



Medication Adherence:

*Technologies and Global
Markets*

November 2017

Dr. Ritu Thakur Dangi

Report Code: HLC069D

Table of Contents

- Chapter 1: Introduction 1**
- Study Goals and Objectives..... 1
- Reasons for Doing This Study..... 2
- Scope of Report..... 3
- Information Sources..... 3
- Methodology and Information Sources..... 4
- Geographic Breakdown..... 4
- Analyst's Credentials..... 8
- Related BCC Research Reports..... 8

- Chapter 2: Summary and Highlights..... 10**

- Chapter 3: Target Diseases and Disorders 16**
- Cardiovascular Diseases (CVD)..... 16
 - Angina Pectoris..... 16
 - Stroke 17
 - Hypertension 18
- Musculoskeletal Disorders..... 20
 - Epidemiology and Economic Burden..... 20
 - Mortality..... 22
- Gastrointestinal/Digestive Diseases 24
 - Epidemiology and Economic Burden..... 24
 - Mortality..... 24
- Common Gastrointestinal Diseases and Disorders..... 25
 - Inflammatory Bowel Disease (IBD)..... 25
 - Ulcer Disease 26
 - Esophagitis/Esophageal Diseases..... 27
 - Gastroesophageal Reflux Disease (GERD) 27
 - Obscure Gastrointestinal Bleeding..... 28
 - Celiac Disease 29
 - Breast Cancer 29
 - Colorectal Cancer 32
 - Small-bowel Tumors/Diseases 37
 - HIV/AIDS..... 37
 - Asthma and Chronic Obstructive Pulmonary Disease (COPD) 38
 - Diabetes..... 39
 - Disease Symptoms and Risk Factors 40
 - Obesity 42

- Chapter 4: Medication Non-adherence 49**
- Medication Non-adherence..... 49
- Medication Non-adherence Categories..... 49
- Economic Burden/Cost of Medication Non-adherence..... 50
- Measurement of Adherence..... 51
- Cost-related Non-adherence 51
- Medication Adherence and Non-economic Factors 51
- Cost and Morbidity in Chronic Disease Medication Non-adherence..... 51

Methods to Improve Medication Adherence	52
Traditional Digital Reminders	52
User Counseling and Behavioral Interventions	52
Medication Adherence and Smartphones	53
Effectiveness of Smartphone Adherence Apps	53
Other General Guidelines to Improve Adherence	53
Future Developments	54
Chapter 5: Medication Adherence Systems	56
Medication Non-adherence	56
Hardware-centric Medication Adherence Systems	56
Type of Medication Adherence Systems	56
Smart Pill Bottles	57
Automated Pill Dispensers	57
Electronic Trays	57
Smart Caps	58
Smart Pills	58
Other Adherence Devices and Solutions	58
Key Marketed and Pipeline Products	58
Omnicell VBM 200F	58
Omnicell XT Automated Medication Dispensing Cabinets	59
OmniRx Automated Medication Dispensing Cabinets	59
Robot-Rx Medication Dispensing Solution	59
AcuDose-Rx Automated Medication Dispensing Cabinets	59
Didit	59
DoseCue Containers	60
Med-IC Electronic Compliance Monitor	60
eCAP Information Mediary Corp.'s eCAP is a smart bottle designed for senior patients. It is child-resistant and can dispense solid or liquid doses. It can be read and accessed using a smart device.....	60
Med-IC eDiary	60
ePill Automatic Medication Dispensers and Pill Boxes	60
ID-Capsule	61
iRemember	62
Vitality GlowCap	62
MedCenter Monthly Pill Organizer	62
Med-E-Lert Reminder and Dispenser	62
MedMinder Pill Dispensers	62
MedStart Connect	63
CleverCap	63
Kraken Medication Monitoring System	64
Propeller	64
Medimi Dispenser	64
Medimi Smart	64
Medication Dispensing Systems (from Manrex Ltd.)	65
Silent Knight, Calm-Press, Powdercrush (from Manrex Ltd.)	65
Electronic Medication Management Assistant	65
Smart Pill Bottles	66
Nomi	66
PillStation	67
MedaCheck Medication Management	67
TalkingRx	67

Take-n-Slide dose tracker.....	67
Talking Pill Reminder.....	67
Target Prescription Bottle.....	67
Tel-Rx.....	68
Timex 2.....	68
Smartinjector.....	68
TowerView Pillbox.....	69
Proteus Patch.....	69
Abilify Smart Pill.....	70
Smart Pill (Novartis Drugs + Proteus Ingestible Sensor).....	70
IntelliCap.....	71
Novartis Robotic Pill.....	71
Novartis Smart Pill).....	71
uBox.....	72
Reminder Rosie.....	72
PillBill.....	72
Livi.....	73
PreciseMeds Personal Pill Dispenser.....	73
PillTime Medical Adherence Device.....	73
Pillpresso.....	74
MODO Pill Dispenser.....	74
CapsulePen.....	74
Smartinhaler.....	74
PillDrill Smart Medication Tracking.....	75
Rowa Dose System.....	75
Inspiration 626.....	75
PillsyCap.....	75
Biodose System.....	75
SentryPal Mobile Medical Alert Systems.....	76
Medication Management Systems.....	76
HealthAssist Watch.....	76
RxPense Home Medication Dispenser.....	76
SimpleMedRx.....	76
Challenges to Improving Medication Adherence with Technology.....	77
Future Developments.....	77
Chapter 6: Software Applications.....	79
Medication Adherence and Software Applications.....	79
Types of Software and Internet Applications.....	79
Mobile and Digital Applications.....	79
Internet Web Portals and Platforms.....	79
Communications Solutions.....	79
Big Data Solutions.....	80
Other Tools.....	80
Advantages of Software and Mobile Applications.....	80
Interconnectivity of Adherence Apps.....	81
Effectiveness of Smartphone Adherence Apps.....	81
Key Marketed and R&D Pipeline Products.....	81
Software and Support Applications.....	81
Glooko Remote Patient Monitoring Platform.....	81
Diasend Clinic.....	82

Diasend Personal.....	82
Memotext.....	82
HealthPrize Action Engine.....	82
Omada.....	82
DoseCue Services (from DoseCue LLC).....	83
CertiScan.....	83
Quand Medication Compliance Software.....	84
HealthAssist.....	84
AirStrip ONE.....	84
AirStrip Accelerator Services.....	84
Patient Advisor.....	85
RxAdvance Platform.....	85
Pega Care Management.....	85
StarWellness (Med Sync).....	86
MTM Assist.....	86
PrescribeMedicare.....	86
MedAdvisor.....	86
Healthnotes App.....	86
Rx&You.....	86
Mango Health.....	87
Know My Meds.....	87
Patient list and reminder system.....	87
PillFill.....	87
PatientPartner.....	87
MedPal.....	87
PillCast.....	88
Monitor My Meds.....	88
RxNetwork.....	88
Adherence.....	88
eNURZ.....	88
Mscripts.....	88
MobiDawa.....	89
SafeText.....	89
Quantified Medicine.....	89
MedaCheck.....	89
Care Management Workflow Framework.....	89
Health Saathi.....	90
MedSync-Rx.....	90
RXShare.....	90
TrackMyStack.....	91
OATBook.....	91
Pocket Pill.....	91
Healthera.....	91
OpiSafe.....	91
CuePath.....	92
Medicyne.....	92
Plan-it Med.....	92
eCareCoordinator Platform.....	93
Care4today Mobile Health Manager.....	93
AiCure.....	93
Nightingale.....	93

PatientPartner app	93
RxAnte	94
My Medication 2Comply	94
Empower	94
CareSpeak text messaging platform.....	94
CellepathicRx	95
Dosecast	95
CloudMetRx.....	95
iPharmacy and PACE Health Connect apps	96
MedCoach	96
MedHelper App	96
PillBoxie	96
Pillmanager.....	97
Pill Monitor Pro	97
RxCase Minder.....	98
VirtusaPolaris'.....	98
MyMeds.....	98
Meds IQ	98
MedSimple	98
MediMemory.....	99
RxmindMe	99
MyMedSchedule	99
Current Challenges.....	99
Future Developments	100
Chapter 7: Market Size and Growth Analysis	102
Market Size and Growth Analysis	102
Market Size and Growth Analysis by Region.....	102
Market Size and Growth Analysis by Segments	103
Market Size and Growth Analysis by Diseases Application.....	105
Market Growth Drivers and Restraints.....	106
Market Growth Drivers	106
Market Restraints.....	109
Chapter 8: Competitive Landscape in Medication Adherence Market	111
Competitive Landscape in Medication Adherence Market	111
Chapter 9: Market Strategy.....	115
Mergers and Acquisitions in the Medication Adherence Market.....	115
Recent Mergers and Acquisitions	115
Omniceil Acquires Ateb	115
MedAdvisor Ltd. Acquires Health Enterprises 2 Pty Ltd. (Healthnotes)	115
Omniceil Acquires Aesynt.....	115
Teva Pharmaceuticals Acquires Gecko Health Innovations	116
Becton Dickinson Acquires CareFusion	116
Omniceil Acquires Surgichem.....	117
RxAdvance Acquires SentiCare.....	117
Omniceil Acquires MTS Medication Technologies	117
Philips Acquires Interactive Medical Developments.....	117
Omniceil Acquires Rioux Vision	117
Emerson Electronic Acquires medDispense	117

Future Strategic Landscape.....	117
Chapter 10: Regulatory Structure	119
Regulatory Background.....	119
Regulatory Systems for Drug/Device Combination Products	119
Regulatory Systems for Medical Devices	120
U.S.	120
European Union.....	123
Japan.....	125
Other Asian Countries	125
U.S. FDA Technical Considerations.....	126
FDA Policy for Low-risk and General Wellness Devices	127
FDA Recalls and Safety Alerts.....	127
Regulatory Systems for Medication Adherence Systems and Applications	127
Medication Adherence Systems.....	127
Smart Pills.....	128
Old Drug, New Medical Device.....	128
Old Drug, Old Medical Device	129
New Drug, Old Medical Device.....	130
New Drug, New Medical Device	130
Medication Adherence Software Applications.....	130
Chapter 11: Pricing and Reimbursement: Medical Devices	133
U.S.....	133
Health Insurance Portability and Accountability Act	133
Europe.....	133
Japan	134
Other Asian Countries	134
Chapter 12: Conclusions – Outlook for Medication Adherence.....	136
Major Developments Influencing the Market	136
Technological Developments	136
Social Developments: Social Media and Rise of Smartphone Use.....	137
Demographic and Economic Trends: Income Growth in Developing Markets	137
Long-term Outlook for Medication Adherence Systems	139
Chapter 13: Company Profiles	142
Appendix A: Acronyms.....	172
Appendix B: Professional Organizations.....	175
American Association for Cancer Research (AACR)	175
American Heart Association.....	175
American Society for Gastrointestinal Endoscopy (ASGE).....	175
Center for Drug Evaluation and Research (CDER).....	175
Center for Devices and Radiological Health (CDRH)	175
Center for Medicare and Medicaid Services (CMS)	176
European Databank for Medical Devices (EUDAMED)	176
Food and Drug Administration (FDA).....	176
Global Cancer Foundation	176
Hormone Foundation.....	177
International Diabetes Federation.....	177

International Federation of Pharmaceutical Manufacturers & Associations (IFPMA)	177
New England Healthcare Institute (NEHI).....	177
National Center for Biotechnology Information (NCBI).....	177
National Institute of Aging (NIA).....	178
Pharmaceuticals and Medical Devices Agency (PMDA).....	178
World Cancer Research Fund International.....	178
World Health Organization (WHO)	178
About BCC Research.....	179
About BCC Research.....	180
BCC Membership	180
BCC Custom Research	180

List of Tables

Summary Table: Global Market for Medication Adherence, by Region, Through 2021 (\$ Millions)	10
Table 1 Global Prevalence of Angina Pectoris and Stroke (Survivors), Through 2030 (Thousands).....	16
Table 2 Global Incidence of Congestive Heart Failure and Stroke, Through 2030 (Thousands).....	18
Table 3 Global Incidence of Hypertension, by Patient Group, 2015 (% of Total Patients)	19
Table 4 Global Symptomatic Prevalence of Key Musculoskeletal Disorders, Through 2021 (Thousands)	22
Table 5 Global Deaths by Various Musculoskeletal Disorders, Through 2030 (No.)	23
Table 6 Global Deaths from Digestive Diseases, by Region, Through 2021 (Thousands).....	24
Table 7 Global Prevalence of Breast Cancer, by Region, Through 2021 (Millions).....	31
Table 8 Global Epidemiology of Colon Cancer, by Region, Through 2030 (Thousands)	33
Table 9 Global Deaths, by Various Cancer Types, Through 2030 (Thousands).....	34
Table 10 Global Deaths, by Various Cancer Types, 2015 (% of Total Deaths Due to Cancer)	35
Table 11 Global Diabetes Types (% of Total Diabetes)	40
Table 12 Global Prevalence of Diabetes, by Type, Through 2040 (Millions)	42
Table 13 BMI Calculation	43
Table 14 BMI Categories Based on Increasing Health Risks.....	44
Table 15 Trends in Obesity Composition of the World's Population, Through 2020 (Millions)	45
Table 16 U.S. Obesity and Severe Obesity vs. General Population, Through 2021 (Millions)	47
Table 17 Automated Medication Dispensing Cabinets.....	59
Table 18 Smart Pill Dispensers, Pillboxes and Organizers.....	61
Table 19 Medication Tracking Devices and Apps.....	63
Table 20 Pill Organizer and Reminder Systems.....	65
Table 21 Smart Pill Cap and Bottle Systems.....	66
Table 22 Specialized Medication Adherence Devices.....	68
Table 23 Smart Pills for Patient Monitoring.....	69
Table 24 Smart Pills for Oral Drug Delivery.....	72
Table 25 Other Medication Adherence Solutions.....	73
Table 26 Health and Medication Reminder Apps	83
Table 27 Personalized Medication Adherence and Text Messaging Apps.....	85
Table 28 Health and Medication Monitoring Apps.....	90
Table 29 Cloud-based Adherence Solutions and Databases.....	92
Table 30 Health and Medication Adherence Apps	94
Table 31 Other Medication Adherence Apps.....	96
Table 32 Global Market for Medication Adherence, by Region, Through 2021 (\$ Millions).....	103
Table 33 Global Market for Medication Adherence Systems, by Segment, Through 2021 (\$ Millions)..	104
Table 34 Global Market for Medication Adherence, by Disease, Through 2021 (\$ Millions).....	105
Table 35 Global Market for Medication Adherence, by Leading Companies, 2016 (\$ Millions/%).....	111
Table 36 Recent Key Strategic Deals in the Medication Adherence Market	116
Table 37 Differences in Regulatory Approval in The U.S. and Europe.....	124
Table 38 Trends in Per Capita Real GDP Growth, by Region, 2012–2015 (Annual Average Percentage Change)	138
Table 39 List of Acronyms	172

List of Figures

Summary Figure: Global Market for Medication Adherence, by Region, 2015-2021 (\$ Millions)	11
Figure 1 Global Prevalence of Angina Pectoris and Stroke (Survivors), 2004–2030 (Thousands)	17
Figure 2 Global Incidence of Congestive Heart Failure and Stroke, 2004–2030 (Thousands)	18
Figure 3 Global Incidence of Hypertension, by Patient Group, 2015 (% of Total Patients)	20
Figure 4 Global Symptomatic Prevalence of Key Musculoskeletal Disorders, by Region, 2015 (Thousands)	22
Figure 5 Global Deaths by Various Musculoskeletal Disorders, 2015 (% of Total Deaths due to Musculoskeletal Disorders)	23
Figure 6 Global Deaths from Digestive Diseases, by Region, 2015–2021 (Thousands)	25
Figure 7 Global Prevalence of Breast Cancer, by Region, 2015-2021 (Millions)	31
Figure 8 Global Epidemiology of Colon Cancer, by Region, 2000–2030 (Thousands)	33
Figure 9 Global Deaths, by Various Cancer Types, 2000–2030 (Thousands)	35
Figure 10 Global Deaths, by Various Cancer Types, 2015 (% of Total Deaths Due to Cancer)	36
Figure 11 Global Diabetes Types (% of Total Diabetes)	40
Figure 12 Global Prevalence of Diabetes, by Type, 2015–2040 (Millions)	42
Figure 13 Trends in Obesity Composition of the World’s Population, 2012–2020 (Millions)	46
Figure 14 U.S. Obesity and Severe Obesity vs. General Population, 2015–2021 (Millions)	47
Figure 15 Global Market for Medication Adherence, by Region, 2015–2021 (\$ Millions)	103
Figure 16 Global Market for Medication Adherence Systems, by Segment, 2015–2021 (\$ Millions)	104
Figure 17 Global Market for Medication Adherence, by Disease, 2015–2021 (\$ Millions)	106
Figure 18 Global Market for Medication Adherence, By Leading Companies, 2016 (%)	112
Figure 19 Trends in Per Capita Real GDP Growth, by Region, 2012-2015 (Annual Average Percentage Change)	138



About BCC Research

About BCC Research

With our unparalleled 45-year history, BCC Research provides comprehensive analysis of global market sizing, forecasting and industry intelligence, covering markets where advances in science and technology are improving the quality, standard and sustainability of businesses, economies and lives.

BCC Membership

From market sizing and forecasts, to opportunity assessments and competitive analyses, our ever-expanding library gives you the data, insights and intelligence required to ensure your project is a success. Members benefit from ongoing, unlimited access to the category or collections of their choice, and most membership packages pay for themselves within two to three reports being accessed.

Did you buy this report? You may qualify to apply your purchase price towards a full membership. Call 866/285-7215 or e-mail info@bccresearch.com to request a demo.

BCC Custom Research

Our experts provide custom research projects to those working to identify new markets, introduce new products, validate existing market share, analyze competition and assess the potential for products to impact existing markets. With impressive academic credentials and broad and deep knowledge of global industrial markets, our independent analysts and consultants develop the facts, figures, analysis and assessments to inform the decisions that will move your company ahead. Confidential inquiries to custom@bccresearch.com or 781/205-2429.

DISCLAIMER

The information developed in this report is intended to be as reliable as possible at the time of publication and is of a professional nature. This information does not constitute managerial, legal or accounting advice, nor should it be considered as a corporate policy guide, laboratory manual or an endorsement of any product, as much of the information is speculative in nature. BCC Research and the author assume no responsibility for any loss or damage that might result from reliance on the reported information or from its use.

ISBN: 1-62296-574-4
November 2017