MILLIONS)</i>	177

<b>TOPIC</b>	<b>PAGE NO.</b>
Cataract Treatment	177
GLAUCOMA	178
Prevalence of Glaucoma	179
<i>FIGURE 36 PREVALENCE OF GLAUCOMA IN THE UNITED STATES, 2000-2050 (MILLIONS)</i>	179
Treatment and Monitoring	180
New Surgical Glaucoma Treatments	181
DIABETIC RETINOPATHY	182
Prevalence of Diabetic Retinopathy	182
<i>TABLE 29 PREVALENCE OF DIABETIC RETINOPATHY BY REGION (%)</i>	183
Treatment and Monitoring	183
AGE-RELATED MACULAR DEGENERATION	184
Prevalence of AMD	185
<i>FIGURE 37 PREVALENCE OF AGE-RELATED MACULAR DEGENERATION IN THE UNITED STATES, 2000-2050 (MILLIONS)</i>	185
Diagnosis and Treatment of AMD	186
REFRACTIVE DISORDERS	186
Prevalence of Refractive Disorders	187
<i>FIGURE 38 PREVALENCE OF MYOPIA AND HYPEROPIC IN THE UNITED STATES, 2000-2050 (MILLIONS)</i>	188
Diagnosis and Treatment of Refractive Disorders	188

**LIST OF TABLES**

<b>TABLE HEADING</b>	<b>PAGE NO.</b>
TABLE 1 MARKET FOR U.S. LABORATORY-DEVELOPED TESTS, THROUGH 2019 (\$ MILLIONS)	6
TABLE 2 LIFE CYCLE OF CLINICAL DIAGNOSTIC TESTS	10
TABLE 3 RADIATION THERAPY MARKET BY TYPE, THROUGH 2019 (\$ MILLIONS)	30
TABLE 4 CHARACTERISTICS OF BENIGN AND MALIGNANT TUMORS	33
TABLE 5 IMPACT OF CANCER PROTECTIVE FACTORS AND CANCER RISK FACTORS ON VARIOUS TYPES OF CANCERS	34
TABLE 6 STEPS INVOLVED IN RADIATION THERAPY	41
TABLE 7 ADVANTAGES AND DISADVANTAGES OF VARIOUS CANCER TREATMENTS	52
TABLE 8 GLOBAL MARKET FOR MIS DEVICES AND EQUIPMENT, THROUGH 2019 (\$ MILLIONS)	60
TABLE 9 SURGICAL PROCEDURES COMMONLY PERFORMED IN THE U.S. USING A MINIMALLY INVASIVE APPROACH, 2013	71
TABLE 10 PRINCIPAL TYPES OF MONITORING/VISUALIZATION EQUIPMENT	92
TABLE 11 PRINCIPAL TYPES OF SURGICAL ROBOTIC SYSTEMS	94
TABLE 12 ELECTROSURGICAL EQUIPMENT	96
TABLE 13 PRINCIPAL TYPES OF MECHANICAL INSTRUMENTS	97
TABLE 14 PRINCIPAL TYPES OF AUXILIARY EQUIPMENT USED FOR MINIMALLY INVASIVE SURGERY	98
TABLE 15 MINIMALLY INVASIVE SURGICAL DEVICES	99
TABLE 16 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY REGION, THROUGH 2019 (\$ MILLIONS)	113
TABLE 17 EVOLUTION OF MEMS IN THE HEALTHCARE SECTOR	115
TABLE 18 CANCER INCIDENCES, 2008 AND 2015 (MILLIONS)	120
TABLE 19 NORTH AMERICA DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)	123
TABLE 20 EUROPEAN DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)	123
TABLE 21 ASIA-PACIFIC DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)	123
TABLE 22 LATIN AMERICAN DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)	124
TABLE 23 MENA DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)	124
TABLE 24 CIS DIABETES PREVALENCE BY COUNTRY, 2013 AND 2035 (%)	125
TABLE 25 IMPLANTABLE SENSORS	130
TABLE 26 GLOBAL MARKET FOR SELECTED HEALTH SELF-MONITORING TECHNOLOGIES, THROUGH 2019 (\$ MILLIONS)	148
TABLE 27 GLOBAL MARKET FOR HEALTH SELF-MONITORING TECHNOLOGIES BY TYPE OF TECHNOLOGY, THROUGH 2019 (\$ MILLIONS)	167
TABLE 28 GLOBAL OPHTHALMIC DEVICE MARKET BY REGION, THROUGH 2019 (\$ MILLIONS)	174
TABLE 29 PREVALENCE OF DIABETIC RETINOPATHY BY REGION (%)	183

**LIST OF FIGURES**

<b>FIGURE TITLE</b>	<b>PAGE NO.</b>
FIGURE 1 MARKET FOR U.S. LABORATORY-DEVELOPED TESTS, 2012-2019 (\$ MILLIONS)	6
FIGURE 2 RADIATION THERAPY MARKET BY REGION, THROUGH 2019 (\$ MILLIONS)	30
FIGURE 3 TYPES OF RADIATION	35
FIGURE 4 CELL GROWTH CYCLE	39
FIGURE 5 RADIATION THERAPY MARKET SEGMENTATION	42
FIGURE 6 DRIVERS, RESTRAINTS, OPPORTUNITIES AND TRENDS IN THE RADIATION THERAPY MARKET	43
FIGURE 7 GLOBAL AGING POPULATION (MILLIONS)	44
FIGURE 8 FACTORS RELATED TO AGING AND THE PROMOTION OF CANCER	45
FIGURE 9 MARKET SHARE ANALYSIS OF THE RADIATION THERAPY MARKET, 2013 (%)	50
FIGURE 10 GLOBAL MARKET FOR MIS DEVICES AND EQUIPMENT, 2013-2019 (\$ MILLIONS)	60
FIGURE 11 MIS PROCEDURES AS A PERCENTAGE OF ALL SURGICAL PROCEDURES PERFORMED IN THE U.S., 2013 (%)	66
FIGURE 12 MIS PROCEDURES AS A PERCENTAGE OF SELECTED TYPES OF SURGICAL MEASURES IN THE U.S., 2013	67
FIGURE 13 SURGICAL PROCEDURES PERFORMED IN THE U.S. USING ALL MIS APPROACHES, 2013 (% OF ALL MIS PROCEDURES)	70
FIGURE 14 U.S. HOSPITALS WITH SURGERY DEPARTMENTS, 2013 (NUMBER OF HOSPITALS)	107
FIGURE 15 U.S. SURGICAL SPECIALTIES, 2013 (% OF ALL U.S. SURGEONS)	108
FIGURE 16 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY REGION, 2013-2019 (\$ MILLIONS)	114
FIGURE 17 TYPES OF SENSORS	115
FIGURE 18 SEGMENTATION OF BIOSENSORS	116
FIGURE 19 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY PRODUCT, 2013 (\$ MILLIONS)	117
FIGURE 20 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY TYPE, 2013 (\$ MILLIONS)	117
FIGURE 21 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY APPLICATION, 2013 (\$ MILLIONS)	118
FIGURE 22 GLOBAL MARKET FOR DISPOSABLE MEDICAL SENSORS BY REGION, 2013-2019 (\$ MILLIONS)	118
FIGURE 23 DIABETES PREVALENCE IN TOP 10 COUNTRIES FOR AGES 20 TO 79 YEARS, 2013 (MILLIONS)	121
FIGURE 24 GLOBAL DIABETES PREVALENCE BY REGION, 2013 AND 2035 (MILLIONS)	121
FIGURE 25 ESTIMATED PERCENTAGE INCREASE IN NUMBER OF PERSONS (65 YEARS AND OLDER) WITH HEARING LOSS BY REGION, 2010-2020 (%)	125
FIGURE 26 GLOBAL PERCENTAGE A PERSON'S SUSCEPTIBILITY TO CHRONIC DISEASES BY AGE GROUP, 2000 AND 2015 (%)	127
FIGURE 27 GLOBAL MARKET SHARE FOR DISPOSABLE MEDICAL SENSORS BY COMPANY, 2013* (%)	131
FIGURE 28 APPROVAL PROCESS OF CHINA SFDA REGULATORY BODY INVOLVED IN DISPOSABLE MEDICAL SENSORS	135
FIGURE 29 GLOBAL MARKET FOR SELECTED HEALTH SELF-MONITORING TECHNOLOGIES, 2013-2019 (\$ MILLIONS)	148
FIGURE 30 SELF-MONITORING HUB (SCHEMATIC)	157
FIGURE 31 GLOBAL MARKET FOR HEALTH SELF-MONITORING TECHNOLOGIES, 2013-2019 (\$ MILLIONS)	167

<b>FIGURE TITLE</b>	<b>PAGE NO.</b>
FIGURE 32 GLOBAL MARKET FOR HEALTH SELF-MONITORING TECHNOLOGIES BY REGION, 2013-2019 (\$ MILLIONS)	168
FIGURE 33 GLOBAL OPHTHALMIC DEVICE MARKET BY REGION, 2013-2019 (\$ MILLIONS)	174
FIGURE 34 STRUCTURE OF THE EYE	175
FIGURE 35 PREVALENCE OF CATARACTS IN THE UNITED STATES, 2000-2050 (MILLIONS)	177
FIGURE 36 PREVALENCE OF GLAUCOMA IN THE UNITED STATES, 2000-2050 (MILLIONS)	179
FIGURE 37 PREVALENCE OF AGE-RELATED MACULAR DEGENERATION IN THE UNITED STATES, 2000-2050 (MILLIONS)	185
FIGURE 38 PREVALENCE OF MYOPIA AND HYPEROPIC IN THE UNITED STATES, 2000-2050 (MILLIONS)	188