THE FUTURE OF CARDIOVASCULAR MEDICINE
Two decades ahead
The Case of Greece

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Nothing to declare related to this presentation

Honoraria and research disclosures
Menarini, Bayer, Boehringer, Servier
The population, especially in the industrialised countries is ageing. By 2050 the proportion of the world’s population over age 60 will double, increasing than 2 billion.

- Longer lives, mean more diseases of old age and rising costs.

- The inequalities and health care gaps between different European countries and/or regions are astonishing.
PROJECTED DIRECT AND INDIRECT COSTS OF ALL CVD, 2010 TO 2030 (in billions 2008$)
NATIONAL DIFFERENCES IN CRT-D IMPLANTATION

CRT-D - Units per million inhabitants

Source population data: OECD
Units - Eucomed based on reports from major manufacturers
* Europe represents total of listed countries

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3. CARDIOVASCULAR MEDTECH

3.1 TRENDS AND NEW REALITIES

- Cardiovascular technologies no longer command big premiums

- The lines between different markets (device, drugs, materials) are blurring, while surgical specialists seek to slow the caseload migration to interventionalists.

- In order to be effective, manufacturers, investors, healthcare providers, advisors and others cardiology and vascular markets need to understand the evolving dynamics.
INTEGRATED HEALTH SOLUTIONS™

SOLUTIONS FOR EXCELLENCE IN CARDIAC SERVICES

ARRHYTHMIAS UPDATE 2017
ΜΕ ΔΙΕΘΝΗ ΣΥΜΜΕΤΟΧΗ
7-8 ΑΠΡΙΛΙΟΥ 2017
MEDTRONIC ANNOUNCES FORMATION OF HOSPITAL SOLUTIONS BUSINESS AIMED AT DRIVING EFFICIENCIES AND COST SAVINGS

Medtronic Hospital Solutions signs first contracts with two leading hospitals in Europe and makes equity investment in NGC Medical

MINNEAPOLIS AND TOLOCHENAZ – September 2, 2013 – Medtronic, Inc. (NYSE: MDT) today announced the formation of Medtronic Hospital Solutions, a new business focused on developing novel partnerships with hospitals to provide services directly related to hospital operational efficiency. The new business will focus initially on offering services in Europe to manage and modernize catheterization laboratory (cath lab) facilities, bringing sustainable efficiencies and programs to this critical area of hospital cardiology departments.

Medtronic Hospital Solutions today also announced it was awarded its first tenders with two leading hospitals in Europe. These two long-term tenders have been awarded to Medtronic to manage cath lab facilities for the University Hospital of South Manchester (UHSM) NHS Trust and Imperial College Healthcare NHS Trust in London.
Top 10 technical fields in patent applications.
Number of patent applications filed with EPO, 2014²

- Medical technology: 11,124
- Electrical machinery, apparatus, energy: 10,944
- Digital communication: 10,018
- Computer technology: 9,869
- Transport: 7,533
- Measurement: 7,228
- Organic fine chemistry: 6,132
- Engines, pumps, turbines: 5,318
- Biotechnology: 5,905
- Pharmaceuticals: 5,270
Medical technology offers solutions for many disease areas. On a worldwide perspective, in-vitro diagnostics are the largest sector, followed by cardiology and orthopaedics.
1967
ΑΡΡΥΘΜΙΑΙΣ ΜΕ ΔΙΕΘΝΗ ΣΥΜΜΕΤΟΧΗ
7-8 ΑΠΡΙΛΙΟΥ 2017
ΑΡΡΥΘΜΙΑΣ
UPDATE 2017
ΜΕ ΔΙΕΘΝΗ ΣΥΜΜΕΤΟΧΗ
7-8 ΑΠΡΙΛΙΟΥ 2017
ICD Implantation Rates

3-Yr CAGR = 12%*
*WW ICD unit growth from 2006e to 2009e

Source: Morgan Stanley Estimates
LOOKING TO THE FUTURE
2017-2037

1. CARDIOVASCULAR DRUGS DOMAIN
2. REGENERATIVE CARDIOVASCULAR MEDICINE
3. MINIATURISATION
4. LEADLESS AND BATTERYLESS DEVICES
5. BIG DATA AND ANALYTICS
6. BEDLESS HOSPITALS
7. MULTISENSORING
8. TISSUE ENGINEERING AND REGENERATIVE MEDICINE
9. SUDDEN DEATH ADVANCES SOLUTIONS
10. HIGH QUALITY IMAGING
11. HOLOGRAMS/HOLOGRAPHY (Education, Medical Practice)
LOOKING TO THE FUTURE
2017-2037

CARDIOVASCULAR DRUGS DOMAIN
THE FUTURE OF CARDIOVASCULAR MEDICINE
CARDIOVASCULAR DRUGS DOMAIN

• Proprotein couvertase subtilisin/kexin type 9 (PCSK9) inhibitors
  The use of alirocumab and evolocumab as once every two weeks injections is possible to be expanded more broadly for the secondary CHD management. Their cost will be reduced dramatically.

• Monoclonal antibodies. A number of monoclonal antibodies, at the moment in clinical trials, is expected to be in clinical use during the next decade.
THE FUTURE OF CARDIOVASCULAR MEDICINE
CARDIOVASCULAR DRUGS DOMAIN

• **Antithrombotics:** Our developing understanding of the coagulation system offers promise for the design of safer anticoagulant therapy.

A future challenge will be to understand which pathway is most responsible for particular thrombotic complications.

• **Antithrombotics:** Future understanding of the role of coagulation factors in modulating cellular responses will likely contribute to our selection of the most appropriate antithrombotic agent for particular disease processes.
THE FUTURE OF CARDIOVASCULAR MEDICINE
CARDIOVASCULAR DRUGS DOMAIN

• Antiarrhythmic drugs: Improved understanding of the cellular and molecular basis of cardiac arrhythmias holds the promise of identifying novel therapeutic / pharmaceutical approaches

• These approaches may target traditional and newly discovered cardiac ion channels as well as new molecular and pathways that modulate arrhythmic substrates
LOOKING TO THE FUTURE
2017-2037

MINIATURISATION
LOOKING TO THE FUTURE
2017-2037

REGENERATIVE MEDICINE
THE FUTURE OF CV REGENERATIVE MEDICINE
THE ROLE OF REGENERATIVE BIOLOGY

• Regenerative biology has many definitions but a simple one is the study of how organisms replace lost or damaged tissue with a new tissue.

• We are now entering an era where regenerative biology is turning from science fiction into science.

• This change is based on a broader and more fundamental understanding of cell biology and this new view has laid a formulation for the potential repair of organs.
THE FUTURE OF CV REGENERATIVE MEDICINE
THE ROLE OF REGENERATIVE BIOLOGY

• **PREDICTION 1:** Degenerative medicine will initially struggle to become practical reality

• **PREDICTION 2:** Stem cell biology irrespective of therapy will advance our understanding of diseases

• **PREDICTION 3:** Stem cell therapy will provide an avenue for the application of genome editing
THE FUTURE OF CV REGENERATIVE MEDICINE
THEROLE OF REGENERATIVE BIOLOGY

• PREDICTION 4: Regenerative medicine will promote the convergence of diverse fields

• PREDICTION 5: Therapy with combinations of cells will become necessary

• PREDICTION 6: Cardiovascular diseases that currently seem beyond regenerative medicine will become viable targets
LOOKING TO THE FUTURE
2017-2037

LEADLESS AND BATTERYLESS DEVICES
LOOKING TO THE FUTURE
2017-2037
Organ powered battery
LOOKING TO THE FUTURE
2017-2037

BIG DATA AND ANALYTICS
In even the smallest medical practice, clinicians and office workers generate many types of data every day. Here are the most familiar medical systems which generate clinical data and information:

- **Electronic health records (EHR):** Think of an electronic version of a paper-based system used to document a patient’s condition, treatment and care. To this collection of mostly structured information, add a wide variety of data that describes methods to measure, improve and maintain patient health. Make this collection of structured and unstructured information storable and portable, and you have an EHR system.

- **Patient monitoring systems:** Equipment that monitors heart rates, blood pressure and oxygen rates, measures breathing rates, heart and brain function and many other functions—all use sensors that deliver unstructured data for notification.

- **Laboratory systems.** Everything you can think of that measures the current condition of a patient can be represented with lab procedures. Structured data (such as iron levels in the blood) and unstructured information (lab slides) are produced in the lab and added to the EHR system.

- **Imaging systems:** Imaging devices visualize the condition and sometimes the function of patients’ organs. They produce some of the most data-dense information in medicine. Computed tomography (CT), magnetic resonance imaging (MRI), X-ray and ultrasound machines are just some of the systems that provide unstructured data as images.

- **Wave-form processors.** This type of processing analyzes waves—heartbeats (EKG), brain function (EEGs) and blood volume surging through organs. This data-intensive processing adds more unstructured data to patient records.

- **Operations support systems.** The many operations tasks that make lab tests, EKGs, and physical therapy possible add an enormous burden onto medical information systems.
LOOKING TO THE FUTURE
2017-2037

BEDLESS HOSPITALS
LOOKING TO THE FUTURE
2017-2037

MULTISENSORING
LOOKING TO THE FUTURE
2017-2037

TISSUE ENGINEERING
LOOKING TO THE FUTURE
2017-2037

SUDDEN DEATH ADVANCED SOLUTIONS
LOOKING TO THE FUTURE
2017-2037

HIGH QUALITY IMAGING
LOOKING TO THE FUTURE
2017-2037

HOLOGRAMS / HOLOGRAPHY (EDUCATION, MEDICAL PRACTICE)
Holograms and education
I never worry about the future. It comes soon enough.

- Albert Einstein