Final Report

Diabetes – Insulin – Care
Patent and Technology Landscape

8.12.2017
Executive Summary - 1

- Overall patenting in Diabetes – Care Wellness space is increasing

- Technological change is very rapid and intense. Diagnostic technologies are merged with computer and software technologies.

- Range of smaller emerging technologies and business domains are visible (AI, early diagnosis, predictive care)

- Old and new firms compete intensely. The industry patents are applied for by a wide range of companies, old and new, large and startups

- Patents are increasingly important for new business and growth areas

Total patenting in THE FINAL PATENT LANDSCAPE is about 6,000 annual new patents in 2017
Executive Summary - 2

- **Growth Areas** are specific, small and emerging. They include:
  - **AI and Machine Learning for Diabetes.** This group involves much "wearable" type of inventions.
  - **Early Detection of Diabetes.** This includes also a range of "life style" related solutions.
  - **Solutions for type 2- Diabetes.** This group includes medical diagnosis and treatment inventions, but increasingly also "life style" related solutions.

- **Competition** is focussed on highly specialized technology and business segments.

- In contrast, **competition in established or old technology areas is markedly slow or declining.**
Executive Summary - 4

- Within established technology and business areas, large incumbent firms have cemented their positions with very large patent portfolios.

- In emerging technology and business domains new and small firms have potential to capture industry leadership.

- The balance between large-incumbent firms vs new-starups is different depending on the pace of technology innovation in the business domain.

FITBIC INC, an industry outsider and wearable start-up, is the leading inventor for solutions to identify pre-diabetic conditions.
Patenting is declining by large firms, in general.

This, together with clearly emerging new technology areas, suggests that large firms are trying to adapt to the new competitive landscape.

The role of small, innovative and, focussed firms is likely to be strengthened in the near future.

An example is the Roche Group.
Executive Summary - 6

- M&A and venturing activity by large firms will increase in the near term.

- Digitalization is driving this trend.

- This will impact technology and start-up strategies, as well as available VC funding.

- The trend is likely to continue for the next 2-4 years.

mySugr joins the Roche Family

JUNE 30, 2017 BY

This is a momentous day for any startup, but for a team on a mission it’s even greater. Today we’re proud to announce that we’re joining the Roche family to help create an open digital diabetes ecosystem that revolves entirely around people with diabetes.

New Abbott diabetes deal is a “missed opportunity” for DexCom

By ARUNDAHATI PARMAKR

1 Comment / Jul 13, 2017 at 2:52 PM

DexCom is the unrivaled king of the CGM market especially as it relates to various artificial pancreas development efforts.

A new deal between Abbott and startup Bigfoot Medical may be the beginnings of future competition for the San Diego CGM maker.

Abbott Laboratories announced Thursday that it is teaming up with Milpitas, California-based Bigfoot to develop diabetes management systems that would integrate Abbott’s FreeStyle Libre glucose sensing technology with Bigfoot’s insulin delivery solutions in the United States. Terms of the deal weren’t disclosed.
Executive Summary - 7

- **Key technologies in Diabetes Care are undergoing rapid change.** Large firms have cemented their leadership in old technologies, but face tough competition by startups in novel areas, such as AI / Machine Learning / Wearables / Life Style / Pre-diabetes solutions.

- **Patenting is driven by increasing inventive effort in specialized technology areas.**

- **Successful and innovative companies must demonstrate ability to exploit emerging innovation frontiers.** Old technology areas are slow in their dynamics, indicating low future potential.
TEQMINE APPROACH

STAGE 1

STAGE 2
Records classified into 10 technology and business areas with TEQMINE AI solution.

STAGE 3
Topic 3 identified as high-priority area. Select all patents < 0.30 weight for Topic 3. Records=73,695

STAGE 4
Records classified into 15 Topic Areas.
High accuracy identification of Client interest areas.

Network visualization of patent landscape and final analysis.

Online-Results and Tools
Method, system and computer readable medium for assessing actionable glycemic risk

Abstract

A system, method and non-transient computer readable medium for assessing the opportunity to address either hyperglycemic or hypoglycemic risk (or both) in patients with diabetes based on historical continuous glucose monitoring (CGM) data.

Classifications

A61B5/7275 Determining trends in physiological measurement data; Predicting development of a medical condition based on physiological measurements, e.g. determining a risk factor

View 5 more classifications

Management method and system for implementation, execution, data collection, and data analysis of a structured collection procedure which runs on a collection device

Abstract

Methods for performing a structured collection procedure by utilizing a collection device are disclosed herein, in which a collection procedure is initiated for performing one or more data collections for one or more data event instances occurring according to a schedule of events. Each data event instance comprises a data collection pertaining to a biomarker to be performed according to one or more conditions of an adherence criterion. Each data event instance is determined to be successful or unsuccessful on the basis of actual performance of the data collection and meeting certain conditions of the predetermined adherence criteria for the data event instance. Contextual information for successful data collections is generated and a data file generated for storing records relating to successful data collections. For unsuccessful data event instances, substitute data relating to data collections performed separately from the collection procedure are included in the data file records for the collection procedure if the substitute data is determined to meet conditions of the predetermined adherence criterion for the corresponding data event instance.
All high relevance patents score very high in TOPIC 3

TOPIC 3 chosen as priority. 205,578 records have received weight in Topic 3.

All patents with weight $\geq 0.25$ in Topic 3 chosen for round 2.

Total records = 73,695
EVALUATING QUALITY Round 2

- High-Relevance Topic Areas
  - Topic 10
  - Topic 5
- Very similar Topic profiles
TEQMINE Created 15 Topic Areas

Topic 9: data, information, subject, based, computer, parameter, memory, brain, threshold, event, processing, activity, signal, condition, patient, user, server, method, method, system, block, access, input.

Topic 10: data, information, user, system, medical, disease, record, treatment, program, device, layer, optical, energy, wavelength, surface, power, target, system, thermodynamic, imaging, density, fiber, material, signal.

Topic 11: optical, light, tissue, power, target, fiber, intensity, measurement, image, detection, absorption, optical, power, reflectance, illumination, signal.

Topic 12: concentration, algorithm, frequency, computer, methods, image, measurements, subject, point, determined, blood, disease, equation, spectra, imaging, total.

High Client Interest Area Topic: stent, drug, delivery, therapeutic, luminal, catheter, polymer, device, agent, material, distribution, release, particle, substance, component, device, membrane.

Topic 13: stent, drug, delivery, therapeutic, luminal, catheter, polymer, device, agent, material, distribution, release, particle, substance, component, device, membrane.

Topic 14: stent, drug, delivery, therapeutic, luminal, catheter, polymer, device, agent, material, distribution, release, particle, substance, component, device, membrane.

Topic 15: stent, drug, delivery, therapeutic, luminal, catheter, polymer, device, agent, material, distribution, release, particle, substance, component, device, membrane.
High Priority Topic Areas

- **Topic 3:** Sensor – Measuring - Data – Glucose – Insuling - Blood
- **Topic 5:** Medical - Device – Data – Communication – User – Wireless - interface
- **Topic 10:** Patient – Health – Information – User – Data – Healthcare – Software - Database
C.a. 6000 patents / year and slightly increasing patenting in the technology area
Topic 1 and 2 are largest
Total Patenting – Diabetes Map
2002-2017 (september)

- **Topic 10** is a major growth area
- **Topic 5** is recent major growth area
Total Patenting – Diabetes Map
Priority Topic Areas 2002-2017 (September)

- **Topic 5**: Medical – Device – Data – Communication – User – Wireless - interface
Diabetes Patent Map
Diabetes Patent Map

Topic 3

Device

Topic 5

Sensor

Topic 10

Glucose
Priority Topic Areas in Detail

- **Topic 3**: Sensor – Measuring - Data – Glucose – Insuling - Blood
- **Topic 5**: Medical - Device – Data – Communication – User – Wireless - interface
Patenting activity and leading firms

- High growth 2005-2010, but currently stabilized.
- Average patenting 300 / year
- Leading inventors are large medical equipment and healthcare firms specialized in Diabetes care, e.g., DexCom, Akray, Medtronic, etc.
- Univ of Virginia holds significant patent portfolio
- Leading firms have very sizable patent portfolios > 100 patents
- Inventors concentrated in the US, GP, JP, IL, DE, KR, CH.

**Top 10 Countries By Inventors**

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**Top 15 Assignees**

- ABBOTT DIABETES CARE INC.
- DexCom, Inc.
- MEDTRONIC MINIMED, INC.
- ABBOTT DIABETES CARE, INC.
- Bayer HealthCare LLC
- LifeScan, Inc.
- LIFESCAN SCOTLAND LIMITED
- Roche Diagnostics GmbH
- HOFFMANN-LA ROCHE AG
- ROCHE DIAGNOSTICS OPERA...
- UNIVERSITY OF VIRGINIA PA...
- ARKRAY, Inc.
- CILAG GMBH INTERNATIONAL
- Cygnus, Inc.
- SYSMEX CORPORATION
Topic 3 in Detail

IPC focus

- A61B 5/00 Measuring for diagnostic purposes
- A61B 5/145 Measuring characteristics of blood in vivo, e.g. gas concentration, pH-value
- G06F 19/00 Digital computing or data processing equipment or methods, specially adapted for specific applications
- G01N 27/00 Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means
- A61M DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY
Topic 5 in Detail
Patenting activity and leading firms

- High growth in inventive and patenting effort, expect around 600/year
- Leading inventors are large medical equipment and healthcare firms specialized in Diabetes care, but include also Samsung
- Leading firms have very sizable patent portfolios > 100 patents
- Inventors concentrated in the US, DE, GB, CH.
- Finland among top 15 countries
Topic 5 in Detail

IPC focus

- **A61B 5/00** Measuring for diagnostic purposes
- **A61B 5/145** Measuring characteristics of blood in vivo, e.g. gas concentration, pH-value
- **G06F 19/00** Digital computing or data processing equipment or methods, specially adapted for specific applications
- **G01N 27/00** Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means
- **G06Q 50/00** Systems or methods specially adapted for a specific business sector, e.g. utilities or tourism
- **G08B 23/00** Alarms responsive to unspecified undesired or abnormal conditions
- **A61M** DEVICES FOR INTRODUCING MEDIA INTO, OR ONTO, THE BODY
Secure pairing of ehealth devices and authentication of data using a gateway device having secured a

Abstract

A gateway device, method for operating the gateway device, and system are presented for securely obtaining health information from a personal medical device. The method comprises receiving a gateway application from a relying system, storing the gateway application, executing the gateway application. The executing the gateway application comprises establishing first secure communication with the personal medical device, establishing second secure communication with the relying system, receiving information from the personal medical device via the first secure communication, transmitting the information to the relying system via the second secure communication.

Images (4)

The PMDs 104 may be sensors for reporting on the heart rate, blood pressure, blood sugar level, or other measurable characteristic of a user's body. The PMDs 104 may also be actuators for dispensing insulin, electrical stimulation, or other therapeutic action. A PMD may also be referred to as an eHealth device. A PMD may include a health sensor/actuator application that uses a sensor/actuator driver, a hardware security module, and a communication module to provide its functionality in cooperation with an external device. A PMD typically has little or no direct user interface functionality, relying, instead on the external device for such functionality.
Topic 10 in Detail
Patenting activity and leading firms

- High growth in recent years, but has stabilized
- Expect around 600 patents / year
- Leading inventors are established software firms, large medical equipment and healthcare firms, as well as known patent trolls
- Leading firms have mid-size patent portfolios > 50 patents
- Inventors concentrated in the US, JP, CA, GB, DE, IL, NL
Topic 10 in Detail

IPC focus

- **A61B 5/00** Measuring for diagnostic purposes
- **A61B 5/145** Measuring characteristics of blood in vivo, e.g. gas concentration, pH-value
- **G06F 19/00** Digital computing or data processing equipment or methods, specially adapted for specific applications
- **G01N 27/00** Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means
- **G06Q 50/00** Systems or methods specially adapted for a specific business sector, e.g. utilities or tourism
- **G08B 23/00** Alarms responsive to unspecified undesired or abnormal conditions

**Topic Area technology** is more IT and software driven
Description of the Related Art

[0002] In view of chronic health problems facing employees, employers may adopt workplace strategies to motivate and coach employees to improve their health and well-being. For example, diabetes may affect twenty percent (20%) of some populations. As will be understood by those skilled in the art, there exist a group of non-communicable diseases labeled "the big five": diabetes, cardiovascular disease, respiratory disease, cancer, and obesity. Research indicates that lifestyle is a contributing factor to the big five non-communicable diseases and may account for as much as eighty percent (80%) of the causes of these diseases.
Technology Focus Areas in Detail

- “Machine Learning” OR “Artificial Intelligence”
- “Pre-diabetic” - Preventive care
- Diabetes-2
- Diabetic Eye Conditions
Tech Area in Detail
Machine Learning - AI

- **DESCRIPTION:** “machine learning” OR “artificial intelligence”
  - 3158 patents
- **VERY HIGH growth**, expect 200 / 2017, and continued high growth
- Leading patent firms large software firms, specialized health-care software firms, and start-ups.

![Bar chart showing Top 10 IPC Classes](chart1.png)

![Bar chart showing Top 14 Assignees](chart2.png)
A device and method is provided for the detection of diabetes in a person using pulse palpation signals. The pulse palpation signal is captured from the radial artery of the person using a photo-plethysmograph (PPG) sensor. The PPG signal is then preprocessed by a processor. The preprocessed PPG signal is then analyzed by the processor to detect the peak in the PPG signal. The detected peaks are used to extract a first set of feature parameters. The first of feature parameters are compared with a second set of feature parameters, wherein the second set of feature parameters are extracted from the control group of individuals. Based on the comparison it is detected that the person is one of in normal condition, pre-diabetic condition or a diabetic condition. According to another embodiment, the invention also provides a method to determine the severity index and progression risk of diabetes in the person.
Tech Area in Detail
Pre-Diabetic – Early Stage Diagnosis

- DESCRIPTION: "pre-diabetic" OR "pre diabetic" OR "early detection ..."
  - 391 patents
  - MYLIST: “pre-diabetic_2”
- RELATIVELY SMALL PATENT AREA, BUT
- RAPIDLY EMERGING TECHNOLOGY AREA, with high growth. Currenty around 60 / year and continued high growth
- FITBIT the leading patent firm, followed by mixed group of specialized medical equipment and software firms. Universities also pay an important role.
Tech Area in Detail
IPC focus of Pre-Diabetic

- **A61B 5/00** Measuring for diagnostic purposes
- **A61B 5/145** Measuring characteristics of blood in vivo, e.g. gas concentration, pH-value
- **G06F 19/00** Digital computing or data processing equipment or methods, specially adapted for specific applications
- **G01N 27/00** Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means
- Diagnostic technologies mixed with software and computing technologies
Biological information and medical knowledge information are used for self-learning clinical intelligence. Medical knowledge information is assembled. Medical rules are generated based on the medical knowledge. The medical rules can be generated probabilistically. A plurality of risk models can be learned. The plurality of risk models are associated with a given disease based on patient attributes. A medical probabilistic rule graph is built based on the medical rules and the plurality of risk models. The building of the medical probabilistic rule graph is based on ordering the medical rules. Attributes from an individual patient are applied to the medical probabilistic rule graph. A diagnosis for the individual is generated from the attributes applied to the medical probabilistic rule graph. A treatment for the individual can be generated from the attributes applied to the medical probabilistic rule graph.

[0040] The flow 100 can include building risk models 132. Risk models are based on medical knowledge information and related to medical rules, but the risk models focus on medical metrics and biological information that combine to indicate probabilistically certain medical risks. For example, the current best knowledge risk factors for heart disease include high blood pressure, high blood cholesterol, diabetes and pre-diabetes, smoking, being overweight or obese, being physically inactive, having a family history of early heart disease, having a history of preeclampsia during pregnancy, unhealthy diet, and age (55 or older for women). A risk model can be built using the known risk factors with a probabilistic traversal of the risk model, that is, factors A, B, C, and D may yield a higher risk than factors A, B, C, and E, for example. In addition, the risk models may include exposing the actual risk (well understood and accepted), exposing risk contributors (novel), and exposing what-if simulation (very novel) to provide clinical intelligence over a broader spectrum of possibilities than is normally available in a clinical setting. The risk models can be included in the building a medical probabilistic rule graph 130. In embodiments, the risk models can be included in the building a medical probabilistic inference graph.
Tech Area in Detail
Pre-Diabetic – Example Patents

US2017277841 (A1) - SELF-LEARNING CLINICAL INTELLIGENCE SYSTEM BASED ON BIOLOGICAL INFORMATION AND MEDICAL DATA METRICS

SHANKAR SUSHANT [US]; DASH RAJESH [US]; DESAI NIKHIL [US]; FU JUSTIN JUNXUAN [US] ✪

HEALTHPALS INC [US] ✪
Systems and methods are provided relating to open loop decision-making for management of diabetes. People with diabetes face many problems in controlling their glucose because of the complex interactions between food, insulin, exercise, stress, activity, and other physiological and environmental conditions. Established principles of management of glucose sometimes are not adequate because there is a significant amount of variability in how different conditions impact different individuals and what actions might be effective for them. Accordingly, systems and methods according to present principles minimize the impact of the vagaries of diabetes on individuals, i.e., by looking for patterns and tendencies of an individual and customizing the management to that individual. Consequently, the same reduces the uncertainty that diabetes typically is associated with and improves quality of life.

Dexcom, Inc. is a company that develops, manufactures and distributes continuous glucose monitoring systems for diabetes management. It operates internationally with headquarters in San Diego, California, United States. Wikipedia

Stock price: DXCM (NASDAQ) US$50.74 +0.36 (+0.71 %) 10 Nov, 16:00 GMT-5 - Disclaimer

Headquarters: San Diego, California, United States
CEO: Kevin R. Sayer
CFO: Quentin Blackford
Founded: 1999
EVP: Andrew K. Balo (Clinical, Regulatory, Global Access), MORE
Subsidiaries: Nintamed GmbH & Co. KG, SweetSpot Diabetes Care, Inc., DXCM Sweden AB
Tech Area in Detail
Type-2 Diabetes

- **DESCRIPTION**: "diabetes mellitus type 2" OR "diabetes type 2" OR "diabetes type-2" OR "type 2 diabetes" OR "type-2 diabetes"
  - 4130 patents
- **RELATIVELY LARGE PATENT AREA**, with stabilized growth. Expect 120 patents / 2017, and continued growth
- Leading patent firms large software firms, specialized health-care software firms, and startups.
- Includes large group of patents dealing with “life style” issues

**Top 15 Countries By Inventors**

**Top 15 Assignees**

- ROCHE DIAGNOSTICS GMBH
- ROCHE DIAGNOSTICS OPERA...
- F. HOFFMANN-LA ROCHE AG
- GI DYNAMICS, INC.
- Medtronic Minimed, Inc.
- ETHICON ENDO-SURGERY, I...
- UNIVERSITY OF VIRGINIA PA...
- ASEKO, INC.
- SANOFI-AVENTIS DEUTSCHL...
- E2 LLC
- NOVO NORDISK A/S
- F.HOFFMANN-LA ROCHE AG
- Hyleia, Inc.
- PACESETTER, INC.
- ResMed Limited
Tech Area in Detail
IPC focus of Type-2 Diabetes

- A61B 5/00 Measuring for diagnostic purposes
- A61B 5/145 Measuring characteristics of blood in vivo, e.g. gas concentration, pH-value
- G06F 19/00 Digital computing or data processing equipment or methods, specially adapted for specific applications
- G01N 27/00 Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means
- Diagnostic technologies mixed with software and computing technologies
Tech Area in Detail
Type 2 Diabetes - Example Patents

US2017293733 (A1) - Dynamic Selection and Sequencing of Healthcare Assessments for Patients

KELLY KARIE L [US]; KUMAR ATUL [US]; MCCOY ADAM C [US]; MRNUSTIK GUY B [US]; OLSEN RUSSELL G [US]; WALTERS PATRICK L [US] +

IBM [US] ±

- international: G06F17/27; G06F19/00

[0035] It should be appreciated that the term “lifestyle” as it is used herein refers to the way in which a person lives their lives. The term “lifestyle information” refers to the data collected that characterizes the lifestyle of the patient and may encompass various temporal, spatial, environmental, and behavioral information/data about the patient that together comprises a unique combination of information/data that characterizes and represents the way in which that specific patient conducts their life on a daily basis. The lifestyle information for a patient is specific to that patient and is not generally applicable to multiple patients. The lifestyle information may be provided at various levels of granularity depending upon the particular implementation. As part of this lifestyle information, data generated by the specific patient via one or more computing devices or other data communication devices may be included such as actions performed by the patient on a daily basis, personal schedules, specifications of preferences, etc. For example, lifestyle information may include the patient entering information, such as into a computing device executing a patient tracking application, indicating that the patient ate breakfast at a fast food restaurant in the airport on the way to Virginia this morning. In addition, data generated by external systems associated with third parties that characterizes the patient’s lifestyle may be included in the lifestyle information as well, e.g., a healthcare insurance company may have information about the patient’s lifestyle, e.g., smoker, overweight, sedentary, high risk for diabetes, etc., which may be characteristic of the patient's lifestyle.
Tech Area in Detail

Diabetic Eye

- **CLAIMS**: "diabetic macular" OR "diabetic retinopathy" OR "diabetic eye"
  - 181 patents
- **NOTE**: Diabetic eye is very large patenting area focusing on treatment (esp drug delivery) and evaluation. Search limited to patents with related claims to narrow patents to reasonable number.
- Technologically separate area from other technology areas analyzed here
- **Leading countries**: US, GB, IL, CH, AU, DK, FR, CN, DE.

![Graph of patents by publication year]

![Graph of top 15 countries by inventors]

![Graph of top 10 assignees]

![Graph of top 10 assignees]
Tech Area in Detail
Diabetic Eye

- **A61B 3/00** Apparatus for testing the eyes; Instruments for examining the eyes
- **A61B 3/12** for looking at the eye fundus, e.g. ophthalmoscopes
- **A61B 3/14** Arrangements specially adapted for eye photography
- **A61B 3/10** Objective types, i.e. instruments for examining the eyes independent of the patients perceptions or reactions
- **A61B 5/00** Measuring for diagnostic purposes
Tech Area in Detail
Diabetic Eye – Example Patent

Treatment and prevention of retinal vascular disease by photocoagulation

Abstract

This disclosure relates to methods for treatment or prevention of retinal vascular disease by photocoagulation. More specifically, this disclosure relates to an improved technique for the placement of retinal burns so as to prevent the development of hypoxia and progression of ischemia in retinal tissue, including the macula. The methods can also be employed to prevent potential ischemic tissue damage in diabetic, pre-diabetic or other patients with ischemic retinal vascular disease, or those at risk of ischemic retinal vascular disease.

Classifications

A61F9/00821  Methods or devices for eye surgery using laser for coagulation

WO2017127732A1
WO Application

Other languages: French

Inventor: Thomas J. GAST, Xiao FU

Original Assignee: Indiana University Research And Technology Corporation

Priority date: 2016-01-21
Major Firms in Detail

- Hoffman-La Roche Group
- Roche Diabetes
- Novartis
- Sanofi Aventis
- Medtronic
- Novo Nordisk
- Abbott Diabetes
- Dexcom
Roche Group in Detail

- Very strong and broad patent portfolio, covering different Diabetes areas.
- 1138 patents
- Main patent areas: Topic 1, 3, and 5.
- Technological and patenting focus is shifting from strategically
- Broad geographical base of inventors
Roche Group in Detail
Topic Profile

- Topic Area distribution shows strategic focus
- Shiftings from one to other area
- Main interest areas part of main trends of the broader map data

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- **Topic 3**: Sensor – Measuring - Data – Glucose – Insuling - Blood
- **Topic 5**: Medical - Device – Data – Communication – User – Wireless - interface
Roche Diabetes in Detail

- A new entity with clear technology and business focus
- 85 patents
- Strongly growing patenting activity
- Main patent areas: Topic 1, 3, and 5.
- Technological and patenting focus is shifting from strategically
- Broad geographical base of inventors
Roche Diabetes in Detail

Topic Profile

- Topic Area distribution shows strategic focus
- Main effort in Topic Area 1, 3, and 5

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- **Topic 3**: Sensor – Measuring - Data – Glucose – Insuling - Blood
- **Topic 5**: Medical - Device – Data – Communication – User – Wireless - interface
Novartis in Detail

- Small portfolio, but increasing
- 39 patents
- Patenting too small volume to support clear conclusions
Sanofi-Aventis in Detail

- Very large patent portfolio, but decreasing patent effort
- 1908 patents
- **Very narrow technology and patent focus as analyzed in IPC and Topic Areas**
- Main Focus Area Topic 2, IPC A61M5
## Sanofi-Aventis in Detail

### Topic Profile

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- **Topic 3**: Sensor – Measuring - Data – Glucose – Insuling - Blood
- **Topic 5**: Medical - Device – Data – Communication – User – Wireless - interface
Medtronic in Detail

- Large portfolio, but increasing
- 1904 patents
- Patenting continues strong in emerging areas, such as Topic Areas 1, 3, 5.
- Broad technological focus, as evident in IPC and Topic Area Analysis
# Medtronic in Detail

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Novo Nordisk in Detail

- Large portfolio, and relatively stable patent effort.
- Currently probably increasing.
- 805 patents
- Technologically relatively narrow focus
# Novo Nordisk in Detail

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- **Topic 3**: Sensor – Measuring - Data – Glucose – Insuling - Blood
- **Topic 5**: Medical - Device – Data – Communication – User – Wireless - interface
Abbott Diabetes in Detail

- Large portfolio, but strongly declining inventive effort
- 1185 patents
- Technologically relatively narrow focus per IPC and Topic Area classification
# Abbott Diabetes in Detail

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- **Topic 3**: Sensor – Measuring - Data – Glucose – Insuling - Blood
- **Topic 5**: Medical - Device – Data – Communication – User – Wireless - interface
Dexcom in Detail

- Large portfolio, but strongly declining inventive effort
- **Topic Area 5** is a modest, and only real, growth area (mobile & wireless devices)
- 577 patents
- Technologically relatively broad focus per IPC and Topic Area classification
# Dexcom in Detail

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- **Topic 3**: Sensor – Measuring - Data – Glucose – Insuling - Blood
- **Topic 5**: Medical - Device – Data – Communication – User – Wireless - interface
CONTACT

Hannes Toivanen
Tel. +358 50 400 2947
Email. Hannes.Toivanen@teqmine.com

Pasilanraitio 5
00240 Helsinki
Finland
www.teqmine.com