

Index

Table of Contents

Table of Contents.....	i
List of Figures.....	viii
Executive summary.....	1
1 The challenge from welfare diseases.....	3
1.1 Introduction.....	3
1.1.1 The ageing world population.....	4
1.1.2 Metabolic syndrome and lifestyle related diseases.....	5
1.2 Common chronic diseases.....	5
1.2.1 Cardiac arrhythmia.....	7
1.2.2 Ischemic diseases.....	7
1.2.3 Hypertension.....	8
1.2.4 Sleep apnea.....	9
1.2.5 Chronic respiratory diseases.....	10
1.2.6 Diabetes.....	13
1.2.7 Hyperlipidemia.....	14
1.3 Healthcare providers and reimbursement systems.....	14
1.3.1 Healthcare in Asia-Pacific.....	18
1.3.2 Healthcare in Europe.....	19
1.3.3 Healthcare in North America.....	20
1.4 Regulatory environment.....	22
1.4.1 Regulatory environment in Europe.....	23
1.4.2 Regulatory environment in the US.....	24
1.4.3 Regulatory environment in other major markets.....	27
1.4.4 International standardisation.....	27
2 mHealth platforms.....	29
2.1 Overview of the mHealth market.....	29
2.1.1 mHealth market segments.....	30
2.1.2 Connectivity options for medical devices.....	32

2.1.3	The mHealth value chain.....	34
2.2	mHealth connectivity solutions.....	36
2.2.1	Apple HealthKit.....	38
2.2.2	Axeda.....	39
2.2.3	eDevice.....	40
2.2.4	Ericsson.....	42
2.2.5	KORE Wireless	43
2.2.6	Microsoft HealthVault	44
2.2.7	Numera.....	45
2.2.8	Orange.....	47
2.2.9	Qualcomm Life	49
2.2.10	Telenor Connexion.....	51
2.2.11	Vodafone	51
2.3	mHealth care delivery platforms.....	53
2.3.1	BodyTel	55
2.3.2	BePatient Solutions	56
2.3.3	Exco InTouch	57
2.3.4	Get Real Health	58
2.3.5	HealthyCircles	59
2.3.6	Medixine	60
2.3.7	S3 Group.....	61
2.3.8	SilverBullet.....	62
2.3.9	Verizon Mobile Health Solutions	63
2.3.10	Verklizan.....	64
3	Physiological monitoring solution providers	67
3.1	Medical devices and remote monitoring.....	67
3.1.1	Medical device revenues by market segment	67
3.1.2	Overview of the remote patient monitoring market.....	69
3.2	Cardiac rhythm management.....	70
3.2.1	Overview of the CRM device market.....	70
3.2.2	Use cases for CRM monitoring	71
3.2.3	Remote monitoring solution providers.....	73

- 3.2.4 Biotronik 75
- 3.2.5 Boston Scientific..... 76
- 3.2.6 Medtronic 77
- 3.2.7 Sorin Group..... 80
- 3.2.8 St. Jude Medical..... 81
- 3.3 Remote ECG monitoring 82
 - 3.3.1 Overview of the remote ECG monitoring device market..... 82
 - 3.3.2 Use cases for remote ECG monitoring 82
 - 3.3.3 Remote monitoring solution providers..... 85
 - 3.3.4 Aerotel Medical Systems..... 86
 - 3.3.5 BioTelemetry 87
 - 3.3.6 CardioComm Solutions..... 88
 - 3.3.7 LifeWatch..... 90
 - 3.3.8 ScottCare..... 91
 - 3.3.9 TZ Medical..... 92
 - 3.3.10 Zenicor 92
- 3.4 Blood pressure monitoring..... 93
 - 3.4.1 Overview of the blood pressure monitoring device market 93
 - 3.4.2 Use cases for blood pressure monitoring..... 93
 - 3.4.3 Remote monitoring solution providers..... 95
 - 3.4.4 Omron Healthcare..... 95
 - 3.4.5 A&D Medical..... 96
 - 3.4.6 Microlife 97
 - 3.4.7 Rossmax..... 98
 - 3.4.8 Sotera Wireless 98
- 3.5 Coagulation monitoring 99
 - 3.5.1 Overview of the coagulation monitoring device market..... 99
 - 3.5.2 Use cases for blood coagulation monitoring 99
 - 3.5.3 Remote monitoring solution providers..... 100
 - 3.5.4 CoaguSense..... 100
 - 3.5.5 Helena Laboratories 101
 - 3.5.6 International Technidyne Corporation 101

3.6	Sleep therapy monitoring	101
3.6.1	Overview of the sleep therapy device market	102
3.6.2	Use cases for sleep therapy monitoring	102
3.6.3	Remote monitoring solution providers	104
3.6.4	Fisher & Paykel Healthcare	106
3.6.5	Philips Respironics	107
3.6.6	ResMed	109
3.6.7	SRETT	111
3.6.8	Weinmann	112
3.7	Home sleep diagnostics	113
3.7.1	Overview of the home sleep diagnostics market	114
3.7.2	Use cases for home sleep diagnostics	115
3.7.3	Remote monitoring solution providers	115
3.7.4	Cadwell Laboratories	116
3.7.5	CareFusion	116
3.7.6	Compumedics	117
3.7.7	Natus Medical	118
3.7.8	NovaSom	118
3.7.9	SleepMed	118
3.8	Blood oxygen monitoring	119
3.8.1	Overview of the blood oxygen monitoring device market	119
3.8.2	Use cases for blood oxygen monitoring	120
3.8.3	Remote monitoring solution providers	120
3.8.4	ChoiceMMed	121
3.8.5	Covidien	121
3.8.6	Masimo	122
3.8.7	Nonin Medical	123
3.9	Air flow monitoring	124
3.9.1	Overview of the air flow monitoring device market	124
3.9.2	Use cases for air flow monitoring	124
3.9.3	Remote monitoring solution providers	125
3.9.4	Aerocrine	126

- 3.9.5 Clement Clarke International..... 126
- 3.9.6 iSonea 126
- 3.9.7 Medical International Research..... 128
- 3.9.8 Ndd Medizintechnik..... 128
- 3.9.9 nSpire Health..... 128
- 3.9.10 Propeller Health..... 129
- 3.9.11 Sibelmed 130
- 3.9.12 Vitalograph 131
- 3.10 Glucose level monitoring..... 131
 - 3.10.1 Overview of the glucose monitoring device market..... 131
 - 3.10.2 Use cases for glucose monitoring 133
 - 3.10.3 Remote monitoring solution providers..... 136
 - 3.10.4 Abbott..... 138
 - 3.10.5 Bayer Healthcare..... 139
 - 3.10.6 Johnson & Johnson 140
 - 3.10.7 Roche 141
 - 3.10.8 Dexcom 142
 - 3.10.9 Voluntis..... 143
 - 3.10.10 Telcare..... 144
 - 3.10.11 Welldoc..... 145
- 3.11 Other 146
 - 3.11.1 Implantable medical devices..... 146
 - 3.11.2 Home hemodialysis..... 147
 - 3.11.3 Telerehabilitation 147
- 4 Medication and integrated monitoring solution providers..... 149
 - 4.1 Telehealth solution providers 149
 - 4.1.1 Overview of the telehealth solutions market 149
 - 4.1.2 Use cases for telehealth solutions 151
 - 4.1.3 Telehealth solution providers 151
 - 4.1.4 Alere 153
 - 4.1.5 American TeleCare..... 155
 - 4.1.6 Authentidate 155

4.1.7	Bosch Healthcare	155
4.1.8	Care Innovations	157
4.1.9	H2AD	157
4.1.10	Honeywell HomMed	159
4.1.11	Ideal Life	160
4.1.12	Grandcare Systems.....	161
4.1.13	Medvivo	162
4.1.14	Philips Healthcare	162
4.1.15	SHL Telemedicine	164
4.1.16	Telefónica	165
4.1.17	Tunstall Healthcare Group	166
4.1.18	Vitaphone	168
4.2	Medication compliance monitoring	169
4.2.1	Overview of the medication compliance monitoring market	169
4.2.2	Use cases for medication compliance monitoring.....	170
4.2.3	Compliance monitoring solution providers	170
4.2.4	DayaMed	171
4.2.5	Evondos	173
4.2.6	Innospense.....	175
4.2.7	InRange Systems	176
4.2.8	Medicpen.....	178
4.2.9	Merck Serono	179
4.2.10	Compliance Meds Technologies	180
4.2.11	MedSignals.....	181
4.2.12	Proteus Digital Health.....	181
4.2.13	Vitality	182
5	Market analysis and forecasts	185
5.1	Market forecasts	185
5.1.1	Cardiac rhythm management	188
5.1.2	Sleep therapy	189
5.1.3	Telehealth	191
5.1.4	ECG monitoring.....	192

5.1.5 Glucose level monitoring 193

5.1.6 Medication compliance monitoring..... 195

5.1.7 Other medical devices..... 196

5.2 Revenue forecasts 197

5.2.1 Medical monitoring devices 197

5.2.2 mHealth connectivity solutions 199

5.2.3 Care delivery platforms 199

5.2.4 Monitoring services 200

5.3 Industry trends and analysis..... 201

5.3.1 New players enter the market 202

5.3.2 Modularization of the value chain 204

5.3.3 Digitalisation of PSTN networks 205

5.3.4 BYOD will become a viable option..... 206

5.4 Market drivers and barriers..... 207

5.4.1 An ageing population 208

5.4.2 Increasing welfare disease prevalence 209

5.4.3 Focus on disease prevention 209

5.4.4 Substitutes to medical monitoring 210

5.4.5 Resistance to change..... 211

5.4.6 Alignment of financial incentives 211

5.5 Potential market catalysts..... 212

5.5.1 Increased monitoring during clinical trials 212

5.5.2 Incentives from insurance companies and payers 213

5.5.3 National health systems support remote monitoring..... 214

5.5.4 New clinical evidence on cost effectiveness 214

5.5.5 Non-prescribed monitoring and healthcare consumerism 215

Glossary 217

Index

List of Figures

Figure 1.1: Population by age group (EU, North America and Japan 2010–2030).....	4
Figure 1.2: Direct and indirect costs of chronic welfare diseases in the US and EU	6
Figure 1.3: Number of people suffering from chronic welfare diseases (EU/US 2008)	9
Figure 1.4: Percentage of population diagnosed with chronic welfare diseases.....	11
Figure 1.5: Total and per capita healthcare spending by country (2012)	15
Figure 1.6: Healthcare expenditure per capita by country (World 2012)	17
Figure 1.7: Share of population covered by private health insurance by country	18
Figure 1.8: Healthcare spending by type of service and product (US 2012)	21
Figure 2.1: mHealth market segments	31
Figure 2.2: Connected medical devices and the provision of care	33
Figure 2.3: Overview of the mHealth landscape.....	34
Figure 2.4: Main focus areas of mHealth connectivity solution providers.....	37
Figure 2.5: HealthGO+ and HealthGO Mini by eDevice	41
Figure 2.6: Examples of HealthVault-certified devices	45
Figure 2.7: Numera Libris and Numera Home Hub.....	46
Figure 2.8: Examples of mHealth care delivery platform categories.....	53
Figure 3.1: Medical device market revenues by segment (World 2013–2018)	68
Figure 3.2: Connected medical devices by segment (World 2013)	69
Figure 3.3: Implantable cardiac rhythm management vendor market shares (2013)	71
Figure 3.4: Examples of implantable CRM devices	72
Figure 3.5: Examples of remote monitoring devices	73
Figure 3.6: Market shares for remote monitoring of CRM implants (2013)	74
Figure 3.7: MCT sensor and monitor from CardioNet	84
Figure 3.8: Implantable loop recorder from Medtronic.....	85
Figure 3.9: HeartCheck devices from CardioComm Solutions	89
Figure 3.10: Blood pressure monitor from Omron Healthcare.....	94
Figure 3.11: Sleep therapy vendor market shares (2013)	102
Figure 3.12: ResMed S9 CPAP device with FX Series masks.....	103

Figure 3.13: Connected sleep therapy solutions by vendor (2013) 105

Figure 3.14: SleepMapper mobile application..... 108

Figure 3.15: SRETT T4P..... 111

Figure 3.16: Weinmann sleep therapy device featuring the somno2CLOUD modem 113

Figure 3.17: Examples of home sleep diagnostics companies and products 114

Figure 3.18: iSpO2 device and application 123

Figure 3.19: iSonea’s device and asthma management app..... 127

Figure 3.20: Propeller Health’s asthma management app and inhaler sensor..... 130

Figure 3.21: Blood glucose meter vendor market shares (2013)..... 132

Figure 3.22: CGM and insulin delivery system vendor market shares (2013)..... 133

Figure 3.23: Medication usage by diabetes patients (US 2011) 134

Figure 3.24: Glucose meters from LifeScan and Roche..... 135

Figure 3.25: Dexcom G4 CGM system 135

Figure 3.26: Asante Pearl insulin pump..... 136

Figure 3.27: Examples of connected blood glucose meters..... 137

Figure 3.28: Examples of connected CGM and insulin pump systems 138

Figure 4.1: Overview of the telehealth landscape..... 150

Figure 4.2: Installed base of telehealth hubs by region (2013) 151

Figure 4.3: Telehealth hub vendor market shares (2013) 152

Figure 4.4: The Twitoo telehealth hub 158

Figure 4.5: The Honeywell Genesis DM telehealth monitor with peripherals..... 160

Figure 4.6: Compliance monitoring solution form factors 171

Figure 4.7: The DayMed MedPod..... 172

Figure 4.8: The Evondos E300 Automatic Medicine Dispenser 173

Figure 4.9: Medido medication dispensers 176

Figure 4.10: The EMMA medication management system 177

Figure 4.11: The Easypod injector and the Easypod connect transmitter 179

Figure 4.12: The CleverCap dispenser 181

Figure 4.13: The Vitality GlowCaps system 183

Figure 5.1: Connected home medical monitoring devices (World 2013–2018)..... 186

Figure 5.2: Connected home medical monitoring devices by region (World 2013–2018)..... 187

Figure 5.3: Connected cardiac rhythm management devices (World 2013–2018)..... 188

Figure 5.4: Connected sleep therapy devices (World 2013–2018)	190
Figure 5.5: Telehealth hubs (World 2013–2018).....	191
Figure 5.6: Connected ECG monitoring devices (World 2013–2018)	193
Figure 5.7: Connected glucose monitoring devices (World 2013–2018)	194
Figure 5.8: Connected medication monitoring solutions (World 2013–2018).....	195
Figure 5.9: Other connected medical devices (World 2013–2018)	196
Figure 5.10: Remote patient monitoring revenues (World 2013–2018).....	197
Figure 5.11: Connected medical device revenues (World 2013–2018)	198
Figure 5.12: mHealth connectivity solution revenues (World 2013–2018)	199
Figure 5.13: Care delivery platform revenues (World 2013–2018)	200
Figure 5.14: Monitoring service revenues (World 2013–2018)	201
Figure 5.15: New players enter the connected care market	202